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# How does elderly family care evolve over time?

An analysis of the care provided to the elderly by their spouse and children in the Panel Study of Belgian Households 1992-2002

PhD Dissertation of

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*To my parents,*
*Who instilled in me the passion for the social sciences and the willingness to understand the mechanisms of the society*

# SUMMARY

Population ageing has become one of the most burning issues on the agenda of the social policy-makers in the industrialised countries. In 2050, about a quarter of the population of Belgium will be aged 65+ and a tenth 80+. This change in the population structure is associated with an increase in the demand for community care. Therefore, the organisation of a sustainable long-term care system is one of the main challenges to address. So far, the family seems to remain the first, the main and the most stable source of elderly care. But family care has its limitations (it is not available for the family-less elderly and may have detrimental consequences for the care-givers if long-term and/or heavy care is needed). Social policies should be developed in order to support or to substitute family care and to provide sustainable long-term care for the elderly in the community. To do that, the first step is to have a good knowledge of the determinants and the dynamics of the care provided to the elderly by their family.

This dissertation focuses on the care provided by the spouse and the children (the 'family care-givers') in **Belgium**. The approach is **quantitative** and, using the **Life Course** as theoretical framework, the dissertation tries to explore the 'longitudinal' and 'contextual' aspects of the study phenomenon. The main **originality** is to carry out a longitudinal analysis of the elderly family care characteristics in a representative sample of Belgian elderly. The three main **research questions** are addressed: *Who is receiving family care? What are the characteristics of the received family care? How do these characteristics evolve over time?* But before starting the analyses and answering those questions, the context and the methodology should be specified. Therefore the dissertation has been divided into three parts.

The contextual part starts with a discussion of the concept of care and a presentation of the Life Course approach, continues with the review of the literature, then describes the Belgian context and ends with a comparison of the existing surveys dealing with elderly family care in Belgium. The methodological part begins with a presentation of the analysed survey (the Panel Study of Belgian Households-**PSBH 1992-2002**) and the study sample (**the 1,123** respondents of Belgian nationality, who have answered - at least - both to the first and the third wave and are aged 65+ in 1994), afterwards, the preparation of the analysis file is detailed and the used variables are presented. The analysis part includes three chapters (one for each of the research questions).

The family elderly care is a complex phenomenon which is part of an existing relationship. The risk of under-declaration is highlighted from the presentation of the care concept onward and many efforts were done in the data preparation to correct this declaration bias. But it still appears in the analyses results and can, therefore be considered as a main finding because it shows that the current terminology and its related question wording should be revised. In the conclusion, 'close support' is suggested as an alternative to 'family care'. Being more positive and inclusive, it would favour care declaration and allow the development of more comprehensive preventive supportive policy measures.

Another important finding is the presence of regional differences: elderly Flemish were more likely to receive intensive and long-term family care and Brussels inhabitants were the most likely to rely only on care services or to receive no care at all. These differences were explained by the differences in elderly care policy orientations which also reflect strong cultural differences.

Finally, the longitudinal approach highlighted that once the family starts to care, it is often for a long time, and especially when the elderly is very old or if a child cares for a spouseless parent. In both cases, care services are often used in complement. The elderly having a spouse are less likely to use care services and this should be a major concern for social policy-makers: elderly couples are often both frail and, without external support, they would be at high risk of institutionalisation.

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# LEXICAL

The present lexical specifies the meaning of all the used **ACRONYMS** (e.g. **PSBH =** Panel Study of Belgian Households), the **exact terminology** in French and in Dutch for the services which have been translated into English in the text (e.g. **Day-care centre**: *centre de jour/dagverzorgingcentrum*) and the definition of the *wordings having a specific meaning in the dissertation* (e.g. ***Family-member:*** refers to the elderly ***respondent**** who has a spouse and/or children.
The terms are classified according to the alphabetic order (without accounting for the words between brackets).

The symbol '*' indicates that the word is defined elsewhere in the lexical. In some cases, the symbol '><' gives the antonym and the symbol '≠' calls one's attention to the difference with another term.

**-2LL =** -2 Log-Likelihood

**AARP =** American Association of Retired Persons

**ADL =** Activities of Daily Living. They usually include eating, dressing, getting into or out of a bed or chair, taking a bath or shower, and using the toilet.

**ADMR =** *Aide à Domicile en Milieu Rural*

**AFS =** *Association française de sociologie*

**AHEAD =** Aging and Health Dynamics among the Oldest Old

**AIC =** Akaike Information Criterion

**ALE/PWA =** *Agence locale pour l'emploi/Plaatselijk werkgelegenheidsagentschap*. These agencies aim at activating unemployed people by proposing them a work contract as temporary helper to people (sick, disabled or elderly people who need help with odds jobs or sit-in service*) or to an institution (municipality, school, etc). More information on the conditions can be sought at http://www.minfin.fgov.be/portail2/fr/themes/advantages/pwa-ale.htm [accessed on 08/ 11/2010].

***Analysis sample*:** Refers to the sample actually used for the analyses: it may be the whole study sample if the analysis is carried on the 1,123 elderly ***respondents**** or a specific sub-sample. The term of 'at-risk' sample is sometimes used as a synonymous of 'analysis sample' when the focus is on the way the sub-sample is selected according to the analysed care characteristic (e.g. elderly ***respondents**** included in the analysis sample of daughter care are those who are 'at-risk' of receiving daughter care) (≠ ***PSBH baseline sample****, ***study sample****).

***Analysis variable*:** Refers to the variables used for a given analysis (which may have undergone imputation, recoding and other transformations).

**APA/THAB =** *Allocation d'aide aux personnes âgées/Tegemoetkoming voor hulp aan bejaarden* (allowance for assistance to the elderly). Since 1989, it replaces the integration benefit, once the beneficiary reached 65 years. (On the 01/09/10, the maximum amount varies from 925 to 6,210 euros a year).

**ASBL/VZW =** *Association sans but lucratif/Vereniging zonder winstoogmerk* (not-for profit organization).

***Attritor*: *Sample person**** who leaves the panel survey before its end. (>< non-attritor). The 'leave' can be defined by the presence of a former respondent in the household or, more restrictively, the (non) answer to the individual questionnaire.

***Baseline*** (questionnaire, wave): Refers to the first data collection of the survey, the time when the (representative) sample is drawn. For the PSBH, 1992 is the baseline wave. (>< **follow-up***).

***Between-waves imputation*:** Imputation of the value of the **closest wave** (before or after the missing wave) having a valid answer.

**BFP/FPB =** *Bureau fédéral du Plan/ Federaal Planbureau* (Federal Planning Bureau).

**BHPS** = British Households Panel Survey

(home) C***are combination***: Refers to the articulation of ***family care**** and ***care services**** (four different situations) at a given point in time: care services only, family care only, mixed care (care services and family care) and no care. The care combination is one of the aspects that can be used to describe the family care configuration.

(elderly) **C*are:*** Refers to the care provided for **ADL*-IADL*** activities (whatever the care provider).

***Care-givers:*** Refers to the nuclear family members (spouse and/or children) providing ***at home care**** . All the members of the nuclear family are '***potential care-givers*' (PCG)***.

***Care-giver types***: Three types of care-givers are distinguished: the spouse, daughter(s) and/or son(s). The care-giver types 'combination' describes the types of care-givers (e.g. spouse & son(s), 'son(s)) who are caring 'together' at the given wave.

(at home) ***Care providers:*** Include all the people who provide ***at home care**** (***care-services**** and ***care-givers****).

***Care-receiver*:** Refers to the elderly who receives care. It is possible to be both ***care-giver**** and ***care-receiver**** (elderly couple). All the 'elderly' are '***potential care-receivers*'** (PCR).

(home) ***Care services*:** Refers to the ***at home care**** provided by people who are not a member of the nuclear family.

***Carelines* (file): The d**ata file in which the level of analysis is the family ***care-giver**** (spouse or child) at a given wave for a given elderly ***respondent****. For instance, if an elderly has three children and no alive spouse and stays in the panel until the end, he has 33 carelines (11 (waves)*3 (potential family care-giver). This file gives information on the care provided at the most detailed level (the individual care-giver at a given wave). It allows computing aggregated variables at the wave level (e.g. number of care-givers at $wave_n$) or at the care-receiver level (e.g. ever received care from spouse).

**CBGS** = *Centrum voor Bevolkings- en Gezinsstudie* (Population and Family Study Centre)

**CEMFI =** *Centro de Estudios Monetarios y Financieros*

(Belgian) **Census**: Original term in French (*recensement de la population*) in Dutch (*census*). The census of 2001 is named '**General Socio-Economic Survey'**: original term in French (*Enquête socio-économique générale*) and in Dutch (*Algemene socio-economische enquête*).

**CEPESS** = *Centre d'études politiques, économiques et sociales*

**CEV/SVV=** *Conseil supérieur des Finances - Comité d'étude sur le vieillissement/ Hoge Raad van Financiën - Studiecommissie voor de Vergrijzing* (High Council of Finance - Study Committee on Ageing)

***Children care*** and ***parental care:*** Are used interchangeably to refer to the care provided by adult children to their elderly parents (=upward solidarity)**. (≠ Childcare which** refers to downward solidarity: the care provided by (grand) parents to their (grand) children).

**CHS =** Cardiovascular Health Study

**Cleaning helper (service):** Professional working in a public service, who helps the elderly, sick or disabled to do the housework he is not able to do alone. In French: *aide ménagère/service de nettoyage*, in Dutch: *poetsdienst* (≠ ***housemaid****).

**CNAV =** *Caisse nationale d'assurance vieillesse*

**COCOF/FGC =** *Commission communautaire française/Franse Gemeenschapscommissie*

**COCOM/GGC =** *Commission communautaire commune/Gemeenschappelijke Gemeenschaps-commissie*

**COCON/VGC =** *Commission communautaire néerlandophone/Vlaamse Gemeenschapscommissie*

***Combined (analysis) variable*:** Variable built on two or more ***analysis variables**** referring to a same concept (e.g. family composition, health).

***Community care:*** Includes ***home care**** and ***transmural care****.

***Community care orientation*:** refers to the preferences of an individual, a group (e.g. the Flemish), a culture (the care orientations in policies usually reflect cultural values) for the elderly care provided in the community (by the family, but also by other informal or formal care providers). (≠ ***formal care orientation*, family care orientation*).**

**CPAS/OCMW** = *Centres publics d'action sociale/Openbaar Centrum voor Maatschappelijk Welzijn* (translation used in Willemé (2010): Local Public Centres for Social Welfare)

**CREPP** = *Centre de Recherche en Economie Publique et de la Population*

**CRISP** = *Centre de recherche et d'information socio-politiques/ Centrum voor socio-politiek onderzoek en informatie*

**CRIV =** *Centre de Recherche Interdisciplinaire sur le Vieillissement* (CRIV° is used to refer to the survey *« Solidarités sociales et santé des aînés »* - own acronym*)*

**CSB** = *Centrum voor Sociaal Beleid*

***Day-care centre**: Centre de jour/Dagverzorgingcentrum*

**DULBEA =** *Département d'Economie appliquée de l'**ULB****

**EB =** Eurobarometer

**ECHP =** European Households Community Panel

**EFTA** = European Free Trade Association. The EFTA countries are Norway, Iceland, Switzerland and Liechtenstein

**EHEMU =** European Health Expectancy Monitoring Unit

**ELSA** = English Longitudinal Study of Ageing

**ENEPRI =** European Network of Economic Policy Research Institution

**EPESE =** Established Populations for Epidemiologic Studies of the Elderly [Duke database of the-]

**ESS** = European Social Survey

**EUROFAMCARE =** Is the short name for an international research project, **"**Services for Supporting Family Carers of Elderly People in Europe", funded by the European Community.

***'Ever' variable*:** variable which tells whether or not a given event (e.g. receiving family care) has 'ever' happened or not during a period of time regardless of the timing and the duration of the event.

***Family care*:** Refers to the ***home care**** provided by the nuclear family.

***Family care orientation*:** Refers to preferences of an individual, a group (e.g. religious people), a culture (the care orientations in policies usually reflect cultural values) for the elderly care provided in the community by the family members only. People of this orientation usually justify it by the importance of the family solidarity values (≠ ***formal care orientation*, community care orientation*).**

***Family constellation:*** Describes the nuclear family composition (spouse, daughter(s) and/or son(s)).

***Family helper*:** Professional working in a public service, who helps the elderly, sick or disabled to do the activities of the daily life (shopping, preparing meals, etc.). They are not in charge of the housework (assumed by a ***cleaning helper**** or a ***private clean lady**), nor for the "medical washing-up" (assumed by the nurse at home). In French: *aide familiale*, in Dutch: *gezinshelpster* (≠ family ***care-givers**).

***Family-less (elderly):*** refers to elderly ***respondent**** having neither a spouse nor children (>< ***Family-member**).

***Family-member (elderly):*** refers to elderly ***respondent**** having a spouse and/or children (>< ***Family-less**).

**FAMSUP (project) =** Family Support for Older People (project)

**FELICIE (project)** = Future Elderly Living Conditions In Europe (project)

**FFS =** Family and Fertility Survey

***FL = Family-less****

***FM = Family-member****

***Follow-up*** (wave): In a longitudinal study, waves organised after the ***baseline**** wave and concerning (at least part of) the respondents of the baseline wave.

***Follow-up statuses***: Refers to a combined variable build on the value of a time-varying variable at $wave_{n-1}$ and $wave_n$. If the statuses of the two waves differ, a transition is recorded at $wave_n$; otherwise, there is a 'continuity'.

***Formal care*:** Refers to the ***at home care**** provided by people who did not have a family relationship with the elderly before providing care and for whom the relationship is justified by the need of care and usually restricted to it (volunteers, professionals). (>< ***informal care***)

***Formal care orientation*:** Refers to the preferences of an individual, a group (e.g. higher educated people), a culture (the care orientations in policies usually reflect cultural values) for the elderly care provided by professionals in the community or in an institution. People of this orientation usually justify it by the willingness to not depend on their family (≠ ***community care orientation*, family care orientation*).**

**FRB/KBS =** *Fondation Roi Baudouin/Koning Boudewijnstichting* (King Baudouin Foundation). Also used to refer to the FRB/KBS survey on informal ***care providers**** ("*Écouter les aidants proches pour mieux les soutenir").* In this case the acronym is followed by a '°'.

***FSW* =** First study wave (Wave 1994 or wave 3 in the dissertation).

**GALCA =** Gender Analysis and Long Term Care

**GGPS** = Gender and Generation Panel Study

**GHS =** General Household Survey

**GLMM =** Generalised linear mixed model

**GRAPA/IGO =** *Garantie de revenus aux personnes âgées/ Gewaarborgd inkomen voor ouderen*

**GSA =** German Ageing Survey

**GSOEP** = German Socio-Economic Panel (SOEP, for *Sozio-oekonomisches Panel*)

**GSS =** General Social Survey

**HIG =** *Hoger Instituut voor Gezinswetenschappen*

**HIS** = Health Interview Survey. Original term in French (*Enquête santé par interview)* and in Dutch (*Gezondheidsenquête in België door Interview*)

***Home care*:** Refers to the care with **ADL*** and/or **IADL*** provided at the elderly' home.

**Home care services coordination** : *Centre de (coordination) de services de soins à domicile/ Samenwerkinginitiatieven Thuiszorg (SITs).* Since 2010, the SITs were replaced by SELs *Samenwerkingsinitiatieven Eerstelijnszorg* in Flanders.

***Housemaid*:** Is used in the dissertation to refer to any ***at home care services**** related to housework (provided by a private cleaning lady, a ***cleaning helper****, services cheques*, people under an ***ALE/PWA****, etc.).

**HIVA =** *Hoger instituut voor de arbeid* (research centre of the **KUL***)

**HRS** = Health and Retirement Study

**IADL** = Instrumental Activities of the Daily Living. They usually include preparing meals, managing money, shopping, doing housework, and using a telephone.

**ICS =** Informal Caregiver's Survey

**ICP =** Informal care provider

**IMMAQ =** *Institut de recherche multidisciplinaire pour la modélisation et l'analyse quantitative* **(UCL*)**

**INAMI/RIZIV** = *Institut National d'Assurance Maladie Invalidité/Rijksinstituut voor Ziekte- en Invaliditeitsverzekering* (National Institute of Sickness and Invalidity Insurance)

**INED =** *Institut National d'Études Démographiques*

***Informal care*:** Refers to ***home care**** with **ADL*** and/or **IADL*** provided by people who have a relationship with the elderly before the onset of the caring relationship and which (partially) justify their decision to care (family, friends, neighbours, etc.) (>< ***formal care****).

**INRA =** International Research Associates Ltd

**INS/NIS =** *Institut national de Statistique/ Nationaal Instituut voor de Statistiek* (National Institute of Statistics). In 1999, this institute became the *Direction générale Statistique et Information économique/ Algemene directie Statistiek en Economische informatie* (Directorate-general Statistics and Economic information), a sub-section of the *SPF Économie, P.M.E., classes moyennes et énergie/FOD Economie, K.M.O., Middenstand en Energie* (FPS Economy, S.M.E.s, Self-employed and Energy). For clarity and briefness purpose: *INS/NIS* is used in the text and references.

**INSEE** = *Institut national de la statistique et des études économiques*

**INSERM** = *Institut national de la santé et de la recherche médicale*

**INSIDE =** Integrative Research Unit: Social and Individual Development (University of Luxembourg)

***Institutional care:*** Refers to the care provided for ***ADL**** and/or ***IADL**** in institution (rest home, nursing home, hospital, etc.). In the literature, the term of 'residential care' is often used as a synonym.

***Integration benefit:*** *Allocation d'intégration/Integratietegemoetkomingen*. It is granted to handicapped persons who, because of the reduction of their autonomy, have additional expenses. The granting of the benefit (a federal matter) is subjected to conditions of handicap or dependency and the amount (on the 1/09/10, it varies from 1,082 to 9,741 euros per year) is calculated according to the composition and incomes of the household.

**ISP/WIV =** *Institut Scientifique de Santé Publique/Wetenschappelijk Instituut Volksgezondheid* (Scientific Institute of Public Health)

**ISSP =** *International Social Survey Programme*

**IUGM =** *Institut universitaire de gériatrie de Montréal*

**IUSSP =** International Union for the Scientific Study of Population

**IWEPS =** *Institut wallon de l'évaluation de la prospective et de la statistique*

**IZA =** *Forschungsinstitut zur Zukunft der Arbeit*

**KCE =** *Centre fédéral d'expertise des soins de santé/ Federaal Kenniscentrum voor de Gezondheidszorg* (Belgian Health Care Knowledge Centre)

**KUL =** *Katholieke Universiteit Leuven*

**LEDA =** Life Event Data Analysis (research unit of the ULg*)

**Ladies' companion**: people, usually women, who spends time with the elderly for discussion, reading or simply being present.

**LASA =** Longitudinal Aging Study Amsterdam

***Last study wave*:** Last ***study wave**** before the attrition. Note that this wave can differ from one individual to another. For the non-attritors, it is necessarily wave 11. For the ***attritors****, it can correspond to the first study wave (if they have left the panel before wave 4) or any other wave, except wave 11.

***Late entry***: People entering the risk group during the panel could have been accepted. Here, it would mean to accept people reaching 65 during the panel and considering only the waves when they were 65+ (e.g. a ***respondent**** born in 1931 reaches 65 in 1996, he could have been included in the ***study sample**** since wave 5).

**LFS =** Labour Force Survey

**LIPRO =** LIfestyle PROjections. It is a household typology including seven household types: single living alone, single-parent family, married couple without children, married couple with children, unmarried couple without children, unmarried couple with children, other types.

**LOVO =** *Leefsituatie Onderzoek bij Vlaamse Ouderen.*

**LSA =** Longitudinal Study of Aging

***LSW* =** Last study wave

**LTZ =** *Landelijke Thuiszorg*

**MCA =** Multiple correspondence analysis

**MEA** = Mannheim Research Institute for the Economics of Aging

**MR/ROB** = *Maisons de repos/Rustoorden voor bejaarden* (rest home).

**MRS/RVT** = *Maisons de repos et soins/Rust- en verzorgingstehuizen* (nursing home). Unlike the MR/ROB, the access is needs-tested.

**Meals-on-wheels**: *Service de repas chauds à domicile/ Dienst maaltijdbedeling*

**MULTILINKS:** Is the short-name for the European project "How demographic changes shape intergenerational solidarity, well-being, and social integration: a multilinks framework". MULTILINKS develops a dataset containing information on policies in new Member States related to support for families and elderly care. The project also designs new indicators of intergenerational care regimes.

***Mutualité/Mutualiteit****:* In Belgium, each citizen is member of a sick fund named *mutualité (*or *mutuelle*) in French and *mutualiteit* in Dutch.

**MVE =** *Mantelzorg in Vlaanderen* (*Enquete)*

**na =** Not available

**ns =** Not significant

**NHIS =** National Health Interview Survey

**NIDI =** Netherlands Interdisciplinary Demographic Institute

**NKPS =** The Netherlands Kinship Panel Study

**NLTCS =** National Long-Term Care Survey

**NSA =** National Surveys of the Aged

**NSFH =** National Survey of Families and Households

***Nuclear family*:** Includes spouse and/or the children

**Nurse at home services (or nursing care services)**: *Infirmière à domicile/ Thuisverpleegster*

**Odd-jobs service:** *Service de petits travaux/Klusjesdienst*

**OCDE/OECD =** *Organisation de Coopération et de Développement Économiques/*Organisation for Economic Co-operation and Development

**OLS =** Ordinary least square

**ONEM/NDAW =** *Office national de l'emploi/Nationale Dienst voor Arbeidsbemiddeling en Werkloosheid.*

**OR =** Odds ratios

**OSSB/OGWB =** *Observatoire de la Santé et du Social Bruxelles-Capitale/Observatorium voor Gezondheid en Welzijn Brussel-Hoofdstad*

**PAQUID** = Personnes Agées QUID

***Participant:*** Refers to all the members (whether ***respondent**** or non-respondent) of a 'participating' household (in which at least one member answered the adult questionnaire).

***PCG*** = Potential ***care-giver****. By extension, '**CG'** refers also to an effective care-giver or more generally to a care-giver.

***PCR*** = Potential ***care-receiver*****. By extension, '**CR'** refers to an effective care-receiver or more generally to a care-receiver.

***Permanent attrition***: When the ***respondent**** does not answer the questionnaire at any of the following waves. (≠ ***temporary attrition****). Note that the attrition is based on responses to the adult questionnaire and not on to the presence in the household.

***Person-study-waves:*** Means that multiple observations (***study waves****) can refer to the same elderly ***respondent**** (person). For a given analysis, an elderly contributes to a number of person-study-waves equals to the number of study waves he is 'at-risk' of the event. (in chapter X, the term of '***person-transitional-waves***' is used because the dependent variable describes a transition).

**Personal alarm**: *Télé-alarme/Personenalarmering*

**PMS/CLB** = *Service de concertation psycho-médico-sociale/Centrum voor Leerlingenbegeleiding*

***Proxy*** (respondent): When a ***participant**** is not able to answer the questionnaire (e.g. because of a cognitive disease), it is sometimes possible to ask another person (the proxy) to answer the questions concerning the situation of the ***participant***.

**Proxy variable**: Refers to a variable used to substitute or to complement another variable representing the same concept (e.g. 'ability to make the two ends meet' is often used as a proxy of income to measure the economic status of the ***respondent**** or household).

**PSBH** = Panel Study of Belgian Households. In French (*Panel démographie familiale*), in Dutch (*Panel Studie van Belgische Huishoudens*).

***PSBH waves*****:** Refers to all the 11 waves. (≠ ***study waves****).

**PSF/FW**= *Politique Scientifique Fédérale/Federaal Wetenschapsbeleid* (Belgian Federal Science Policy Office)

**QNFE** = Questions in Netherlands, French and English

**rc** = Reference category

***Registered head of household*****:** Refers to the person who is officially 'registered' as the head of the household in the National register (≠ ***self-defined head of household****).

**Respite centre:** *Centre de répit/Centrum voor respijtzorg*

***Respondent:*** Refers to people who actually answered the adult questionnaire at a given wave (≠ ***participant****).

**RS =** Retirement and Retirement Plans Survey

***Sample-person*** (sometimes also 'panel person')**:** Refers to ***respondents**** who, according to the follow-up rules of the panel study, should be followed over waves. They are often respondents who were sampled and who participate to the ***baseline**** interview. But, it may be decided that other respondents, joining the panel at a later wave, are also 'panel persons' and should be followed over waves. Non-panel persons are, for instance in the ***PSBH****, people who enter in the household after 1994 (e.g. new partner) but leave the household before 2002. In such cases, the ***respondent**** is interviewed only when he lives in the panel household.

**SCV =** *Sociaal-culturele verschuivingen in Vlaanderen*

***Self-defined head of household*****:** refers to the ***respondent**** of the ***PSBH**** who is identified by the other members of the household or by himself as the most able to answer the household questionnaire. (Casman & Lenoir 2004: 28) (≠ ***registered head of household****).

**SEP** = Socio-Economic Panel

***Sequentially (care) sharing*:** Refers to the fact that ***care-givers**** share the care responsibility over time: one of them assumes the care load (using or not ***care services****) and then he stops caring and the other replaces him. (≠ ***Simultaneous (care) sharing****).

**Service-cheques (for housework help):** *Titres services (pour aide ménagère)/Dienstcheques (voor huishoudelijke hulp):* every particular can buy 'housework help service-cheques' and exchange them in a 'services-cheque' office against a defined amount of help with housework. The service can be delivered at home (washing-up, ironing, etc.) or outside the house (help with shopping, ironing center, etc.). Unlike the housework assistance, the use of services-cheque is not needs conditioned. Actually, this 'services' was set-up to create employment and to reduce the use of 'in-black' paid housemaids. More information can be found at http://www.minfin.fgov.be/portail2/fr/themes/advantages/cheques.htm [accessed on 08/11/ 2010].

**Service providing assistance to families and elderly people** (including ***cleaning service****): *Service d'aide aux familles et aux personnes âgées (incluant l'aide menagère)/Dienst gezins en bejaardenhulp (inclusief poetsdienst*)

**SESA =** Socio-Economie de la Santé (research centre of the **UCL***)

**SHARE =** Survey of Health, Ageing and Retirement in Europe

**Short-stay centre:** *Centre de court séjour/Centrum voor kortverblijf*

**SILC** = Survey on Income and Living Conditions

***Simultaneous (care) sharing*:** Refers to the fact that ***care-givers**** share the care responsibility at a giving time: they ensure together the care load (using or not ***care services****). (≠ ***Sequential (care) sharing****).

**SIPP =** Survey of Income and Program Participation

**Sit-in service:** *Service de garde malade, service de surveillance/Dienst voor oppashulp*

**Social services** (**CPAS/OCMW***, local authority, health insurance fund, etc.): *services sociaux (CPAS, commune, mutualité)/Sociale dienst (OCMW, gemeente, mutualiteit)*

**Speech therapist:** *Logopède/Logopedist*

**SPELL =** *Panel Socio-Economique Liewen zu Lëtzebuerg*

**SPF/FOD =** *Service Public Fédéral/Federale Overheidsdienst* (Federal Public Service-FPS)

***Spousal care***: Refers to the care provided to a spouse/partner.

**SoA =** Supplement on Aging (survey)

**SSTC/DWTC =** *Services fédéraux des affaires scientifiques, techniques et culturelles/Federale Diensten voor Wetenschappelijke, Technische en Culturele aangelegenheden*

***Study sample*:** Refers to the 1,123 ***respondents**** aged 65+ in 1994, having a Belgian nationality and having answered an adult questionnaire at least at wave 1 and 3 (≠ ***PSBH baseline sample****, ***Analysis sample****).

***Study waves***: Refers to the 9 standardized waves (3-11). The first study wave is wave 3 for the all study sample. The ***last study wave**** can differ from one individual to another. (≠ ***PSBH waves***)

**SWVG =** *Steunpunt Welzijn, Volksgezondheid en Gezin*

**TEF =** *Centre de Sociologie du travail, de l'emploi et de la formation* (**ULB***)

***Temporary attrition:*** When the sample person agrees to answer the adult questionnaire again after one or more waves of non-response (≠ ***permanent attrition****). Multiple 'temporary

attrition' spells can be observed for a given person. When the spell lasts only one year, it will be considered as a 'short-term attrition'; otherwise, it will be considered as a 'long-term attrition'. Note that the attrition is based on the response to the adult questionnaire and not on the presence in the household.

**TI** = time-invarying (variable)

**TILDA** = The Irish Longitudinal Study on Ageing

***Transition(al) analysis*:** Analyses of changes/stability between two (consecutive) waves of a panel survey.

***Transitional waves:*** Refers to the waves 4 to 11 of the PSBH where transitions between ***study waves**** can be recorded.

***Transmural care***: Refers to the care provided by professional or volunteers out of the elderly home but still in the community (e.g. in a day care service, in a social or senior restaurant, etc.).

**TV =** Time-varying (variable)

**UA =** *Universiteit Antwerpen.* Since 2003, the three university institutions of Antwerp *(*the *Universitaire Instelling Antwerpen-UIA,* the *Universitaire Faculteiten Sint-Ignatius Antwerpen-UFSIA* and the *Rijksuniversitair Centrum Antwerpen-RUCA*) are regrouped under the name '*Universiteit Antwerpen*'. For clarity and briefness purpose: *UA* is used in the text and references.

**UCL =** *Université catholique de Louvain*

**UCP =** *UCP, mouvement social des ainés asbl* **(**formerly: *Union Chrétienne des Pensionnés)*

**UGent =** *Universiteit Gent*

**ULB =** *Université Libre de Bruxelles*

**ULg =** *Université de Liège*

**UMH =** *Université Mons-Hainaut*

**UN =** United Nations

**UNECE =** United Nations Economic Commission for Europe

**VUA =** *Vrije Universiteit Amsterdam*

**VUB =** *Vrije Universiteit Brussel*

***(study) Waves of presence*:** Is used to refer to all the (study) waves of a given elderly after imputation of ***temporary attrition****.

**WFS =** Work and Family Survey

**ZV =** *Zorgverzekering*

**ZVE** = *Zorg in Vlaanderen (Enquete)*

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# *Foreword*

*Dear readers,*
*Before you start reading my dissertation, I would like to clarify the methodological and semantic options taken. They refer to values and communication purposes.*

*First, the decision to study elderly family care is not based on a normative point of view**.** It is **based on facts** and on the **willingness to provide useful information for the social policy makers**. The purpose is not to prove that it is the duty of the family to care for his elderly relatives. The purpose is to observe the reality – the nuclear family remains the first, the main and the most stable elderly care provider – and to understand it – what are the specific characteristics of the care provided by the spouse and the adult children? – in order to identify how social researchers and policy makers should orientate their action to favour tenable elderly community care. Some people will argue that family solidarities belong to the private sphere and that studying their determinants, opportunity costs or consequences lead to consider it as a 'policy' objet. They will claim that it entails the risk of a commodification of family solidarities or of promoting the traditional role of women as family care provider. I am personally convinced that trying to understand what does happen in the private sphere, the dynamic of the care relationship - and its limitations - may be helpful for the individuals involved in this type of relationship and for the whole society. A better identification of the phenomenon would allow the development of preventive policies to support family care-givers and avoid burnout and social isolation, but also to substitute them when they are not available at all. It will benefit to the care-giver(s) (who will feel recognised and supported), to the elderly (who will receive personalised and quality long-term care) and to the society (which will find a way towards a tenable elderly care policy).*

*Second, I wished to make a dissertation **providing useful material and information** for researchers who would like to investigate further the topic of elderly care in Belgium. This is why you will find numerous footnotes, long extracts of questionnaires and technical frames in the text. All the terms referring to institutions, services or norms which are typically Belgian are written in their original language (French and/or Dutch) to give the right entry term for the reader wishing to look for more information. Furthermore, the detailed figures used for the graphs were put in appendices whenever possible, and a note on the systematic literature review steps can also be found in the annex.*

*Third, I also wanted to make my dissertation **as understandable and as clear possible**. It led to define all the topic's specific or technical terms used in a lexical, to justify and nuance my methodological choices. I always tried to favour simple statistical methods and my choices are based on a mix of the acquired knowledge of the phenomenon, on the logic and on the most likely to be observed in the reality rather than sophisticated statistical methods and computer-based choices[1]. This willingness to be 'understandable' also led me to some semantic simplifications. Three of them need to be mentioned because I do not want to offence some feminists, gerontologists or qualitative researchers. The first is the use of the term '**elderly'** to refer to the study population aged 65+. Some gerontological journals prefer the term 'older adults' as it is considering as more 'politically correct' than the use of 'elderly'. However, I decided to use the term 'elderly' because it is shorter and, still widely used without further discussion in economic or family related journals. I also want to specify that the term 'elderly' standing alone is used in this dissertation to refer to the elderly potential care-receivers. Of course, some potential care-givers can also be considered as 'elderly' because of their*

[1] *All the data handling and analyses were carried out using SAS 9.2©.*

*old age (especially the spouse of the elderly care-receiver), this is why all the spouses will be referred as 'elderly spouse' (whatever their age or gender). Similarly, adult children will be referred as 'elderly children'. The term 'spouse' will be used to refer to the person living in couple with the elderly whatever they are married or not.*
*The second simplification is the use of the* ***masculine form*** *with 'elderly', 'respondent' and other substantives referring to both genders. The third simplification is the use of the term* ***'care decisions'*** *and* ***'care determinants'*** *in a quite restrictive way. The dissertation approaches elderly family care from a quantitative point of view focussing on the effect of some 'objective' determinants. The reality is more complex: family care is a relational activity with strong emotional component. How the people get involved and live this experience is very much influenced by cultural and personal aspects. A quantitative analysis based on closed survey questions does not offer the opportunity to analyse the whole complexity of the family care experience. So, when reading 'care determinants', the reader should translate 'main objective care determinants'. The same is true for the 'care decision': can we really speak about a 'decision' taken at a given moment by the potential care-giver or the potential care-receiver? We all know that a family care relationship often starts progressively, people getting more and more involved without knowing how the situation will evolve; the fact that the parental care is shared by siblings or concentrated on one unique child is not necessary the result of the choice or the decision of the elderly parent or of the children. So, the use of 'care decision' to refer to the involvement of a type of care-giver in the elderly care relationship is a question of simplification and does not suggest that care involvement is the result of a rational or free-of-constraints choice.*

*I wish you will enjoy the reading and I am looking forward to your comments*

*Sincerely,*

*Amandine Jasmine Masuy*

# GENERAL INTRODUCTION

## STUDYING THE ELDERLY FAMILY CARE EVOLUTION IN BELGIUM: WHY? (context) WHAT? (focus) HOW? (chapters structure)

Why to study 'elderly family care'? Some people will say "of course, the family is the first elderly care provider, it proceeds from a 'natural' family solidarity and there is no point to study that". But some others will say that they do not want to be a 'burden' for their family when they are getting old and that they would prefer to spend their later life in an institution or to find an alternative housing solution. Still others will say that they want to remain at home as long as possible by combining family and other care services if necessary. Finally, there are also those who would like to rely on family care but who live far from their family or do not have a family at all. These various views show that the presence, the characteristics and the evolution of elderly family care is not as 'obvious' and will depend on various factors (characteristics of the elderly, of his family members and of the availability of other care sources).

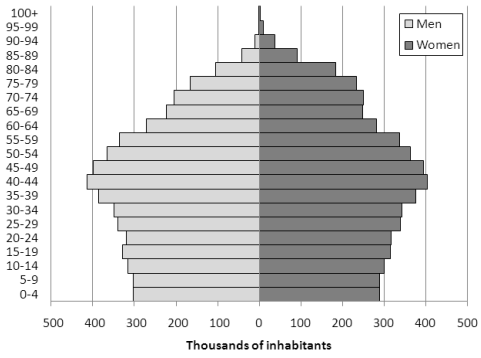
The purpose of this general introduction is (1) to explain **why** studying the determinants and the evolution of elderly family care is relevant in the current socio-demographic context of Belgium; (2) **What** is the specific focus of the dissertation and the used care terminology; (3) **How** the dissertation is structured.

## *Why to study the determinants and the evolution of elderly family care?*

In the last few decades, **population ageing** has emerged as one of the major challenges of the XXI[st] century in industrialised countries[1] and questioned the sustainability of the European Welfare States Regimes: How to insure sufficient pension schemes and high quality health care services when the proportion of working population decreases and the proportion of elderly (potentially dependent) population is on the increase? How to meet the specific needs and the expectations of the elderly without neglecting those of the younger population and considering the budget constraints? This dissertation will focus on one expectation - **most of the elderly would like to remain at home as long as possible** – and one related need – **the possibility to receive long-term and appropriate care at home**.

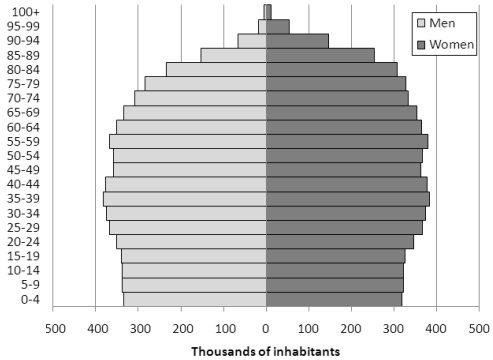
In 2007, the 65+ represented 17.1% of the population of Belgium (1.8 million). According to the projections of the Federal Plan Bureau (BFP/FPB & INS/NIS[2] 2008) they will represent over a quarter of the population in 2050, (25.7%, or 3.2 million persons). The number and share of persons aged 80+ is also increasing: in 2007, they accounted for 4.6% of the population and in 2050, they will represent a tenth of the population (10.1%) (graphs intro-1 and intro-2).

**GRAPH INTRO-1:**
Belgium: 2007 age pyramid




*Source:* BFP/FPB & INS/NIS (2008), (figures in appendix table III-1).

**GRAPH INTRO-2:**
Belgium: 2050 age pyramid (projections)




*Source:* BFP/FPB & INS/NIS (2008), (figures in appendix table III-1).

[1] In the recent years, the growing interest for the topic has clearly appeared. There has been a multiplication of international forums, reports and expert committees set up to discuss the consequences of population ageing and to formulate policy recommendations. The first 'World Assembly on Ageing' was organised by the United Nations (UN) in 1982 in Vienna (UN 1982, 1983). Twenty years later, the second World Assembly took place in Madrid (UN 2002) in order to assess the progresses made since 1982 and to adopt a new 'International Plan of Action on Ageing'. Since the 1990s, the *Organisation de Coopération et de Développement Économique/*Organisation of Economic Development and Coopération (OCDE/OECD) has published many reports and studies on the elderly long-term care question (Hennessy 1995, 1996; Jacobzone *et al.* 1998; Jacobzone 1999, 2000; Jenson & Jacobzone 2000; OCDE/OECD 1994, 1996, 1997, 1998, 2005). Since 2006, a European Demography Forum is organised every two years by the Employment, Social affairs and inclusion directorate of the European commission (Commission of the European Communities 2006, 2007, 2008). And this is without considering the numerous studies done by economic institutions to estimate the costs of population ageing, by demographers to forecast the evolution of the phenomenon and the burgeoning international movements and associations created to tackle ageing related problems such as dementia, elderly abuse, etc. Interestingly, the development of 'proximity services', 'supports for family care-givers' and 'flexible solidarities mechanisms' (issues very much related to the elderly care) start to be addressed at the international and national levels as required measures for insuring a sustainable development (see *Plan Fédéral de développement durable/Federaal Plan inzake Duurzame Ontwikkeling* 2004-2008). It shows how elderly care is becoming a global social issue.

[2] *Institut National de Statistique/Nationaal Instituut voor de Statistiek.*

Even if the elderly remain in relatively good health longer, there comes a time when incapacities and limitations appear: if disability-free life expectancy is increasing, it remains lower than the total life expectancy. The 2005 life expectancy of a 65 year old Belgian woman was of 20.2 years, but of only 9.5 years without incapacities (respectively 16.6 and 9.1 years for men)(EHEMU[3] 2008).

The majority of those years are lived at home. In 2005, only 5.1% of the 60 + lived in institution, but this proportion increases with advancement in age: 25.6% of the 85-89 group, 44.4% of the 90-94 year old group and 66.6% of the 95 + (IWEPS[4] 2008). The institutionalisation rate varies according to the regions: it is the highest in Brussels (where the proportion of isolated elderly persons is the highest: 49.4% of the 65+ live alone and it increases up to 66.1% for the 80+ in 2003 (Lodewijckx 2004)) and the lowest in the Flemish Region (where the institutional care policy targets the most dependent elderly (Pacolet *et al.* 1998)).

The question is: ***who is and will provide care to the elderly who want to remain at home even when they are getting moderately disabled?***

Traditionally, the family (and especially the women) was responsible for the elderly care. As the elderly family care modalities are ruled by social, cultural and generational norms, then one can wonder how this kind of solidarity will survive the individualisation of the society. To this, a twofold answer is given by the sociological studies on intergenerational solidarities**: family solidarities and concern are still very strong today, but their modalities have changed** (e.g. Pitrou 1977; Finch & Mason 1993; Spillman & Pezzin 2000; Daatland & Herlofson 2003).

Three major areas of changes can be identified:

- The first concerns the **communication means** and the available care resources: the new information and communication technologies make long-distance contacts easier and the development of community care services allow the children to provide financial support (buying the services) if they cannot provide themselves the needed care.
- The second deals with the effect of **individualisation** on the adult-child relationships. This change will probably be more visible when the baby-boomers will become the care-receivers: this generation was the first to benefit from the contraceptive revolution. It implies that they, usually, wanted the children they had and developed a closer and more emotional relationship with their children than the one they had with their own parents. As soon as relationships are not only based on obligations but also on affection, a parent/child may feel closer to one child/parent than with the other(s). And this 'affinity' aspect of a relationship (de Singly 1993) will influence the care interactions. The social norms of 'autonomy' and 'self-development' also affect the care interactions: some parents may not want to 'depend on' their children and may prefer to receive formal care. Another phenomenon, already observed in 1965 by Rosenmayr & Kockeis, is the 'intimacy at a distance': when parents and children see or contact each other daily, as if they lived together, but would never want to cohabit. These norms contribute to the feeling of ambivalence adult children may face when they try to balance their willing of caring for a beloved parent and their willing of preserving their own autonomy and the one of their parents too (Connidis & McMullin 2002; Bengtson *et al.* 2002).
- The third change is the '**destandardisation**' of the family structure. Formerly, most families were made of a married couple having numerous children, siblings and some elderly relatives to care for during a relatively short time. Today, family structures tend to diversify. While the average number of children is decreasing, the number of co-existing generations is on the

[3] European Health Expectancy Monitoring Unit.
[4] *Institut Wallon de l'Évaluation de la Prospective et de la Statistique.*

increase (the phenomenon is known as the 'verticalisation' of the family structure); marriage is less frequent and less stable; women of working age stay in the labour market; life expectancy is still increasing even at very old ages. These changes in family structure and occupation schemes result in a decreasing number of potential family care-givers and in the onset of new caring situations like the 'sandwich generation'[5] - or others where the elderly couples are living on their own, but where the spouse who is caring also needs to be cared for (Gaymu *et al.* 2008). It also raises the issue of how to organise long-term community care for the isolated elderly: childless, migrants, divorced parent having lost contact with their children, etc.

Despite these society evolutions and the development of formal care services, almost all the studies on elderly community care converge: **the nuclear family (spouse and children) remains the first, the main and the most stable source of elderly care.** Professionals can be asked to complement family care but rarely to replace it. Friends and neighbours may also help, but not as much, nor as long as family members do.

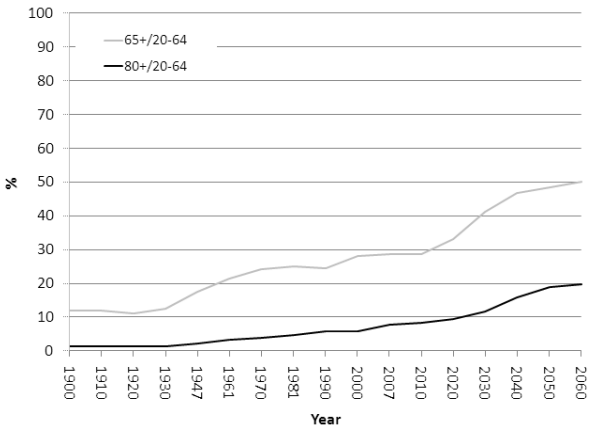
These findings may lead some policy makers to think that everything is 'well and good' like it is. Keeping the elderly in the community and letting the family caring for them seems to be the cheapest care solution for a State having to face an increasing health care demand. However, it is not as simple. First of all, the family is not 'free of charges'. Numerous researches studied the consequences of providing care on the physical and psychological health, on the work and the family situation of the care-giver. Some other tried to evaluate the individual financial cost of providing informal care. Secondly, if the family solidarities stay strong in the today's society, it does not mean that family is and will always be available, able and willing to endorse alone the (long-term) elderly care responsibility.

Therefore, **the presence of potential family care-givers, their characteristics and the difficulties they meet when providing long-term care should be a starting point for the development of a future elderly care policy**. It is also necessary to have **information on the evolution of the needs and the care provided over time** because the 'long-term' aspect of elderly care is the most challenging: providing acute short-term care is rarely a problem (the family, friends, or neighbours can be mobilised and short stays in hospital may even be considered). Identifying the adequate supports (care services, information, allowances, etc.) which may help the elderly and his potential or effective family care-givers to keep a sane and feasible care relationship in the long-term is much more difficult.

Up to now, most of the data on the evolution of elderly care needs and on the evolution of the number or ratio of potential informal care providers are macro measures. Several indicators have been computed to estimate the evolution in the number of elderly (to care for) per potential care provider in a given population over time. The most known is the 'elderly dependency ratio', based on the population age structure. It divides the number of elderly (65+ or 80+) by the number of potential care providers (usually the population of active age: 20-64). It has the advantage to be simple, to allow making projections and to show clear trends. Graph intro-3 displays the evolution of the elderly dependency ratio in Belgium and shows that in 1900, there were 12 elderly aged 65+ and 1 aged 80+ per 100 potential care providers (20-64). These ratios increase very much over the XX$^{th}$ century. According to the projections, in 2060, there will be about 50 elderly aged 65+ and 20 aged 80+ per 100 people aged 20-64. The elderly care load will clearly become heavier at the society level.

[5] This expression was coined by Miller (1981) to refer to the situation of the age group 45-65 who may have to care at the same time for their very old parents (still alive) and their grandchildren.

**GRAPH INTRO-3:** Evolution of the elderly dependency ratio (65+/20-64; 80+/20-64), Belgium (1900-2060)




*Sources*: 1900-1981: INS/NIS 1985; 1990-2007: INS/NIS 2011; 2010-2060: BFP/FPB & INS/NIS 2008. *Note:* figures from 2010 to 2050 are based on projections, (figures are in appendix table III-19).

However, this is only a gross measure which does not account for the needs level of the elderly (not all the 65+ need care!), the definition of the potential care provider is also very large (people aged 20 are very unlikely to have an elderly parent to care for). A more sophisticated indicator was computed by Bontout *et al.* (2002) on French data: it compares the evolution in dependent elderly number and in women aged 50-79 (the most likely to be care providers). Estimations of the evolution of the number of dependent elderly also exist for Belgium (Breda & Geerts 2001; Abramowska *et al.* 2005). Recently, the *Future elderly living conditions in Europe* (FELICIE) project (Gaymu *et al.* 2008) made projections on the living arrangements and potential support that would be available for the baby-boomers generation in several European countries, including Belgium. But still, these measures do not tell anything about what is happening at the micro level, between the elderly and his potential family care-givers, about what does make care effective and makes it change or remain stable over time.

To know what are the determinants and the limitations of elderly family care over time, it is necessary to work on **longitudinal individual data**. Although a large number of studies investigate family care, the available literature does not provide a clear idea of the dynamics of elderly family care in Belgium for three main reasons:

First, most of the studies focus on one specific care aspect (e.g. caring decisions among children, intensity of the care provided by working women, etc.) and/or on a particular sub-group of elderly (e.g. demented, in palliative care, depressed). This prevents from having a clear picture of who is receiving family care in the general elderly population and how the family care situation looks like in its all.

Second, most of the studies are **cross-sectional.** They give a snapshot of the care situation at a given time but are not able to tell how it will evolve over time.

Third, the few longitudinal studies on family elderly care determinants were carried out in the US population or, more recently on British or Netherlands samples. Although, the Western countries share some similar cultural and societal characteristics, each country has its own specificities. In Belgium, the regional differences in the elderly care policies reflecting cultural differences were recently developed. The region variable is therefore likely to influence the family elderly care determinants and their evolution.

The purpose and the main contribution of this dissertation research **will be to study the evolution of family care in a representative sample of Belgian elderly living in the community.**

## *What is the focus of the dissertation research?*

The definition of elderly family care varies from one study to another, according to the age group or cohorts of the studied elderly, the decision to analyse a general elderly sample or a specific sub-population, the chosen unit of observation, the studied care characteristic, the theoretical approach, the potential constraints imposed by the data, etc.

Many choices have had to be made to define an approach of elderly family care which was, at the same time, feasible (for the analyses) and meaningful (for the social policy makers and researchers). All these choices will be carefully discussed in the next chapters. However, it might be useful to mention four major choices right now. It will allow the reader to have a clear idea of the dissertation topic delimitations.

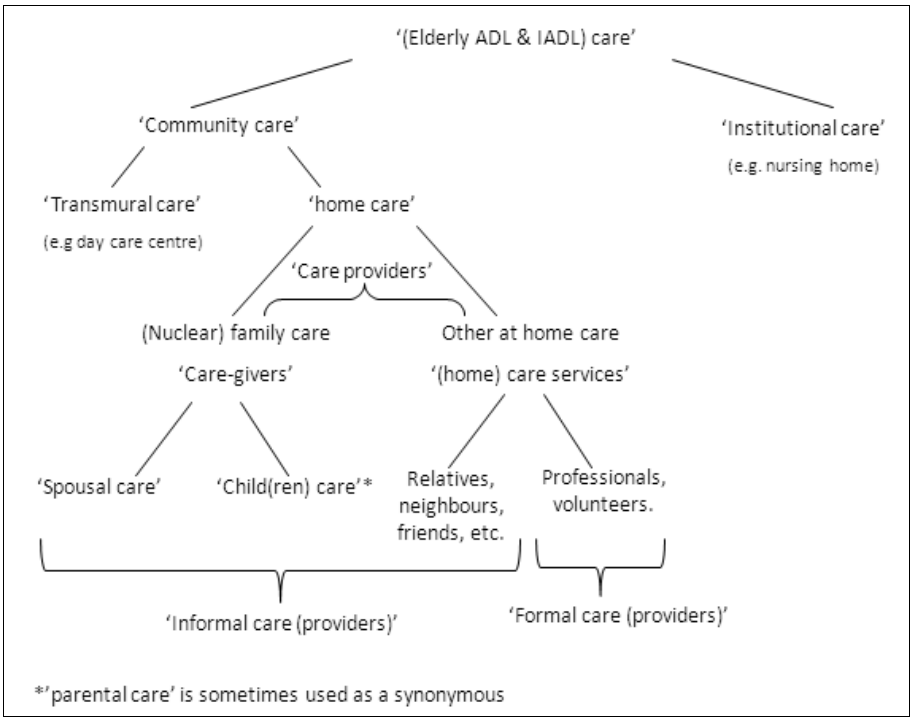
1. The '**Life Course' approach** (Elder 1977) is used as theoretical framework. The main idea is that, for understanding what are the determinants of an individual phenomenon and its timing (like receiving family care at old age), it is necessary to account for the current situation of the individual (where does he live? What are his family situation and his social network? What is the socio-economic context?), but also for his past life experiences (what are the key historic or personal events he lived and how could they have influenced his current life?).
2. The study phenomenon, **'family elderly care'**, is defined as the care provided by the spouse and/or the adult children for the (instrumental) activities of the daily life. Two kinds of activities are usually distinguished:
    - The 'instrumental activities of the daily life' (**IADL**) including preparing meals, managing money, shopping, doing housework, and using a telephone (activities list set by Lawton & Brody in 1969);
    - The 'activities of the daily life' (**ADL**) including eating, dressing, getting into or out of a bed or chair, taking a bath or shower, and using the toilet (activities list set by Katz *et al.* in 1963). The ADL are considered as more intensive and time constraining because the activities need to be done several times each day.
3. The Panel Study of Belgian Households (**PSBH**) is a yearly panel of private Belgian households starting in 1992 and ending in 2002. The questionnaires are standardised since 1994 only and therefore, if we want to study the evolution of a phenomenon over time, the analyses should be limited to the waves **1994 to 2002**.
4. The study population is the **elderly,** defined as the **population of Belgian nationality aged 65+ in 1994** which corresponds to the survivors of the **birth cohorts 1900-1929** living in the community. The reference to the year 1994 is due to the used survey data.

Although the dissertation focuses on the elderly family care, other sources of elderly care will sometimes be mentioned, described or even being involved in some of the dissertation analyses. It is therefore essential to define a terminology to distinguish the different sources of care. Scheme intro-1) presents them and shows how they are articulated: there are many possible sources[6] of ADL and IADL elderly care. A first distinction can be done between institutional care and community care. Community care can be divided into transmural care (care provided out of the elderly home, in a

[6] Note that 'technical care' (e.g. personal alarm, wheel-chair, etc.) and 'self-care' (term used to refer to the care provided by the care-receiver to himself) differ from the other sources of care as they do not involve a care relationship. This kind of care is not considered here.

medical or non-medical centre) and home care. The dissertation scope is limited to home care. Note that all the people or services providing home care are named 'care-providers'. The care-providers include the nuclear family – the 'care-givers' – and the other care-providers, are regrouped under the term of 'care-services'[7] (informal: friends, neighbours, relatives etc. and formal: professionals and volunteers).

**SCHEME INTRO–1:** Care terminology[8] used in the dissertation




*Note:* The words between brackets may be omitted for brevity purpose when there is no ambiguity. For instance, 'care' is used to refer to elderly ADL and IADL care.

## *How is the dissertation structured?*

The dissertation aims at answering three main research questions: *Who is receiving family care? What are the characteristics of the received family care? How do those characteristics evolve over time?* These questions will structure the analyses part. But before starting analysing the data, the study phenomenon should be contextualised and the analysis method and material should be presented and discussed. The dissertation is divided into three parts.

The first 'contexts' part includes chapters I to IV. **Chapter I** sets the theoretical framework of the analysis *(What is elderly family care and how this phenomenon will be approached?)*: it discusses the concept of 'care' and the difficulties of its operationalisation. It also presents the Life Course approach and its principles which will be used as theoretical framework. **Chapter II** proposes a systematic review of the existing literature on the elderly family care determinants *(What do we know about elderly family care in Western countries?)*. The literature will be used to formulate the

[7] Usually, the literature opposes 'informal care' (including family, friends, neighbours and colleagues) to 'formal care' (including professionals and volunteers). For the dissertation, the decision was taken to distinguish the nuclear family from all the other care-providers.

[8] This terminology is systematically used in the dissertation (including this introduction) except for the quotations and references.

hypotheses to test, to identify the most appropriate methodological choices to make and to see how the dissertation can contribute to the current knowledge in this research area. This chapter also introduces two theories (the 'behaviour model' and the 'formal-informal care articulation models') which complement the literature review. **Chapter III** describes the historical and demographic context in which the study cohorts have grown up *(What are the major demographic trends and historic events experienced by the study population?).* It is structured like a life story: it starts in 1900 when the oldest cohort was born and presents the historical and demographic context in which the study cohorts grew up (1900-1950). Then, it jumps to the 90s to focus on the socio-politic context (especially the elderly care policies orientations) in which the study cohorts are 'at risk' of receiving family care. **Chapter IV** completes the systematic literature review by analysing the Belgian literature in particular (*What do we know about elderly family care in Belgium?)*. It presents the Belgian surveys having included questions on elderly family care, compares their designs and their findings. The chapter ends by justifying why the PSBH has been chosen among the existing Belgian surveys.

Between the two first parts, an '**interpart**' presents the theoretical scheme *(What do we like to test?)*. The scheme is structured by the three main research questions. It articulates the hypotheses formulated based on the systematic literature review and on the other contextual chapters.

The second 'methodology' part includes chapters V to VII. **Chapter V** introduces the analysed survey, the PSBH, and explains how the study sample of 1,123 elderly has been selected *(What is the 'material' we will analyse?)*. The PSBH baseline sample and the specific study sample are submitted to external validation in order to assess the quality and the representativity of the analysed material. **Chapter VI** explains how a particular 'carelines' file has been built for the analyses and how the family care characteristics have been operationalised into dependent variables (*Which are the data preparations needed to study the elderly family care evolution with the PSBH dataset?*). **Chapter VII** describes and validates the operationalisation of the care determinants into independent variables *(What are the variables which will be introduced in the regression analyses?)*.

Between the two last parts, there is an '**interpart**' which presents the operational table *(What can we effectively test in the PSBH?)*. This table reviews all the hypotheses formulated in the theoretical scheme. For each of them, it specifies how the hypothesis is operationalised (using the variables presented in the methodological part) or why the hypothesis is 'not testable' with the PSBH data.

The third 'analyses' part includes chapters VIII to X. Each chapter refers to one of the three main research questions. As we are progressing in the chapters, the analyses are more specific and complex and the 'at risk' sample narrows. **Chapter VIII** tries to answer the most global question 'Who has ever received care' (which is an adaptation of the question '*Who is receiving care?*'). This analysis is done at the elderly level. **Chapter IX** tries to answer to a more specific question *'What are the characteristics of the received family care'?* The analyses are done at the wave level for each care characteristic separately. Finally, **chapter X** tries to answer the question '*How do the elderly family care characteristics evolve over time'?* Transition analyses allow studying the evolution observed between each pair of successive waves.

The general conclusion starts by summarising the results (*Which hypotheses are supported or not by the analyses or could not be tested?)* and proposing a Life Course reading of the main findings highlighting the main contributions and limitations of the dissertation. To go further, two important questions will be discussed: the first - *How could we better approach the reality of elderly family care?* – is related to the definition and the recognition of elderly family care. The second - *To what extent could the dissertation findings be inferred to the next cohorts of elderly?* – shows how the baby-boomers elderly cohorts differ from the study cohorts and what will be the new challenges to address?

# CHAPTER I

## THE CONCEPT OF CARE AND THE LIFE COURSE THEORETICAL FRAMEWORK

The introduction explained why it is relevant to study the dynamics of elderly family care in Belgium today, what the delimitations of the research topic are and how the dissertation is structured. The purpose was to give a quick overview of the whole document. Now, it is time to plunge into the topic and the very first step is to set the theoretical frame: what does 'elderly family care' mean? How should the Life Course approach serve as a theoretical framework?

The purpose of this chapter is therefore to present the concept of 'care' in general, of 'elderly family care' in particular, and of the 'Life Course' approach and its principles; how and to what extent they will be used in the dissertation research.

Section I introduces and discusses the concept of 'elderly family care'. It starts with the emergence of 'care' in the social policy arena in the 70s. It shows the growing interest for 'informal care' by the researchers in the 80s and highlights their difficulties in defining 'elderly family care'. The main theoretical developments in family intergenerational relationships and spousal care are presented, because they allow having a better idea on the complexity of the 'elderly family care' relationship. Finally, the question of the measurement is asked: how to identify and measure 'elderly family care' in quantitative studies and what are the options taken for the dissertation research?

Section II presents the Life Course approach. It begins by explaining why this approach is so popular today and what are the disciplines and topics applying it most often. Then, it explains the five Life Course principles of the sociological 'version' developed by Elder. It discusses finally the interest of studying elderly family care from a Life Course perspective in general, and the feasibility of such an approach in the research dissertation, in particular.

# *SECTION 1. The concept of elderly family care*[1]

As most of the concepts used in the social sciences, the concept of 'elderly family care' is at the same time **well-known** and **elusive**. Everybody knows what it is about and may even have a personal experience of 'elderly family care' to tell, but it is elusive because if you ask people to define what 'caring' for an elderly relative means and involves, then some will find the exercise impossible and others will give you a very personal definition. The same is true in the research field, where nearly as many definitions as the number of studies on the topic are found

Scholars usually agree with the idea that a too broad and inaccurate definition of elderly family care is problematic (Membrado 1999; Pennec 1999; Adams 2000; Molyneaux *et al.* 2010). They acknowledge that it may have detrimental consequences on the identification of care and on the efficiency of social policy measures aiming at supporting the elderly and their family care-givers. So, the question is why is it so difficult to agree on a definition and on measures of elderly family care?

Elements of answers will be provided in this section.

## A. Emergence of 'informal care' as a social policy object

In the traditional family model, looking after the children, the severely ill, and the elderly members of the family was not considered as a separated 'care' activity but as an integrative and 'natural' part of the woman duties. Until the middle of the XX$^{th}$ century, the term of '**care**' was mainly used to refer to 'formal' care. Originally, it has two central meanings: it either refers to a certain protection or security; or to nursing or medical care (De Koker & Vanbrabant 2004). If the first meaning was the most used until the beginning of the XX$^{th}$ century, the second became dominant in the Post-War societies where the improvement of public health and the development of solidarity mechanisms by the Welfare States have contributed to reduce the life insecurity and mortality. In its medical sense, it referred to the professional activities directed to the frail or dependent people (the young children, elderly, and the sick) and, care was usually performed under medical supervision. Kyle (1995) makes a review of the medical literature on the concept of 'care' and shows that the term of 'care' is often used as a complement or a synonym for nursing but that the exact 'content' of the care activities has never been well defined.

The term of '**community care'** appeared in Great-Britain in the 50s. In the context of care budget retrenchment, 'community care' officially referred to the care policies for dependent people: the objective was to reduce the number of beds in the hospitals and the rest homes (Degavre & Nyssens 2008). For Titmuss (1963), relying on the community to provide care would be a good solution. But, he never defined what 'community' meant and whether or not it included the family.

The second wave of feminism[2] took up the idea of using the term of 'care' out of the medical institutions. They introduced the concept of '**informal care**' into the social policy arena (Kröger 2003). The purpose was that 'caring' (looking after dependent family members) and the other

[1] This section is based on a book contribution I wrote on the concept of care, its definitions and the sociological theories related to intergenerational solidarities (Masuy, under revision).

[2] Until now, three main waves of feminism have been distinguished (Kroløkke & Scott 2006): the first wave (end of XIX$^{th}$- beginning of XX$^{th}$) is also known as the 'suffragette' movement in the US. They wanted to reform the institutions and demonstrated to obtain gender equality in the eyes of the law. The second wave (60s-70s) aimed at obtaining the gender equality 'within' the system. This involved reversing the patriarchal system, introducing new values and new gender roles. This movement is also known as 'radical feminism', 'women liberation movement', 'neo-feminism' or 'Marxist feminism'. The third wave started in the 80s (especially in the US), when numerous black feminists contested some aspects of the previous wave which seemed to them too 'bourgeois' and 'white people' values oriented.

'invisible domestic duties' performed by women, were recognised as a 'work' or an 'economic activity', and no longer considered as a 'natural duty' (Waerness 1978; Finch & Groves 1983; Carrasco 2007). Their approach of informal care is mainly 'macro', 'critical' and focused on the care provider point of view.

Martin (2008) identified three main informal care debates ongoing since the 70s: the first is philosophic and is about the 'ethics of care'; the second is political and concerns the articulation of the private and the public spheres through the organisation of 'social care'. The third debate is on the care activity itself: Who is providing care? What are the characteristics of the informal care relationship? Etc. The feminists mainly contributed to the two first debates: the works of Gilligan (1982), Tronto (1993) and Sevenhuijsen (1998) questioned the existence of a women specific moral and ethics of care. Concerning the political debate, the feminists introduced the concept of 'social care' as a thematic for social policies and as an aspect to consider in the analysis and comparison of Welfare States (Lewis 1992; Sainsbury 1994; Daly & Lewis 1998).

The dissertation research takes part to the third debate level. The purpose is to gain a better understanding of the characteristics and the dynamics of the care relationships at the micro level. The focus is on a specific type of informal care, the one provided to an elderly by his spouse and adult children.

## B. The development of elderly family care research

There were already some studies on the determinants and the characteristics of the care provided by the family to the elderly in the 70s under the term of 'social support'[3] (e.g. Cantor 1975). But, according to many authors (Brubaker 1990; Walker *et al.* 1995; Molineaux *et al.* 2011), the literature on 'elderly family care' really flourished in the early 80s.

The elderly can be considered as one of the three main family care-receivers. The two others are the young children and the sick or disabled. The experience of care, its evolution and the recognition of the effective family care-giver as such is likely to differ according to the type of care-receivers (Trabut & Weber 2009).

- Caring for one's **baby or young child** is a major and primary part of the parental roles: future parents know that they are responsible for their children and that it is their role to care for them. Most of the time, the care responsibility is shared by the two parents, and the grandparents or other family members are often glad to look after their younger relatives. Parents can expect a decrease in care intensity over time when the children are growing and gain in autonomy.
- Caring for an **elderly relative** is very different. Although the adult children or the (married) elderly may imagine that their parent or spouse may need extra care because of old age, providing long-term elderly care is not a 'normal' part of spousal or parent-children relationship. It is something 'more' and 'unclear' which is added to an existing relationship. It is this existing relationship and its quality and modalities which will allow the caring relation to start. But, in most cases, the family care-giver has not a clear insight of the content and the duration of his caring role. The intensity of care is likely to increase over time and to affect the pre-existing relationship between the two relatives. Although the care responsibility can be shared within the family or with professionals, there is usually one main care-giver who is in charge of the bulk of the care load and the coordination of care with the other care providers, if any. It is very difficult to find a substitute for this 'main' role.

[3] According to Fine (2004), the concept of care is used together with the terms 'informal' or 'family' - to refer to non professional care - for the first time in 1978.

- Finally, caring for a **severely ill relative** is quite difficult to compare from the two first 'types of receivers' because, according to the age of the care-receiver, some aspects may be more or less closer to one of the two previous situations: caring for a sick child is mainly assumed by parents and this is considered as a 'normal' parental responsibility just as caring for a young child. Similarly, an elderly may be severely ill (e.g. cancer, dementia). In this case, the care situation will be partly defined by old age specificities and the disease treatment protocol. However, a particularity of sick care is the recognition of the care situation: the disease is duly identified; the situation is not normal but 'pathologic'. Health professionals are more or less intensively involved in care and these interactions between informal (family) care-givers and professionals contribute to make the family care-giver role visible (O'Connor 2007). The declaration of family care is therefore assumed to be better when the care-receiver is severely ill.

The first elderly family care studies were mostly published in gerontological journals but also in journals specifically focused on families. The three main research areas are: *What is care? What are the negative and positive outcomes of caring for the care-givers? What is the relation between family or informal care and formal care?* (Walker *et al.* 1995).

The main findings regarding those questions will not be discussed here. The systematic literature review will be presented in chapter II. The focus is here on the concept of 'elderly family care'. The literature is explored from this specific point of view. The purpose is to show that despite the large variety of research questions, populations, methods, etc. all the studies on elderly family care have a common point: their difficulty to define what 'elderly family care' is. The multiplicity of answers highlights the 'complexity' of the elderly family care relationship (Dressel & Clark 1990).

## C. How to define 'elderly family care'?

### *1. A definition on 'itself'*

A clear, precise and consensual definition of 'elderly family care' in itself, which is essential for researchers and for policy makers, is missing (Barrera 1986; Barer & Johnson 1990; Cantor 1991; Grammenos 2003; O'Connor 2007). It would be impossible to list all the definitions, because there are nearly as many definitions as studies on family care. However, it is interesting to pinpoint some often mentioned aspects (Dumont *et al.* 2010):

The first aspect is the involved **activities.** Nearly all researchers will agree that helping an elderly member with the IADL or ADL can be considered as 'care', but some will extend it to other activities (visits or any form of contacts, monitoring, listening to complaints, etc.) or kinds of assistance (emotional support: mainly in psychology studies[4]; or financial transfers: usually in economic researches).

A second aspect is the **time devoted to care**. In most studies, there is no time condition. In others, different sub-groups of care-givers are defined (partly) based on the time devoted to care (computed in hours or in frequency 'every day', 'every week', etc.). The duration of care (e.g. 'at least three months') can also to used to classify or to select intensive family care-givers.

[4] The interest for emotional support is probably due to the high impact/popularity of the 'socio-emotional selectivity theory' developed by Carstensen (1987, 1991, 1992) in ageing psychology. According to this theory "reduced rates of interaction in late life are viewed as the result of lifelong selection processes by which people strategically and adaptively cultivate their social networks to maximize social and emotional gains and minimize social and emotional risks" (Carstensen 1992: 331).

A third aspect is the **'unusual' character of the support**. As some support may be part of the usual family life and relationship, some researchers will define 'care' as an unusual support or will only consider the situations where a support is provided because the care-receiver has a duly identified health problem. It might however be difficult for the respondent (elderly or potential care-giver) to distinguish what is 'usual' from what is 'unusual', especially when the 'care' is provided by the spouse and has started by a simple redistribution of the housework tasks. For this reason, some researchers will prefer not to set any health or criterion referring to an exceptional situation.

There are many combinations of these three main aspects and this shows how difficult it is to define elderly family care by itself.

### *2. A definition by comparison*

Other ways used to identify the specific characteristics of elderly family care are: to compare it with other sources of elderly care or to build a typology based on empirical data to regroup and characterise different elderly care situations.

For instance, comparing elderly family care to at-home professionals care highlights its unbounded character and the fact that family care is considered as inherent in the relationship between the care-giver and the care-receiver (frame I-1).

**FRAME I-1:** Comparing professional and family care

| |
|---|
| Professional care is usually very well defined in time, tasks and costs. The relationship between the care-receiver and the care provider is a contractual one and is motivated and defined by the care needs of the receiver. Although affective bonds or affinities may appear and make the relationship more than simply 'contractual', a professional may be replaced by another one, if needed.<br>The family care relationship follows other rules. And, although some European countries offer 'in-cash' benefits for informal care, it is clear that family solidarities are motivated by more complex logics than those of the labour market. The content, time and opportunity costs of informal care are very difficult to evaluate. This is partly because part of the activities are performed by the care-giver anyway (e.g. preparing meals) and are not considered as 'caring tasks'. The nature and the history of the relation will also influence what is perceived, what is actually provided and what is declared as care. Therefore, perfect substitution is not really possible for a family care-giver. |

Examples of typologies of care situations including family care-givers and/or other care providers (formal or informal) can be found in Litwak (1985), Jourdain *et al.* (1988), Noelker & Bass (1989), Porter *et al.* (2004). Matthews & Rosner (1988) distinguish five types of children involvement in parental care: routine help (care is part of the routine of the child), backup help (when the child does not provide regular care but can be called upon if needed), circumscribed help (if the child is ready to provide a very specific support, e.g. medical advice), sporadic help (when the child provides support at his own convenience) and dissociation (when a child is not at all involved in parental care). Other typologies of informal care have been developed by Wenger (1991), Kellerhals *et al.* (1995) or Pruchno *et al.* (1997) Dykstra & Fokkema (2011). A last type of care situations classification consists to identify and describe the successive phases of care-giving. Tronto (1993) distinguishes the four phases of what the author calls 'a good care': the first is 'caring about' (acknowledging the presence of a care need); the second is '*taking care of*' (assuming the care responsibility); the third is '*care-giving'* (when effective care and related skills are highlighted); the last phase is '*care-receiving'* (when the care-receiver actively participate in the care relationship). Nolan (1995) has revised the typology of Bowers (1987) to distinguish eight chronological phases of care: anticipatory care, preventive care, supervisory care, instrumental care, protective care, preservative care, (re)constructive care and reciprocal care.

All these typologies contribute to a better understanding of the reality of family elderly care. However, they are difficult to generalise: some of them are theory-based (an *a priori* typology is applied to empirical data) without testing all the competing theories; the other typologies are data-based (classification methods are applied to the data to classify the respondents into different types) but the used sample is often highly selected and/or too small to generalise the results to the elderly population.

### *3. The use of 'care' and its cognates*

The lack of clarity about the definition of care also lies in the use of cognates and the difficulty to translate this concept into other languages.

According to the discipline, the theoretical framework and the period, various cognates of 'care' can be found in the literature (Marcoen 2005). In gerontology**,** the terms of 'informal care-giving/carer[5]' or 'informal help' are the most common; in psychology, it is the case for 'care-giving', 'help', 'support' and 'assistance'; in sociology, 'intergenerational exchanges/solidarity' or 'social support network' (when enlarging to other informal care providers) are the most popular; in economy, it is 'time transfer' is widely used.

In addition to the discipline preferences, a same word can have different meanings. For instance, care can be restricted to the ADL only, or is extended to the IADL, and sometimes to emotional support as well (e.g. De Koker 2009). Different words can have the same meaning. For instance, 'help' or 'care' can be used indifferently to refer to ADL and IADL care. Some authors combine various terms: they use for instance 'care' for the ADL and 'help' for the IADL (e.g. Brandt *et al.* 2009), or 'personal support' for the ADL and 'instrumental support' for the IADL.

Finally, there is the translation difficulty. In some language, a good translation exists: 'zorg' in Dutch, 'sorge' in German or 'cuidado' in Spanish. But in other languages, like French, no unique term covers the exact meaning of 'care'. When 'help' and 'cure' are perfectly translated into 'aide' and 'traitement', 'care' does not match any existing word. The closest term to 'care' in French would be 'soin'. Interestingly, 'soin' is used both to refer to formal and informal care in French-speaking Canada[6] (e.g. Guberman & Maheu 2001). However in French-speaking European countries, the term 'soin' tends to be restrictedly used for formal care except in a few cases (Cresson (2006) who uses 'soins profanes' or Favrot-Laurens (1996) who prefers 'soins familiaux'). The most common wording to refer to family or informal care are 'aidants proches, 'aidants familiaux' (Blanc 2010) 'solidarités familiales', 'entraide familiale', 'soutien familial' (Pitrou 1977) or 'soutien informel' (De Jong Gierveld 2004). The expression 'prise en charge des personnes âgées' is also widely used in reference to elderly care in general.

On the whole, 'elderly family care' is a complex construct, which can be approached from many points of view, either globally or focussing on a specific aspect or situation. The diversity in terminology among disciplines and the translation difficulties also highlight the 'cultural' influence in the care definition.

## D. Understanding family solidarities

Alongside this 'cultural' influence in the definition and the identification of care, there is another aspect which explains the complexity of the phenomenon: it is the fact that elderly family care is, first

[5] In the UK, the term of 'carer' is the most common while 'care-giver' is more frequently used in American and Canadian journals.

[6] Another term frequently used in the Canadian literature is 'aidants naturels' (Maheu & Guberman 1992; Bédard 2004).

of all, a type of family relationships or exchanges. Understanding how these relationships work and what are the motivations of providing care to an elderly parent or spouse will allow understanding better elderly family care.

Sociologists have widely studied the family relationships and the intergenerational relationships in particular. They tried to **describe the adult children-parents relationships**. The solidarity model was introduced by Bengtson (1975). He distinguishes six types of solidarities: either 'functional', 'associative', 'emotional', 'consensual', 'normative' or 'structural'. The first is the closest to the main 'care' activities because it refers to instrumental assistance (helping with the ADL and the IADL). This model has been criticised because it advocates a too consensual view of the family relationships and has been considered to be too normative (Lowenstein 2007). A revised version of the model (Silverstein *et al.* 1996; Clarke *et al.* 1999; Parrott & Bengtson 1999) includes the presence of potential conflicts. Finally, an alternative model, called the 'ambivalence theory', was proposed by psychologists (Luescher & Pillemer 1998; Connidis & Mcmullin 2002). It recognises the presence of solidarities and conflict mechanisms, but states that contradictions and ambiguities represent a more realistic point of view for studying intergenerational relationships.

Another body of literature attempts to **understand the intergenerational solidarity motivations.** Three groups of theories have been primarily developed: the 'social exchange' theory, the 'altruism' theory and the 'reciprocity' theory (Logan & Spitze 1995; Kohli & Künemund 2003; Bianchi *et al.* 2008).

The first theory ('social exchange') introduced by Dowd (1975) proposes to distinguish three kinds of intergenerational exchanges, depending on the timing of care provision. First, the 'delayed exchange': care is provided either because there is a debt to pay (e.g. adult children want to 'pay back' for the care and attention provided by their parents in their childhood). Second, the 'prospective exchange': care is provided because there is an expectation to receive something back in the future (e.g. adult children care for their parents in order to be favoured in the inheritance). Third, the 'direct exchange': children find it 'natural' to provide care because their parents also support them another way (e.g. financial support, care for the grandchildren). In the three situations, exchanges are motivated by self-interest, and this is the major criticism made to this theory.

The 'altruism' theory was mainly developed by psychologists (among them, Becker 1981). "The altruism theory assumes affection, or a moral duty, or obligation as a basis for providing help in situations of need. Altruism requires no further instrumental explanation." (Kohli & Künemund 2003: 128).

The third theory is maybe the most sociological one. The family sociologist is interested in the whole system of exchanges of various 'goods' within a 'family'. This conception of global system of exchange refers to the anthropological theory of the 'don contre-don' of Marcel Mauss (2001 [1950]). According to this theory, all the social relationships are ruled by three obligations: to give, to receive and to give-back. In other words, the mechanism of reciprocity is a regulator principle of the exchange. When Mauss builds his theory at the level of the society, many researches in social networks analysis found evidence of the reciprocity mechanisms for smaller scale networks like the school, the family or the neighbourhood (Antonucci & Akiyama 1987; Déchaux 1996; Degenne 1997).

Alongside the reciprocity principle, sociologists found that filial obligation and other social, cultural or generational norms (such as gender roles definition, public-private mix, the tendency toward familialism or individualism, etc.) influence the family caring decision: *Who will care? For what?* (Dwyer & Seccombe 1991; Dwyer & Coward 1992). Other studies, including those of psychologists, had further investigated the various norms and values which interplay in the intergenerational solidarities. Among the most important contributions, Cicirelli (1983) highlights the key role of

attachment between the child potential care-giver and his elderly parent, Rossi & Rossi (1990) shows that the quality of the past child-parent relationship influences the propensity of providing care for a given child. Finally, Finch & Mason (1993) introduced the concept of 'family negotiation'. The idea is that the family care responsibility and its modalities are not fixed but rather the result of a continuous negotiation between the members of the family, taking into account their common and individual norms, expectations and personal life history. The 'negotiation' idea has been taken up by economists and translated into the concept of 'bargaining' (Pezzin & Schone 1999; Engers & Stern 2002; Pezzin *et al.* 2007): using the game theory, they study how the care decisions of the children mutually influence each other.

All the above mentioned studies focus on intergenerational solidarities. It does not mean that there is no research on spousal care. Such studies were mainly published in gerontological journals: the reduction of the gender life expectancy gap and the increase in good health life expectancy imply that the number of disabled elderly having a spouse in relatively good health and able to provide long-term care, is increasing. Understanding better the specificities of spousal care and its limitations is therefore essential for developing supportive measures for the elderly and their care-givers.

Mutual support is often considered as part of the marriage contract and therefore 'natural' for the spouses themselves and their social network. However, providing long-term care may weaken the health status of the spouse care-giver and quickly change the couple 'elderly care-receiver/spouse care-giver' in a couple of 'care-receivers'. Another specificity of spousal care is the under-declaration of the care relationship: many studies (Kramer & Lambert 1999; Rose & Bruce 2002; Milne & Hatzidimitriadou 2003; Stoller & Miklowski 2008) highlight gender differences in spousal care-giving declaration: women tend to under-declare and under-estimate the care they provide to their husband, while men tend to over-declare the provided care because it involves assuming responsibilities which are unusual for them.

## E. A consequence of complexity: the possible gap between perceived, declared and effective care

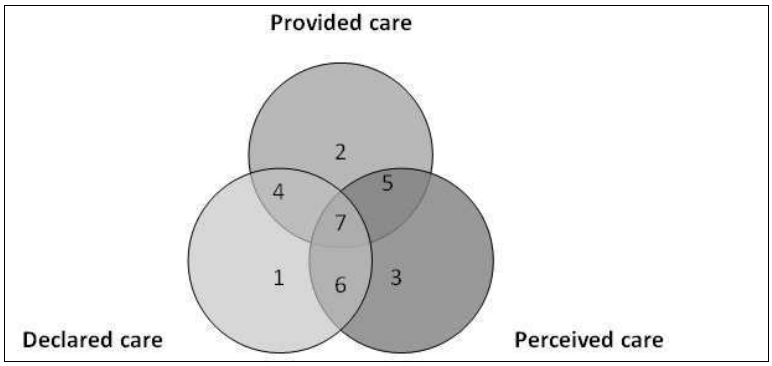
The question of care declaration by respondents is crucial for studying family care determinants. As it was already seen, care is difficult to define for researchers: it is influenced by the culture (which behaviour is considered as 'normal' or 'valuable'), the relationship ((informal care is part of a, usually, long-term relationship between people having their own values – sense of responsibility, reciprocity, autonomy, etc. - and expectations toward the relation) and the personal history of both care-giver and care-receiver (which will influence the perception of the situation). These aspects also influence the recognition of care by the protagonists (care-giver or care-receiver) and whether and how much care they will declare when they are sampled as respondents in a survey. Differences in declaration between spouses were already mentioned. Several studies (Aquilino 1999; Klein Ikkink *et al.* 1999; Shapiro 2004; Mandemakers & Dykstra 2008) also found differences in declaration between the adult children (the potential care-givers) and the elderly parent (the potential care-receiver).

Researchers are usually interested in the actually provided care but they cannot observe it fully[7]. They have to make an operational definition of care, to ask questions to the protagonists of care (potential/effective receivers/providers of informal care) and to rely on their declarations. How carefully researchers make the definition and collect the data, they cannot completely take account of the relational, individual and cultural influences which may bias the response. However, they may try to identify the reasons of under or over declaration and think of how to reduce their impact on

[7] This may only be possible if researchers opt for a participant observation. However this means of investigation is rarely used in the private sphere where informal care takes place.

the declaration. Here, a Venn diagram is used to **identify** the possible gaps between reality and declared care.

**SCHEME I-1:** Venn diagram on the provided, perceived and declared care




Scheme I-1 includes the 7 theoretical 'care' positions at a given time for a given elderly (or potential care-receiver). If there is no 'provided care', no 'perceived care' and no 'declared care', full consistency occurs and we are out of the diagram. When care is provided, that the situation is perceived as such and that the respondent declares the care situation, there is also full consistency and we are in the middle of the diagram (7). The six others positions are 'inconsistent' and may create a gap between what researchers are interested in (the provided care – the upper intermediate-grey circle) and what they observe (declared care – the left-hand dark grey circle).

Position (4) is not 'bad' (because the provided care is declared). However, it is difficult to imagine a case where care is declared without being 'perceived'. Actually, this position does not exist if the elderly is the sole respondent. If potential care-givers are interviewed too, it can happen if they are not aware of the whole care situation:

> For instance, the daughter of an elderly is interviewed about informal care provided to her mother. She lives far away and does not visit her mother very often. She does not know that her brother comes every week and bring water and other 'heavy purchases' to their mother. When interviewing the son, he will probably declare that he helps his mother with the shopping.

This is one reason why it seems better to choose **the elderly as respondent and unit of observation:** he is – by definition- present when the care is provided and, unless suffering from a cognitive disease, he is aware of the situation. However, it does not mean that the provided care will be declared. Biases are still possible, if, for example, the elderly does not perceive the situation as a 'care situation' (position 2).

> For instance, the wife of the elderly has always prepared the meal. The elderly was able to prepare meals occasionally, but is no longer able to do it and his wife is now fully in charge of doing it. Objectively, the current situation can be considered as a 'provided care' situation because, if the wife was no more able to prepare the meals, the couple would probably have to use formal care services or to ask the family or friends to help them. Subjectively, the elderly does not perceive this as a 'care' situation.

Positions 3, 5 and 6 refer to situations where care is perceived but not declared (3 and 5) and/or not provided (3 and 6). Practically positions 3 and 6 are impossible because one cannot imagine situations where care is not provided but perceived. However, it is possible to be in position 5: the respondent is aware (perceives) the provided care situation as a care situation but- for cultural, individual or relational reasons - does not declare it.

By example, a daughter helps her father for taking a bath. The father may not want to declare this help for various reasons: because it touches his intimacy, because declaring that he is now unable to wash himself alone would damage his self-esteem, because he is afraid that this help could be associated with an incestuous relationship, etc.

Finally, over-declaration (position 1) can occur if the respondent considers that, according to cultural or family norms, it is well considered to tell that care is provided by one or another person[8].

For instance, if an elderly woman lives with her unique son and the interviewer asks her: 'Does your son give you some help for the housework?', she may answer 'Yes, of course', even if, in the reality, she does everything in the house. Why not answering the truth in this case? She may want to give a positive image of her adult son (he is a 'good boy'). She may give the impression that she needs him and that she cannot live alone.

As seen in the previous examples, under-declarations (position 2, 5) or over-declarations (position 1) can also be influenced by the interview situation:

- Gaps between provided and perceived care can be explained by inadequate question wording:

If a researcher, interested in hospitalisation-related informal care, use data collected three months after the hospitalisation, it is likely that part of the informal care provided before the hospitalisation or after it, but for a very short time, will not be perceived by the respondent as hospitalisation-related care three months later. In some cases, he will not remember the provided care, in other cases, he may have a more restricted definition of the hospitalisation related informal care than the researcher has (considering only the care provided during the hospitalisation as related – e.g. bringing food and other stuff from outside – while the researcher has a wider definition (including, for instance, offering a lift for going to the hospital for preliminary medical examinations).

- Gaps between perceived and declared care can be explained by the interviewer:

For instance: when the respondent does not feel confident with the interviewer, when there is someone else in the room during the interview or when the respondent wants to give a specific 'image' of himself; he may prefer to conceal the truth.

## F. How to identify and measure elderly family care in quantitative surveys?

The previous points have highlighted the complexity of identifying and defining elderly family care. Of course, it would not be possible to account for the entire complexity of the phenomenon in a quantitative analysis. An operational definition is needed, even if it would necessarily be a simplification of the reality. Although imperfect, this definition will be considered as 'good enough' if it meets the following criteria:

1. It should provide meaningful information for social policy makers
2. It relates to aspects which are measured in closed questionnaires.
3. A preference will be marked for a measurement of the received care by the elderly himself: it is assumed that, being necessarily present and aware during the care relationship, the elderly would be the most able to identify his care providers and to describe his global care situation.

Looking at the quantitative studies on informal care, three main measures can be distinguished, each of them referring to a different research focus:

[8] This is one of the major trends identified by the famous 'Denver validity study' (Parry & Crossley 1950): behaviours or situations considered as socially desirable tend to be over-declared while those considered as socially undesirable tend to be under-declared.

The first measure originates from the medical sciences but has become so common in survey questionnaires that it is now widely used in all the gerontological studies: the elderly respondent is asked whether or not he receives care for the **IADL and/or the ADL** in general or for each of the listed activities in particular. These activities lists were elaborated to help the medical personnel measuring the level of 'dependency' of their elderly patients in hospital and institutions. Their use has been extended to the health insurance system (to define entitlement criteria for dependency allowance or needs tested community care services).

The second measure **(caring hours)** is mainly used in economic studies. Their focus is on the economic (opportunity) costs of informal care for the society. They do not need a measure of the presence or the characteristics of the care activities but a measure of the care intensity which will serve as a basis to compute the individual and collective economic costs of informal care (Chicha 1994; Fast *et al.* 1999; van den Berg *et al.* 2005; Davin *et al.* 2009; de Meijer *et al.* 2010) and the consequences of providing intensive informal care on the labour market participation (e.g. Wolf & Soldo 1994; Johnson & Lo Sasso 2000; Dentinger & Clarkberg 2002; Spiess & Schneider 2003; Henz 2004, 2006; Crespo 2006; Heitmueller & Inglis 2007). Using the 'time allocation theory' (Becker 1965), they consider caring as one of the weekly activities to which individuals decide to allocate a certain amount of their time based on rational thinking and in order to maximise their well-being. To quantify the 'caring-time', economists analyse survey questions focussing on the number of hours the respondent spend in providing 'care'. The definition of care can be restricted to specific activities (like the ADL and IADL) or be unspecified. In this case, the meaning of 'caring' depends on the respondent's perception.

The third major measures of informal care are the burden scales. In **psychological** studies, sophisticated scales are used to measure the consequences of informal care on health and on well-being[9] and the overall 'burden[10]' carried by the informal care providers (e.g. Miller & McFall 1992; Reinardy *et al.* 1999; Pinquart & Sörensen 2006; Ekwall & Hallberg 2007; De Koker 2010). Most of the studies on the topic use the 'stress process model' developed by Pearlin *et al.* (1990) as theoretical framework (Tolkacheva *et al.* 2011). Except from this common background, there is a great variety in the used scales (Bocquet & Andrieu 1999). Among the most famous scales, one has to mention those developed by Zarit *et al.* (1980), by Novak & Guest (1989) and the several scales elaborated by Pearlin *et al.* (1990).

All these measures have their advantages and limitations:

Most of the psychological 'burden' scales account for **multiple life or health aspects** and offer therefore a more realistic view of the care situation, but the variety of the existing scales makes the research results difficult to compare. Moreover, they focus on the care-giver experience and this prevents from having a complete overview of the care situation and the potential care sources allowing the elderly to remain at home or not. Finally, it includes mainly subjective factors which are highly variable from one individual to another. If it may help psychologists to plan an individual support, these factors may not be the best suited to identify the recurrent problems met in elderly family care situations and to develop adequate supportive measures.

The two other types of measures (caring hours or activities) have the advantage to be standard measures which facilitate comparisons between studies: everybody will admit that providing two

[9] On the relationship between informal care (burden) and well-being, it is interesting to notice that 'providing informal care' has been considered as one of the dimensions of the subjective well-being in the European System of Social Indicators project initiated in 1999 (Noll 2002). The inclusion of an informal care measure in such a project shows the growing concern for this issue.

[10] The care burden is usually defined as the impact of care on the multiple dimensions of the care-provider's life (physical and mental health, finances and social life).

hours of care weekly is less intensive than one daily hour and that providing care for the IADL only is less intensive than caring for both the IADL and ADL. The main limitation of these two measures is that their validity relies on the assumption that the respondent is willing and able to identify and quantify the care he receives or provides. Time spent in caring is not so easy to evaluate. For instance, when the care-giver takes two hours doing shopping (for him and for the care-receiver), how can he evaluate the 'net' time allocated to care? The same problem appears for the IADL, especially when the care is provided by a cohabitant: the majority of these activities may be considered as being part of the usual household tasks division (Chappell 1991; De Koker 2008). Therefore, a woman may not identify doing the washing-up as 'caring for her husband' because she did it long before the disability occurred. On the opposite, a man may more easily identify doing the washing-up as 'caring for his wife' as he never did it beforehand.

There is no one best method per se. However, for the dissertation purpose and according to the above-mentioned selection criteria, the presence of ADL and IADL care seems to be the best suited: first, it is a well know and widely use method of measurement (allowing comparisons) and the activities lists are standard (no ambiguity in what 'ADL' or 'IADL' means); second, it provides potentially useful information for policymakers (e.g. one can observe that in some type of care situations, the potential care-givers are able to assume IADL care but not ADL care or that they are partially able to assume both, but need some support or can assume both IADL care and ADL care but for a short time only. Knowing that, allows identifying specific support needs for different target groups and permit the development of meaningful social policies); third, the ADL/IADL questions are often asked to the elderly potential care-receiver who is at the centre of the care network and who is supposed to be the most aware of the overall care situation (Who is involved? And to what extent?)

## *SECTION 2. The Life Course approach[11]*

The sociological Life Course[12] approach (Elder 1977, 1978, 2001; Elder *et al.* 2003) is used as a theoretical framework.

The evolution of the ageing studies over the past decades has been marked by a growing interest in longitudinal data and analysis (Ferraro & Kelley-Moore 2003; Longino 2003; Stanziano *et al.* 2010) and by a change in perspective: ageing is more and more considered as a lifetime process and no longer as a separated and stigmatised life-stage. At the same time, the Life Course approach has gained in popularity in the human sciences. The convergence of those evolutions has resulted in an impressive number of qualitative and quantitative studies on ageing referring to a Life Course approach.

Although the 'Life Course' approach is not restricted to ageing research, it fits well to a phenomenon like family care which implies complex relationships which are likely to evolve over time according to the personal evolution of the people involved in the relationship (needs, capacities, constraints, etc.) and the larger context in which the relationship takes place (the social network, the society and the current elderly care policies, etc.).

[11] This section is based on two papers I have written on the Life Course approach: the first (Masuy 2009b) shows how this theoretical framework can be applied to a specific theme of interest for social policy (the family-work balance) and lead to rethink the policy measures in a long-term perspective. The second paper (unpublished) was prepared for the Workshop '*Ageing Societies and the Welfare state*' (11-12/12/2008, *Vrije Universiteit Amsterdam*-VUA, Amsterdam, NL): I presented a literature review of articles using the Life Course approach in quantitative Ageing research.

[12] This is the spelling used by Elder but other spellings can be found in the literature. In the dissertation, 'Life Course' is used to refer to the approach (or theoretical framework) while 'life-course' is used to refer to the course of the life. To say it shortly: the **Life Course** approach studies the events occurring over the **life-course**.

This section presents the principles of the Life Course approach in sociology and examines how they would be applied to the study of elderly family care.

# A. The Life Course as a theoretical framework

## *1. A holistic and interdisciplinary approach*

There is no consensus on what the Life Course approach is. Scholars refer to it as a theory (Dannefer 2003), as a field of research (Mayer & Tuma 1990), as a perspective (Moen *et al.* 1992), as a new paradigm (Bengtson & Allen 1993) or as all of that (Elder 1999). It is not always easy to make the difference between the study of a phenomenon 'over the life course' and the study of a phenomenon using a 'Life Course' approach, or to establish the distinction between 'Lifespan' and 'Life Course' studies (Mayer 2003).
However, one thing is clear: the studies referring to a 'life' principle have grown in number and in popularity over the past decades (Marshall 1996). Since ever, researchers have attempted to situate their study phenomenon in a broader context (lifetime of the individual, historical or family situation, etc.). What is new today is that we have reached a point where the state of technologies, of the society and of scientific paradigms allow and urge for a framework able to capture a phenomenon in its multiple contexts.

The XX$^{th}$ century was the venue of key historic events and changes (such as World Wars I and II) which have had consequences on the entire society, but also on the individuals (Elder 1985), alongside, many changes did occur in the population structure, the social norms, the lifestyles, the attitudes toward environment, etc. At the turn of the XXI$^{st}$ century, the society is still evolving and individuals are defined by the multiple roles they have to endorse simultaneously (being a mother and a full-time worker, a spouse, having dependent parents and grandchildren at the same time, etc.).

To understand this new reality, researchers need specific tools that are able to capture the dynamics of individual and social changes and the multiple contexts in which individuals are embedded.

The development of longitudinal data and methods can be viewed as a response to this need. Among those, the event history analysis allows researchers to account for the effect of earlier events on the current status and to study the time spent in a given state, the transitions from one state to another or the timing of an event. The multi-level modelling aims at considering the respective effects of characteristics observed at different levels (e.g. individual and familial). Those quantitative tools were first developed and spread in North America, while a more qualitative approach (based on collection of life histories or in-depth interviews) was preferred in Europe (Bertaux & Kohli 1984; Heinz & Kruger 2001). Hill Kulu & Nadja Milewski (2007) notice that the Life Course approach is also used by several European researchers – like Leisering & Schumann (2003), Marshall & Mueller (2003), Settersten & Gannon (2005) - to "stress the critical role played by the social structure, particularly the state 'as a distal force', in determining the life-course outcomes of individuals" (Kulu & Milewski 2007:569). Since then, both perspectives (quantitative and qualitative) have met and, actually contaminate each other.

At the same time, the epistemological paradigms in the social sciences were reviewed. The micro-macro dichotomy seems to be inadequate to capture the complexity of the today's society (Allen *et al.* 2000). Several disciplines move towards more holistic approaches: historical studies integrate demographic aspects and shift their focus from wars and heroes to the ordinary events of daily life (e.g. births, deaths) (e.g. Modell *et al.* 1976; Hareven 1994). The sociology of age shifts its focus from

particular stages of life to the process of ageing (e.g. Riley *et al.* 1972; O'Rand 1996; Settersten & Mayer 1997). Given the longevity increase, there is a revival interest among economists for the concept of 'life-cycle savings' introduced by Modigliani & Brumberg in 1954 (e.g. Bloom *et al.* 2003). Developmental psychology starts to be interested in the influence of gender, race, individual background and life experiences on the differentiation in human development (e.g. Neugarten 1969; Clausen 1986; Baltes & Baltes 1991; Baltes *et al.* 1999). Those evolutions contribute to blur the boundaries between disciplines.

The popularity of the Life Course approach lies probably in its ambition to meet all these challenges: bridging the micro and macro perspectives, accounting for the time and the various contexts in which an individual is embedded and overcoming the disciplinary boundaries in order to get a holistic understanding of the phenomenon's dynamics.
Following this idea, it seems that every phenomenon can be studied from a Life Course perspective by any researchers whatever their discipline. Although this is theoretically true, the history of the Life Course approach shows that, to date, some phenomena (e.g. ageing, family relationships, human development, etc.) were favoured and that the conceptualisation of the Life Course approach varies from one discipline to another (e.g. a focus on the Lifespan principle in psychology).

## *2. Glen Elder as 'the' thinker of the sociological variant of the 'Life Course' approach*

Glen Elder can be considered as one of the most important Life Course researchers (in general) and as a key reference for sociologists studying ageing from a Life Course perspective. First, he has carried out and coordinated a great deal of the so-called 'Life Course research'. Many of them deal with sociological issues such as family relationships and social changes (Elder 1977, 1978, 1987, 1991a, 1991b, 2001; Elder *et al.* 1986; Elder & Johnson 2002). Although Elder is not a specialist in ageing research[13], his works on human development or on age differentiation (Elder 1975, 1991c, 1998, 2002; Crosnoe & Elder 2002, 2004) give interesting insights in how to tackle the ageing processes and transitions from a Life Course vantage. Second, he is nearly almost always quoted in sociological works referring to the Life Course approach but he is also recognised in the handbooks as one of the great names of the Life Course approach (Furstenberg 2003; Marshall 1996; Bengtson & Allen 1993). Third, his way of theorising the Life Course approach, by stressing the link between micro and macro approaches and using social interactions (Linked Lives principle) as one of the bridging principle, makes his perspective of the Life Course highly 'sociological'. Moreover, he clearly situates the emergence and the development of the Life Course approach in the sociological tradition: to explain the macro-micro dichotomy that the Life Course approach tries to overcome, he opposes functionalists like Durkheim or Parsons and social exchange theorists such as Mauss or Lévi-Strauss to the interactionism of the Chicago school[14]. To support his plea for an integration of the structural and dynamic approaches in a comprehensive way (Giele & Elder 1998), he refers to master works of sociology: *The polish peasant in Europe and America* (Thomas & Znaniecki 1918-20) and *The sociological imagination* (Mills 1959) which both urge for longitudinal studies that replace the individuals in their various social contexts.

Elder is also a reference because of his attempt to synthesise the Life Course research and to draw the basis principles of a theoretical framework for a Life Course approach in sociology and, more broadly, in the social sciences. It is important to note that Life Course research was done far before

[13] Marshall (1996) highlights, in his chapter on 'aging theories', that most theories used by gerontologists come from other disciplines (sociology, psychology, biology, etc.).
[14] For Marshall (1996), this double source (functionalism and interactionism) makes the Life Course not only a 'bridging' theory (macro-micro) but also a 'linking' theory (both normative and interpretative). While the first dichotomy is identified in almost all the contributions using the Life Course approach, the latter is less often pointed out. It also seems that it refers more to the qualitative side of the Life Course approach and is therefore out of the scope of this paper.

its theorisation in the 90s. When Elder states that the Life Course is a theory, he does not mean that there is a defined body of hypotheses to test. Indeed, he refers to the definition of a middle range theory following Robert Merton (1968) and rephrased by Glen Elder as follows : "a theoretical orientation that establishes a common field of inquiry by defining a framework that guides research in term of problem identification and formulation, variable selection and rationales, and strategies of design and analysis" (Elder 1999 [1974]: 302).

### *3. The principles of the Life Course approach according to Glen Elder*

The Life Course theoretical framework is based on five principles: the two first, 'Lifespan' and 'Human Agency' represent the individual or the micro level approach, while the 'Time and Place' principle represents the societal or macro level approach. These two poles are bridged by the meso principles of 'Linked Lives' and 'Timing of Transition'. Before explaining each of these principles and their companion concepts, the specific status of the 'Lifespan' principle requires further explanation. If the four others are present in all the Elder's contributions or quotations referring to the Life Course's principles, the 'Lifespan' principle is sometimes missing (also in Elder's publications). Apparently, this principle comes from the psychological variant of the Life Course approach (named itself 'Lifespan' approach). Elder includes it as a fifth principle in his more recent contributions.

The Life Course approach states that, for understanding an individual phenomenon, it is necessary to account for the time and the multiple contexts in which it takes place. More precisely, five principles should be considered.

The two first 'Time and Place' and 'Lifespan' can be viewed as determining principles: they represent the institutional and biographical contexts where the individual is situated. The biographical context ('**Lifespan**') does not only refer to the current age or 'life-stage' of the individual, but it also refers to past stages or life events and to their influence on the study phenomenon. Ageing and human development are considered as a lifetime process during which positive and negative experiences are cumulated. The institutional contexts ('**Time and Place**') refer to the many aspects of the society at one moment in time: historical, geographical, economic, political, social and cultural structures and norms. Not only do these contexts play as enabling or disabling factors for the individual actions but they are also shaped by them. In other words, what is particular to the Life Course approach is to consider the micro and the macro levels as interdependent, each influencing the other one.

The two next principles 'Linked Lives' and 'Timing of Transition' can be considered as 'meso' principles which allow bridging the micro and macro levels. The '**Linked Lives**' principle is maybe the most sociological. It refers to the fact that individuals are not isolated, but belong to various social groups (family, work or school, peer-group, etc.) in which they play specific roles (mother, spouse, leader etc.). Through these groups, they are in contact with the institutions, their norms and rules. The '**Timing of Transition'** principle refers to the fact that each individual event or process takes place in a multi-dimensional time: historical, because it occurs at a given time and place, and chronological, because it occurs at a specific life-stage of the individual. The concept of individual '**trajectory'**, often used in Life Course studies is related to this principle. The idea is to study the succession of life-stages and social roles the individual has experienced over his life or a part of it: in which context do the changes occur? How are the various spheres of his life combined and how do they influence the evolution of the others (work, family, health, etc.).

The last principle '**Human Agency**' introduces a margin of freedom: individual behaviours are not entirely determined by the time process and the society in which they are living. Two people having similar social backgrounds or experimenting similar events during the same period of their life are not necessarily affected by them the same way. Likewise, two people being in the same situation at one point in time may have very different past histories.

Each principle, taken separately, is not specific to the Life Course approach. What makes the Life Course framework original and challenging is its attempt to link those principles in order to study events situated in time and context. However, in practice, most of the empirical articles claiming to follow a Life Course approach only refer to one or two of the five principles[15]. Indeed, the Life Course approach is more a theoretical or 'analysis' framework than a theory involving specific hypotheses to test. Most researchers will agree with its principles because they reflect the complexity of the social world, but, for the same reason, they will experience that, in practice, it is very difficult to account for whole its complexity in research. However, it is possible to use those principles to orient methodological choices and to enrich the interpretation of the research results.

## B. Using the Life Course approach to study the elderly family care evolution

The Life Course approach and its principles as developed by Elder (1977) will serve as theoretical framework to study the elderly family care in its complexity.

The first principle '**Time and Place**' means that a given elderly family care configuration should be situated in its geographical and historical context (what are the social policies or formal services available, what are the historical and demographic contexts in which the study population of elderly have grown up?). **The description of this context will be presented in chapter III and used for interpreting the analyses results.**

The second principle '**Lifespan'** reminds the necessity to situate the care situation in the lifespan of the care-receiver: the quality of the past relationship with the spouse and children, the past social life, lifestyle etc. will influence both the care needs and the care resources of the elderly. The reciprocity principle should probably better work for a person who was formerly kind and helpful. **The PSBH survey has not provided many questions on the past life of the elderly respondent (except for school attainment, religious education, and few questions on the respondent's parents which are usually poorly answered: father social status, etc.). The Lifespan principle can therefore not be analysed in the dissertation.**

The third principle '**Linked Lives**' highlights the fact that 'caring' implies an interaction between, at least, two people and that the existence of this relationship and its modalities would be - more or less explicitly -negotiated by these actors, but also influenced by the other potential care provider choices: lives are linked and individual choices are interdependent. **In the dissertation, the care provided by the spouse, the daughter(s) and the son(s) will be analysed separately, controlling for the presence of the two other types of potential care-givers. Additionally, the use of care services in complement or in substitution to elderly family care will be studied when controlling for the family composition of the elderly. All these analyses (studying the presence of a specific care relationship, including the presence of other potential care relationships in the model) account for the principles that care decisions are linked.**

Applied to elderly family care, the fourth principle, '**Timing of Transition**' refers to fact that the temporality of caring (duration, current life-stage of the potential care-givers and the care-receiver) will affect the care needs: for instance, caring for a parent just after the death of the other parent is not the same as caring for a parent who lived alone for a long time. It will also affect the availability of care resources: children may be less available to care when they have themselves young children

[15]This observation is based on the paper I prepared for the Workshop in Amsterdam (see footnote 11): It presents a literature review of the articles applying a Life Course approach in quantitative research related to an ageing issue. I wrote this paper at the beginning of the dissertation process because I wanted to know how and to what extent it would be feasible to apply the Life Course approach in the dissertation. The literature review methodology and the analysis of the reviewed articles can be found in appendix I.

to care for and when they are still in the labour market. It may also act on the consequences of care: working care-givers close to retirement age are more likely to exit definitively the labour market in order to have more time for caring. **The fact that the dissertation studies the determinants of elderly family care over time is already a way to highlight the importance of time and is, therefore, a way of applying the 'Timing of Transition' principle. Alongside, efforts will be made to rebuild the family care trajectory (a Life Course concept related to the 'Timing' principle): first, in the analysis of the literature review (chapter II): the main findings of the previous research will be reorganised in order to rebuild what could be a typical elderly family care; second, in the analyses, by describing the main care sequences and trying to explain changes in some care characteristics (chapter X).**

The last principle '**Human Agency**' tells that, after having accounted for all the contexts and determinants of a caring situation, there is still room for individual freedom: it might be expressed in the way a 'sandwich' woman will manage her multiple roles; when a daughter will try to negotiate and share the care responsibility with her siblings, even though everybody expect her to assume the totality of the father care; or when an elderly man decides to not declare to the interviewer that he helps his wife to take a bath, because he considers this as a private matter. **This last principle is undoubtedly the most difficult to operationalise in quantitative research, because it is, somehow, the 'unexplained variance', the individual differences which remain after having accounted for the general context and controlling for the socio-demographic and economic variables. In depth qualitative inquiries are better suited to shed light into how a given individual rebuilds his story and develop his own coping strategies.**

Beyond, the five principles, adopting a Life Course approach had some implications on the dissertation methodological choices. The most obvious is the use of panel data (which allows following the evolution of the elderly care over time). Another important implication is the choice for a cohort approach (see frame I-3).

Demographers distinguish three types of time effects: the cohort[16], the age and the period effect (see among others, Ryder 1965; Hobcraft *et al.* 1982). A same research topic (e. g. women providing parental care) can be studied from the three points of view:

- From a cohort approach, the question can be: Are women of the birth cohorts 1950-1955 more likely to provide long-term elderly care than the cohorts 1930-1935? Due to the increase in life expectancy and in the life expectancy in good health, among the birth cohorts 1950-1955, the proportion of adults having a moderately disabled elderly parent still living at-home is higher than for the birth cohort 1930-1935, therefore one may think that the members of the older cohort are more likely to provide care to their parents;
- From an age point of view: are women aged 50-55 more likely to care for an elderly parent than those aged 30-35? Older women have usually older parents, who are more likely to need care because of their old age, therefore one may think that the older group of women is more likely to provide care to their parents;
- From a period point of view: are middle-aged women more likely to provide care after the introduction of the *Mantelzorg* allocation in the Province of Limburg? In some Flemish provinces, the registered informal care providers are entitled to receive a kind of allocation to partially compensate for the cost of care. One may expect that this measure introduced in 2001 will increase the number of women who declare themselves as care provider in the provinces where this allocation is available.

[16] A cohort is defined by the timing of a given event (such as birth, marriage, exit a given education level, etc.) considered as an 'event-origin' (e.g. the marriage cohort 2000-2005 includes all the people who get married between 2000 and 2005, whatever their age).

It is impossible to perfectly disentangle the three of them[17] (Glenn 1977; Palmore 2001). Based on the theory and the research focus, one has often to choose which effect will be favoured (Mayer & Huinink 1990; Alwin & McCammon 2003). Let examine the major advantages and disadvantage of each approach for the study of elderly family care evolution:

For the dissertation, the decision was taken to favour the cohort approach. This choice can be justified by the selective affinities between the Life Course theoretical framework and the cohort approach (described at length in Uhlenberg & Miner 1995) and by the presence of major disadvantages identified in the two other approaches:

- The **age effect** approach presents some shortcomings for the study of elderly family care for three reasons. First, because, **in the later life**, a given age does not have a specific meaning in terms of care needs (people being aged 65 in 2010 are globally healthier than those aged 65 in 1960, partly because their 'lifestyle', context and experience greatly differ). Second because, in later life, small age differences tend to be less meaningful (differences in terms of development process are smaller between 65 and 69 years of age than between 5 and 9 years of age). Third because the ageing process widely varies from one individual to another (according to the social class, the past life experiences and lifestyles). Two people may have the same 'chronological age' at the same period of time but one may be 'biologically' older than the other. In the three above points, the importance of the life experiences and lifestyles clearly appear: in doing so, when explaining why not to using age, we confirm why preferring the cohort approach.
- The **period effect** approach is usually favoured when there is a change in context (policy measures, socio-economic changes, historic events, etc.) during the study period and that this change is likely to influence the study phenomenon the same way for all the cohorts (Elder *et al.* 2003). In the dissertation research, the study period is 1994-2002 (see chapter V) and the study phenomenon is family care. Although there are some changes in elderly care policies over the study period (see chapter III), no period effect is expected.

The **cohort effect** approach is preferred because it is assumed that the experience and characteristics of the care received by an elderly person are very much influenced by his past life and the socio-economic and cultural environment in which he has grown up. Another argument is that this approach would allow discussing the validity of the research results for the future cohorts of elderly in the general conclusion. Being aware of the particular characteristics of the study cohorts and their potential influence on the study phenomenon (family care) allow speculating as to the future of the next cohorts: if the new cohorts of elderly are better educated, less often married and have less children, what would be the implications for elderly care in the XXI$^{st}$ century?

Concretely, the year of birth will be the 'event-origin' used to define the cohorts. For studying the elderly family care provided over the period 1994-2002 in the PSBH data, the birth cohorts have to be defined such as they are 'at risk' of receiving family care during the panel. The decision was to work with the respondents aged 65+ in 1994, who are the survivors of the **birth cohorts 1900-1929**. The sub-division into birth cohort groups to compare will be justified in chapter VII.

[17] As soon as two of them are defined, the third is fully determined (e.g. if one fixes that the study population reached the age of 65 (age) in 2000 (period), they all belong to the 1934 birth cohort). In longitudinal data with many measurements of time, it is sometimes possible to distinguish two of the three effects (e.g. comparing the evolution over time of different birth cohorts).

## *CONCLUSION*

The purpose of this chapter was to set the theoretical bases of the dissertation: presenting and discussing the main concept 'elderly family care' and introducing the sociological Life Course approach and its principles.

Section I focuses on the 'elderly care concept'. It shows how this concept is difficult to define for research but also for the people involved in the care relationship. The major theories mobilised to describe and explain family solidarities are briefly presented. They all highlight the complexity of the phenomenon and give complementary insights for its understanding (the 'ambivalence', 'past relationship history', 'negotiation', 'reciprocity', 'attachment', are all one of the many aspects involved in the relationship). The specific case of spousal care sheds light on another specificity of elderly family care: the risk of under- or over-declaration. A specific point illustrates the possible gaps between received, perceived and declared care. The last point of this section deals with measurement of care in quantitative research: after having acknowledged the complexity of the study phenomenon, it is necessary to make up a decision. The **quantitative** approach is chosen because it allows identifying trends and care situations. These results, based on a large and representative sample of Belgian elderly living in the community might be useful for policy makers willing to develop long-term elderly community care. The secondary analysis of a panel survey is also motivated by the fact that it allows studying the evolution of care and its determinants over a period of nine years. This would not have been possible if qualitative or quantitative data would have been collected during the dissertation research (which only lasted four years). Any quantitative approach of elderly family care implies simplifications and choices. A first choice is to use **the elderly potential care-receiver as unit observation.** It seems to be the best people to interview on his personal care situation[18]. Another reason is that, if one wants to study the evolution of needs and care of an elderly, the unit of observation should be this elderly. This choice has also disadvantages. One of them is that the care-receiver tends to be more likely to under-declare or under-estimate the received care (Klein Ikkink *et al.* 1999). But, the reverse is true if the potential care-giver is chosen as unit of observation: according to the authors, the risk, in this case, is the over-declaration or over-estimation of the provided care. All in all, the choice for the elderly seems to be the best, but it might be more sensible to wait for the literature review (chapter II) for confirming this choice. The second choice was to define and to measure elderly family care using the **IADL** and **ADL**. An elderly would be considered as care-receiver if he declares receiving care for the IADL and/or the ADL. If the care is provided by his spouse and his children, he is considered as receiving 'family care'; if the care comes from other care providers, he is considered as receiving 'care services'. The choice for the IADL and the ADL is motivated by their interest for social policy measures, because of their non-ambiguity, and of the fact that questions on the care received for those activities are common in surveys. A last justification for this choice is that, in the PSBH, the questions on care are asked using the ADL and the IADL. This choice presents some limitations which should be acknowledged: first, the ADL and the IADL represent only part of the activities for which the elderly can receive care. As mentioned earlier, some authors include emotional support, visits etc. in their care definition. However, the ADL and the IADL are probably the most 'objective' and 'observable' activities (e.g. preparing the meal is a very concrete and unambiguous act while 'listening to complains' or 'provide affection' is more difficult to observe and is more subjected to personal assessment). Third, part of the IADL is routine housework and is likely to be distributed among the household members. This can influence the perception and/or the declaration of the care provided by each of the household members and will probably lead to an under-declaration of the care if the care-giver is usually in charge for the IADL.

[18]The only exception would be the case of elderly having severe cognitive problems (but these elderly are less likely to live in the community and to participate in surveys. Moreover, the dissertation focuses on the general population of elderly and not on those having very specific health problems).

Following the idea of focusing on the most 'objective' and 'unambiguous' variables, a last analysis choice is made at this point: to consider only the socio-economic and demographic determinants of elderly family care. The psychological and attitudinal variables will not be considered because their definition is likely to vary between individuals. Another reason for this choice is simply that such variables are not available in the standard PSBH questionnaire[19].

Section II presents the sociological variant of the **Life Course** approach, its principles and tends to assess how and to what extent this theory could be used in the dissertation research. The popularity of this approach mainly lies in its holistic point of view: it urges for resituating the study phenomenon in its timing and in its various contexts. Most of the social scientists will agree with the fact that contextualising is important but, although the increasing availability of longitudinal data and the development of adequate statistical methods (Bengtson *et al.* 2005), I could not find any study on ageing integrating the five Life Course principles. Indeed, the Life Course is not considered as a body of hypotheses to test, but rather as a way of approaching the phenomenon, as a theoretical framework which offers key concepts for the study of changes and which orients the methodological choices and the interpretation of the results. Applied to the quantitative study of elderly family care, the Life Course led to opt for a **cohort approach**, to make a detailed description of the historical and demographic context of the study cohorts ('Time and Place'); strengthens the choice of adopting a longitudinal approach to family care ('Timing of Transition') and reminds that, as family care is a relationship between two individuals which occur in a broader social context, it is likely to be influenced by the other relationships and roles in which the two individuals are involved ('Linked Lives' principle). When presenting the feasibility of applying the Life Course approach to the PSBH data, two limitations were already put forward: the length of the panel, the content and the type of questionnaires used do not allow applying the 'Human Agency' and the 'Lifespan' principles.

[19] Some questions about attitudes and expectations were asked in specific modules at one or at another given wave but not at every year. They are therefore unusable in an analysis of elderly care evolution.

# CHAPTER II

## STATE OF THE ART ON THE ELDERLY FAMILY CARE DETERMINANTS

Chapter I showed the diversity of the care situations and the necessity to adopt a specific care definition and a theoretical point of view to approach the phenomenon. At the end of the chapter, some decisions were taken. Among them, are to focus on the IADL and ADL care provided by spouse and children and the use of the Life Course approach as a theoretical framework. The next step of the theoretical construction is to make a systematic study of the quantitative literature on family care determinants.

The main purpose of this chapter is to see how the characteristics of family care and their evolution over time have been studied in the quantitative literature. This analysis would allow identifying the main determinants of family care and formulating hypotheses on the direction or the conditions in which they influence family care.

**Section I** presents the systematic literature review methodology and its results. In order to follow the Life Course approach - which highlights the cumulativity of the life events - the results will be presented like a 'family care story': the idea is to use the literature to rebuild the different steps of the family care trajectory (from the determinants of starting giving/receiving care to the determinants of ceasing giving/receiving care). This section ends with a discussion on the impact of the research design on the results. **Section II** introduces two theoretical elements which allow organising and complementing the systematic literature review. The first is the behavioural model. It is used to classify the family care determinants. The second are the theories on 'informal-formal care articulation'. It complements the literature review which focuses only on family care and makes the link with the two next chapters which will describe the Belgian context and analyse which care sources are favoured by the elderly care policies or preferred by the population.

# *SECTION 1. Systematic literature review*

Studies on the determinants of family care for elderly are numerous, but no consensus can be drawn on how the care responsibility is shared among the family members and over time.
Most research on care is cross-sectional and/or focuses on a specific characteristic of care or on a specific care-giving relationship. Each of them tells a part of the story (Peek *et al.* 1997). This partial view might explain mixed results.
Inspired by the Life Course approach, which highlights the cumulativity of the life events, I will attempt to identify the different stages of the family care story from the existing literature. This analysis also gives the opportunity to assess how design differences may influence the research results.

## A. Literature review methodology

### *1. A qualitative review of quantitative studies*

Many literature reviews have been conducted on family care but relatively few of them made explicit the criteria of articles selection. Indeed, most of them propose either an **'integrative review' (**Whittemore & Knafl 2005): their aim is to give an overview of the main contributions (theoretical, conceptual and empirical) made in a given area (here: elderly (family) care) during a given period and to identify the aspects which need to be developed in the future (e.g. Blieszner & Alley 1990; Brubaker 1990; Allen *et al.* 2000; Houde 2002; Carpentier & Ducharme 2003; Silverstein & Giarrusso 2010) or a '**critical review'** adopting a reflexive point of view on the reviewed articles (e.g. Abel 1990, Doress-Worters 1994; Walker *et al.* 1995). In both cases, there is usually no specific systematic methodology used to read and compare the reviewed articles.
Only five examples of meta-analysis reviewing informal care were found (Miller & Cafasso, 1992; Miller & Weissert 2000; Lim & Zebrack 2004; Stoltz *et al.* 2004; Goins *et al.* 2009) and none of them concerns quantitative research on the determinants of family care for older adults living in the community.

Quantitative meta-analysis methods are usually applied for comparing the results of experimental studies: it is possible to measure the effect of one variable on an outcome controlling for all the other variables (Manzoli *et al.* 2007). In social sciences, most of the studies use a non-experimental design and then, it makes quantitative meta-analysis methods more difficult to apply: it is often impossible to isolate the net effect of one variable across the reviewed studies[1]. However, alternative forms of meta-analysis have been developed applying the basic principle of meta-analysis – to ask the same questions to various sources to see what are the regularities and the reasons for the variations - to non-experimental designs: qualitative meta-analysis of quantitative studies may be data-based or theory-based. The first kind is more similar to the meta-analysis of experimental designs, but the results are not compared in terms of effect size, but in terms of significance of the results (Algera *et al.* 2004; Lim & Zebrack 2004) and direction of the effect (Miller & Weissert 2000). The second kind of meta-analysis starts with one theory and seeks how quantitative studies operationalised it (Masuy-Stroobant 2002; Greenhalgh *et al.* 2005), or presents competing theories and assesses whether one is better supported by empirical studies tried to than the others are (Messeri *et al.* 1993).

[1] However Montgomery *et al.* (2009) offer an example of quantitative meta-analysis done on non-experimental studies of elderly care. To have comparative designs, their review was limited to four studies (selected out of 58,431 screened references).

The purpose of this chapter is not to make an integrative literature review on all the characteristics and theories related to family care but to progress in the construction of the theoretical scheme which will present the hypothetical answer to the three specific research questions. The literature review needs therefore to be **thematically focused** (on specific family care characteristics studied in countries having a quite similar culture, standard of living and access to services as in the dissertation population of interest) but **methodologically opened** (at this stage, the methodological decisions have non been fixed, it is therefore interesting to approach the different methodological choices made by researchers studying determinants of family care and to identify their advantages, disadvantages and impact on the results). The approach should be **systematic** (to not overlook significant contributions) and '**qualitative'** (the purpose is not to compare the effect size of specific variables through a corpus of standardised studies but to identify trends in a heterogeneous corpus and, in fine, to be able to rebuild a type of family care trajectory).

## *2. Articles selection*

The search methodology was adapted from Fink (2005) and the literature review guidelines of the Belgian Health Care Knowledge Centre-KCE[2] (Cleemput *et al.* 2007)[3].

The search was initially performed in 2008 (at the beginning of the dissertation research) for the period 1990-2007. The search was later updated for the period 2008-2010 (last completed year before the end of the dissertation research).
The databases used for the articles search were either **multi-disciplinary**: *Blackwell* (number of screened references: 1,142[4]), *Ebscohost* (334), *J-Stor* (851), and *Sage* (860); **in social sciences and medicine**: *PubMed* (1,013), *ScienceDirect* (255), *Sociological Abstract* (351) or **specialised in ageing**: *Ageline*[5] (360), *Agelib*[6] (144), *Geronlit database*[7] (601), *IUGM database*[8] (576). In addition, manual search was done for *Journals of Gerontology: Social Sciences* and *The Gerontologist.*

Both inclusion and exclusion criteria were defined in order to get a very well-defined basic corpus of articles to be reviewed:

**Inclusion criteria:**

**1.** The title or the abstract of the article should contain keywords from each of the three following groups:

- '**Elderly'** or cognates: senior/ old aged/old(er) adult/aging/ageing/ older people/old people/elder;
- '**Family'** or cognates: parent, mother, father, primary/main care-giver/caregiver, child/children, daughter, son, spouse/spousal, couple/partner, relative, informal;
- '**Care'** or cognates: care-giver/nursing/caregiver/caregiving/help/instrumental support/personal support/assistance.

**2.** The article uses **multivariate** analysis to study the determinants of one or multiple characteristic(s) of **elderly family** (ADL and/or IADL) **care** on a sample including **at least 100**

[2] *Centre fédéral d'expertise des soins de santé/ Federaal Kenniscentrum voor de Gezondheidszorg.*
[3] More details on the methodological steps can be found in appendix II.
[4] Numbers are based on the initial search (carried out in 2008 for the period 1990-2007). It gives an idea of the frequency of quantitative articles on family care available in each database. Between 2008 and 2010, the characteristics and the access conditions of the electronic databases have evolved. Some databases have merged, some have revised their 'query' options, some have disappeared, etc. It is therefore impossible to give the exact number of candidate articles identified by each database for the entire period (1990-2010).
[5] Online database of the American Association of Retired Persons (AARP)
[6] Online catalogue of the Institute On Aging Library (Carolina, US)
[7] Online catalogue of the German Centre of Gerontology Library
[8] Online catalogue of the *Bibliothèque de Gériatrie et de Gérontologie* (*Institut universitaire de gériatrie de Montréal*-IUGM).

**respondents.**

- Studies including only projections, descriptive or bivariate analyses, or which do not specify the significance level of the independent variables included in the multivariate analysis are excluded.
- The dependent variable can refer specifically to elderly care provided by spouse and/or children (the care-givers) or also refer the care provided by other sources (care-providers)[9].
- If the article studies different care characteristics on different sub-samples, only the analyses carried out on at least 100 respondents are considered for the review.

**3.** The article is written in **English**[10] and has been published in a **journal** between **1990**[11] and **2010.**

**4.** The article analyses elderly family care in a **Western** country (Europe or North America).

**Exclusion criteria:**

**1.** The article studies care provided to institutionalised elderly or to a very specific sub-group of elderly: minorities, elderly in rural areas, having a particular disease (e.g. dementia) or receiving palliative care;

**2.** The article studies only the care provided by children in-laws, siblings, friends, neighbours, volunteers or professionals, but not the care provided by spouse and/or children;

**3.** The article studies the care consequences. In this case, the care (characteristics) is (are) considered as independent variable(s). Similarly, studies using simultaneous equations (e.g. for estimating the number of caring hours and working hours at the same time) are excluded because the care characteristics are also considered as independent variables.

**4.** All the independent variables refer to subjective characteristics (questions on a same subjective aspect - filial concern, for instance – vary very much across surveys, which makes comparisons difficult);

**5.** The article studies the care provided to any care-receiver (including children, the disabled, etc.) but not specifically elderly care;

**6.** The level of significance of the care determinants is not specified.

Noteworthy, the care related criteria are quite similar to the dissertation definition of family care: only articles studying IADL or ADL care provided by spouse and/or children to an elderly relative are eligible for the review. But the population related criteria are not restricted to the dissertation

[9] It implies that the results will sometimes refer specifically to 'care-givers' (spouse and children) and sometimes refers more generally to (informal) 'care-providers'.

[10] Initially, it was planned to search in the journals written in French. However, most of the used databases allow searching in English-written journals only. To overcome this 'databases bias', I did manual search in the French-written journals in which I had already found articles presenting quantitative analyses on gerontology (*Économie et Statistiques Études et Résultats, Gérontologie et Société, Population, Population et Société, Retraite et Société, Recherches et Prévisions*). I realised that most of the quantitative analyses were only descriptive and that the few explanatory ones were also published in English-written journals. Doing manual search in all the French-written journals which might include quantitative analysis of family care would have been very time consuming and probably not fruitful. Therefore, I decided to focus on English-written literature.

[11] The year 1990 was chosen as cut-off because it is the beginning of the decade during which the PSBH data were collected. Publications of that time reflect the challenges and the questions related to the ageing population at the moment when the survey was designed. I accepted articles using data from before 1990. The reason for that is twofold. There is always a delay between the time when the data are collected and the time when they are available for research. Most of the articles from the early 90s used data from the previous decades. The second reason is that one of the major part of the US articles (even the more recent ones) refer to the National Long-Term Care Survey (NLTCS) which started in 1982. If all those articles were eliminated from the selection, a set of researchers and part of the development of knowledge on the topic would have been neglected.

population of interest (Belgian birth cohorts 1900-1929). The reasons are the following: (1) As the literature review is international, the 'Belgian' criterion is not tenable; (2) Most of the studies define the 'elderly' using an age threshold criterion (which can vary from 45 to 85 year). It is of course possible to reconstruct the birth cohorts on the basis of the age at the time of the survey interview. However, it does not have sense because (a) the cohort approach was chosen to account for the common culture and experiences lived in the Belgium context; (b) it would lead to reject the most recent studies because they do not include enough survivors of the study birth cohorts 1900-1929; (3) studies having the (potential) family care-giver as observation unit were accepted too. They could provide useful information on the impact of (potential) care-giver characteristics on elderly family care. Furthermore, comparing their results with those obtained in studies working on the elderly (potential) care-receivers population allows balancing the two options and identifying additional advantages and potential disadvantages of choosing the elderly potential care-receiver as observation unit (as it was decided in chapter I). In short, the sole 'elderly' related requirement is that the article studies the care provided specifically to the elderly (whatever the unit of observation and the particular definition of 'elderly').

## B. Results of the systematic search

Sixty-three articles met all the criteria and were selected for the review. Table II-1 describes their main characteristics: survey name, country and time of the data collection; unit of observation, sample size and age of the elderly (potential) care-receivers; studied care characteristic(s) and statistical methods used and sample size; author(s) and publication data. A reference number [1]-[63] was assigned to each study according to its publication date, the studied countries and the first author. For parsimony purpose, these numbers will further substitute the usual referencing system (author(s) and date) in the text and the tables.

**TABLE II-1:** Reviewed articles sorted by chronological order, country and authors

| Ref. # | Authors and publication date | Country/ countries | Data source[a] | Data collection period[b] | Study sample[c] | Elderly cohort [d] | Dependent variable(s) [e] | Statistical method(s) |
|---|---|---|---|---|---|---|---|---|
| **[1]** | Penning & Chappell (1990) | CA | Original sample | 1985 | disabled elderly (n=743) | -1925 (60+) | # care-givers | OLS regression |
| **[2]** | Penning (1990) | CA | Original sample | 1985 | Elderly (n=1,284) | -1915 (70+) | Caring IADL | Binary logistic regression |
| **[3]** | Dwyer & Miller (1990) | US | NLTCS, ICS | 1982 | Main care-giver (n=1,388) | -1917 (65+) | Hours caring | Structural equation |
| **[4]** | Edelman & Hugues (1990) | US | Hospital-based sample | 1979 | Caring Network of disabled elderly receiving formal care (n=**225**) | -1919 (60+) | (a) # of ADL/IADL tasks<br>(b) Intensity of ADL/IADL care | OLS regression |
| **[5]** | Roberts & Bengtson (1990) | US | Longitudinal study of generation | 1971 | Dyad elderly-children non-cohabitant care-giver (n=363) | -1903 (68+) | Caring IADL | Structural equation |
| **[6]** | Soldo *et al.* (1990) | US | NLTCS | 1982 | Elderly (n=**1,070**) | -1917 (65+) | Child main care-giver | Multinomial logistic regression |
| **[7]** | Spitze & Logan (1990) | US | NHIS | 1984 | Elderly (n=**1,072**) | -1919 (65+) | Caring | Binary logistic regression |
| **[8]** | Chappell (1991) | CA | Original sample | 1985 | Elderly (n=1,285) | -1915 (70+) | Caring IADL | Binary logistic regression |
| **[9]** | Chappell & Blandford (1991) | CA | Original sample | 1985 | Elderly (n=1,285) | -1915 (70+) | Caring ADL | Binary logistic regression |
| **[10]** | Boaz & Muller (1991) | US | NLTCS, ICS | 1982 (2 fictive waves) | Effective care-givers of a disabled elderly (n=1,746) | -1917 (65+) | Ceasing care | Binary logistic regression |
| **[11]** | Dwyer & Coward (1991) | US | NLTCS | 1982 | Children potential care-givers (n=13,172) | -1917 (65+) | Caring ADL, IADL | Binary logistic regression |
| **[12]** | Miller & McFall (1991) | US | NLTCS, ICS | 1982-84 (2 waves) | Elderly (n=**644**) | -1917 (65+) | Change # ADL/IADL | OLS regression |
| **[13]** | Spitze & Logan (1991a) | US | Original sample | 1989 | Children non cohabitants potential care-givers (n=460) | Average 1917 (72) | Caring,<br>Hours caring | OLS regression |

**TABLE II-1:** Reviewed articles sorted by chronological order, country and authors (continued)

| Ref. # | Authors and publication date | Country/ countries | Data source[a] | Data collection period[b] | Study sample[c] | Elderly cohort [d] | Dependent variable(s) [e] | Statistical method(s) |
|---|---|---|---|---|---|---|---|---|
| **[14]** | Spitze & Logan (1991b) | US | Original sample | 1989 | Children non-cohabitants potential care-givers (n=460) | Average 1917 (72) | Caring | OLS regression |
| **[15]** | Whitbeck *et al.* (1991) | US | Panel study of the impact of economic strain | 1989 | Dyad Child potential care-givers (n=451) | Na | Caring | Structural equation |
| **[16]** | Dwyer *et al.* (1992) | US | NLTCS | 1982-84 (2 waves) | Children: starting (n=**5,520**), ceasing ADL (n=**422**) ceasing IADL(n=**1,423**) | -1917 (65+) | Starting ADL/IADL Ceasing ADL/IADL | Binary logistic regression |
| **[17]** | Miller & McFall (1992) | US | NLTCS, ICS | 1982-84 (2 waves) | Elderly (n=**644**) | -1917 (65+) | Change in # of care-givers ADL/IADL | OLS regression |
| **[18]** | Spitze & Logan (1992) | US | Original sample | 1989 | Children non-cohabitants potential care-givers (n=**681**) | -1924 (65+) | Caring IADL | Binary logistic regression |
| **[19]** | Stoller & Cutler (1992) | US | SoA | 1984 | Disabled elderly network with ADL disability (n=1,116) with IADL disability (n=1,311) | -1929 (55+) | # of non-cohabitant care-givers for ADL, IADL | Binary logistic regression |
| **[20]** | Lee *et al.* (1993) | US | NLTCS | 1982 | Children potential care-givers ADL (n=**4,371**) IADL (n=**5,090**) main carer (n=**2,235**) | -1917 (65+) | Caring ADL, IADL, main child care-giver is a daughter | Binary logistic regression |
| **[21]** | Merrill (1993) | US | ICS | 1982 | Daughter (in-law) effective care-givers (n=656) | -1917 (65+) | Hours caring<br># ADL tasks<br># IADL tasks<br>Main care-giver | OLS and Binary logistic regression |
| **[22]** | Silverstein & Litwak (1993) | US | Original sample | 1978 | Dyad elderly- child main care-giver (n=910) | -1913 (65+) | Caring IADL | Binary logistic regression |
| **[23]** | Tennstedt *et al.* (1993) | US | Original sample | 1989 | Dyad main care-giver (n=445) | -1915 (74+) | Caring ADL, IADL Hours caring ADL, IADL | OLS and Binary logistic regression |

**TABLE II-1:** Reviewed articles sorted by chronological order, country and authors (continued)

| Ref. # | Authors and publication date | Country/ countries | Data source[a] | Data collection period[b] | Study sample[c] | Elderly cohort [d] | Dependent variable(s) [e] | Statistical method(s) |
|---|---|---|---|---|---|---|---|---|
| **[24]** | Kasper *et al.* (1994) | US | NLTCS, ICS | 1982<br>(2 fictive waves) | Dyad main care-giver (n=1305) | -1917<br>(65+) | Ceasing care | Binary logistic regression |
| **[25]** | Lee *et al.* (1994) | US | Original sample | 1992 | Dyad child main care-giver (n=387) | -1927<br>(65+) | # IADL | OLS regression |
| **[26]** | Whitbeck *et al.* (1994) | US | Panel study of the impact of economic strain | 1989<br>(3 waves) | Dyad child potential care-givers by gender (n=451) | Na | Caring ADL, IADL | Structural equation |
| **[27]** | Penrod *et al.* (1995) | US | Hospital-based sample | 1989 | Dyad main care-giver of (disabled) elderly back home after acute care (n=**175**) | Na | Hours caring<br>Caring for ADL,IADL<br>(a) housework<br>(b) administrative tasks | OLS and binary logistic regression |
| **[28]** | Silverstein *et al.* (1995) | US | Longitudinal study of generation | 1985-91<br>(3 waves) | Dyad child potential care-givers(n=**521**) | Average 1917<br>(68) | Caring IADL | Structural equation |
| **[29]** | Connidis *et al.* (1996) | CA | WFS | 1991-93 | Employed children effective care-givers (n=1,015) | Average 1916<br>(74) | Hours caring<br>Other care-giver(s)?<br>(a)mother only<br>(b) father only<br>(c)both parents | OLS and binary logistic regression |
| **[30]** | Denton (1997) | CA | GSS | 1985 | Disabled elderly (n=**1,450**) | -1920<br>(65+) | Caring ADL,IADL | Binary logistic regression |
| **[31]** | Broese Van Groenou & van Tilburg (1997) | NL | LSN, LASA | 1992-93<br>(2 waves) | Caring network of disabled elderly (n=**384**) | 1903-1937<br>(55+) | Intensity IADL<br>Change IADL | Multi-level regression (Growth modelling) |
| **[32]** | Peek *et al.* (1997) | US | LSA | 1984-90<br>(4 waves) | Elderly (n=**5,151**) | -1914<br>(68+) | Caring<br>Stop care | Transition matrix |
| **[33]** | van Tilburg (1998) | NL | LSN, LASA | 1992-96<br>(3 waves) | Elderly<br>(n=**2,903**) | 1908-1937<br>(55+) | caring IADL | Multi-level regression |
| **[34]** | Doty *et al.* (1998) | US | NLTC, ICS | 1989 | Dyad women main care-giver (n=587) | Average 1929<br>(60) | Hours caring | Binary logistic<br>OLS regression |
| **[35]** | Davey & Patsios (1999) | US<br>UK | AHEAD, GHS | 1994 | Elderly<br>US (n=1847),UK (n=1203) | -1924<br>(70+) | Caring ADL | Binary logistic regression |

**TABLE II-1:** Reviewed articles sorted by chronological order, country and authors (continued)

| Ref. # | Authors and publication date | Country/ countries | Data source[a] | Data collection period[b] | Study sample[c] | Elderly cohort[d] | Dependent variable(s) [e] | Statistical method(s) |
|---|---|---|---|---|---|---|---|---|
| **[36]** | Barrett & Lynch (1999) | US | NLTCS | 1982 | Disabled elderly (n=**5,551**) | -1917 (65+) | # care-givers | OLS and binary logistic regression |
| **[37]** | Martire *et al.* (1999) | US | CHS | 1989-93 (5 waves) | Disabled elderly (n=**4,662**) | -1924 (65+) | Intensity of care, Change in IADL | Multi-level regression (Growth modelling) |
| **[38]** | Parrott & Bengtson (1999) | US | Longitudinal study of generation | 1988-91 (2 waves) | Dyad child potential care-givers(n=**680**) | Na | Caring IADL | Binary logistic regression |
| **[39]** | Campbell & Martin-Matthews (2000) | CA | WFS | 1991-93 | Employed Son(in-law) effective care-givers IADL(n=**374**), ADL (n=**127**) | -1928 (63+) | # ADL, IADL | OLS regression |
| **[40]** | Dautzenberg *et al.* (2000) | NL | Original sample | 1996 | Daughter (in-law) For caring: potential care-givers (n=**581**), For hours caring: effective care-givers (n=**232**) | Na | Caring, Hours caring | OLS and binary logistic regression |
| **[41]** | Stoller & Pugliesi (2000) | US | Original sample | 1979-1986 (2 waves) | Children caring network (n=**173**) | -1907 (72+) | # care-givers # IADL/ADL | Structural equation |
| **[42]** | Laditka & Laditka (2001) | US | Panel Study of Income Dynamics | 1993 | Children not in cohabitation caring network: potential care-givers (n=**5,458**), effective only (n=**1,323**) | -1929 (64+) | Caring, Hours caring | binary logistic regression, Multi-level regression |
| **[43]** | Checkovich & Stern (2002) | US | NLTC | 1982-84 (2 waves treated separetely) | Children effective care-givers (n1982=**2,635**) (n1984=**2,426**) | -1917 (65+) | Hours caring | OLS regression |
| **[44]** | Broese Van Groenou & van Tilburg (2003) | NL | LSN | 1992 | Elderly (n=2,543) | 1903-1937 (55+) | Caring IADL | Structural equation |
| **[45]** | Lee *et al.* (2003) | US | Original sample | 1989 | Daughters (in-law) (n=**293**) Sons (in-law)(n=**287**) not cohabiting potential care-givers | Average 1914 (75+) | Hours caring | OLS regression |
| **[46]** | Shuey & Hardy (2003) | US | HRS | 1992 | Children couple potential care-givers (n=**3,529**) | 1931-1941 (51-61) | Caring (ADL/money), caring ADL only | binomial and multinomial logistic regression |

**TABLE II-1:** Reviewed articles sorted by chronological order, country and authors (continued)

| Ref. # | Authors and publication date | Country/ countries | Data source[a] | Data collection period[b] | Study sample[c] | Elderly cohort [d] | Dependent variable(s) [e] | Statistical method(s) |
|---|---|---|---|---|---|---|---|---|
| **[47]** | Sarkisian & Gerstel (2004) | US | NSFH | 1994 | Children (in law) potential care-givers (n=7,350) | Na | Caring<br>Hours caring | Zero-inflated negative binomial |
| **[48]** | Taylor & Lynch (2004) | US | EPESE | 1987-96<br>(4 waves) | Children caring network (n=**3,876**) | -1922<br>(65+) | # ADL/IADL, Change in # ADL/IADL | Multi-level regression (Growth modelling) |
| **[49]** | Geerlings *et al.* (2005) | NL | LASA | 1993-99<br>(3 waves) | Elderly (n=**983**) | -1938<br>(55+) | Caring | Binary logistic regression |
| **[50]** | Grundy & Henretta (2006) | UK-US | RS, HRS | 1988(UK)<br>1998(US) | Daughter (in-law) potential care-givers<br>UK married (n=**276**)<br>US married (n=**1,654**)<br>unmarried (n=**565**) | UK :-1933<br>US:1931-1941<br>(55+,57-67) | Caring for parent<br>(a) married US<br>(b ) married UK<br>(c) unmarried | Binary logistic regression |
| **[51]** | Bonsang (2007) | Europe | SHARE | 2004 | Non-cohabitant children potential care-givers caring (n=**4,852**) hours caring (n=**1,496**) | Average 1921<br>(83) | Caring<br>Hours caring | Heckman probit model |
| **[52]** | Guiaux *et al.* (2007) | NL | LSN, LASA | 1992-02<br>(5 waves) | Elderly<br>(n=**634**) | 1908-1937<br>(55+) | Changes in IADL | Multi-level regression |
| **[53]** | Szinovacz & Davey (2007) | US | HRS | 1992-00<br>(5 waves) | Children effective care-givers network (n=**1,577**) | 1931-1941<br>(51-61) | Caring IADL<br>Stop IADL care<br>Change in care | Binary and multinomial logistic regression |
| **[54]** | Stuifbergen *et al.* (2008) | NL | NKPS | 2002-04<br>(1wave) | Non-cohabitant children potential care-givers dyad (n=2,036: 1,314 with mother; 722 with father) | Average 1922<br>(81) | Caring IADL (housework, odd jobs) | Binary logistic regression |
| **[55]** | Glaser *et al.* (2008) | UK | BHPS | 2001-2002<br>(1 wave + Retrospective question) | Elderly (care from non-cohabitant children)<br>(n=**1,345**) | 1932-<br>(70+) | Caring ADL/IADL | Binary logistic regression |
| **[56]** | Glaser *et al.* (2008) | UK | BHPS, RS | 1989(SR)<br>2002 (BHPS) | Elderly (care from non-cohabitant children) SR: 644 mothers, 546 fathers, BHPS: 937 mothers, 801 fathers | 1931-40 (SR)<br>1913-22 (BHPS)<br>(61-69) | Caring IADL | Binary logistic regression |
| **[57]** | Lima *et al.* (2008) | US | HRS | 2000<br>(1 wave) | Spouse main care-giver<br>(n=**1,001**) | -1948<br>(52+) | Hours caring | Binary logistic regression, OLS regression |

**TABLE II-1:** Reviewed articles sorted by chronological order, country and authors (continued)

| Ref. # | Authors and publication date | Country/ countries | Data source[a] | Data collection period[b] | Study sample[c] | Elderly cohort [d] | Dependent variable(s) [e] | Statistical method(s) |
|---|---|---|---|---|---|---|---|---|
| **[58]** | Lin (2008) | US | HRS | 1998, 2000, 2002 (3 waves) | Children potential care-giver mother dyads (n=**5,099**), fathers dyads (n=**4,029**) | 1890-1943 (55+) | Caring, change in care | Multi-level regression (Growth modelling) |
| **[59]** | Brandt *et al.* (2009) | Europe | SHARE | 2004 | Children potential care-giver Mother and father dyads (n=**8,021**) | 1898-1939 (65-106) | Care ADL,IADL | Multi-level regression |
| **[60]** | McGee *et al.* (2008) | Ireland | Original sample | 2003 | Potential care-giver or care-receivers aged 65+ (n=**2,033**) | 1938 (65+) | Care ADL/IADL | Binary logistic regression |
| **[61]** | Tolkacheva *et al.*(2010) | NL | LASA | 2001 | Disabled elderly having 2 children+ (n=**186**) | 1910-1938 (63-91] | Intensity of children care | Multi-level regression |
| **[62]** | Feld *et al.* (2010) | US | AHEAD | 1994 | Elderly living in couple and receiving IADL care (n= **256** husbands, n=**196** wives). | -1924 (70+) | Receiving only spousal care | Binary logistic regression |
| **[63]** | Miller (2010) | US | HRS | 2000,2002 (2 waves) | Disabled elderly living in couple (n=**789** husbands, n=**778** wives) | -1947 (53+) | Change in spousal care hours, change in non-spousal care | Binary Tobit regression |

*Notes:* [a] The complete names of the datasets are : **AHEAD** Aging and Health Dynamics among the Oldest Old; **BHPS:** British Household Panel Study, **CHS:** Cardiovascular Health Study; **EPESE:** Duke Established Populations for Epidemiologic Studies of the elderly data; **GHS:** General Household Survey; **GSS:** General Social Survey; **ICS:** Informal Care-giver's Survey; **HRS:** Health and Retirement Study; **LASA:** Longitudinal Aging Study Amsterdam; **LSA:** Longitudinal Study of Aging; **LSN:** Living arrangements and Social Networks of older adults; **NHIS:** National Health Interview Survey; **NKPS:** The Netherlands Kinship Panel Study; **NLTCS:** National Long-Term Care Survey; **NSA:** National Surveys of the Aged; **NSFH:** National Survey of Families and Households; **RS:** Retirement and Retirement Plans Survey; **SHARE:** Survey of Health, Ageing and Retirement in Europe; **SIPP:** Survey of Income and Program Participation; **SoA:** Supplement on Aging; **WFS:** Work and Family Survey.

[b] When data are collected only once, cross-sectional analysis is the rule with the exceptions of surveys with retrospective questions [15] or when the time of the respondent sampling and the time of interview are considered as two 'fictive' waves [10,24]. When the same individuals are followed over waves, longitudinal analysis can be done, but it is not always the case [43].

[c] When referring to the exact number of observations used for the multivariate analyses, the sample size is in bold letters.

[d] The date refers to the younger birth cohort considered when available. The age at interview is put between brackets. When the exact birth cohorts are not available, the average age is reported.

[e] The number between brackets refers to the column of results (table II-2). A comma between ADL and IADL means that the analyses are done separately for both kinds of activities, while a dash means that both kinds are analysed together. Finally, the symbol '#' stands for 'number of'.

Multiple characteristics of family care are studied. Cross-sectional research investigated the determinants of the presence of care (for ADL and/or IADL) and of the care load measured either by the care intensity (caring hours or number of ADL and/or IADL for which help is provided) or by the number of care-givers. Very few studies [6,20,21,57] investigated who becomes the main care-giver, which limits comparative analysis. Longitudinal research focused on the reasons for ceasing care and on any change in the care characteristics.

The nature of the independent variables included in the analyses did not differ very much according to the studied care characteristic (dependent variable) and could be classified into four groups[12]: characteristics of the elderly, of the care-giver, of the caring relationship between the elderly and his care-giver (geographical proximity, same gender, intensity and duration of care, etc.), of the network (number of children, number of care-givers, etc.).

By contrast, the considered **care-provider** (any potential, effective, main care-provider or only daughter, (non-cohabiting) children, nuclear family), the **considered care activities**[13] (ADL and/or IADL), and the level of analysis ('individual' care-giver/care-receiver, 'couple care-receivers', 'dyad care-receiver/care-giver' or care-receiver 'network', see frame II-1) vary from one study to another.

[12] The following types of independent variables were not considered in the review: the variable 'race' (which is mainly present in US studies due to the multicultural context), those referring to subjective aspects (e.g. the quality of the relationship, filial duty, etc.), and those which are only included in one or two specific studies.

[13] There are also differences in the 'timing' of care. According to the question wording of the used survey, the study investigates the determinants of care provided 'at the time of the survey', 'over the last three months', 'on a daily basis', etc.

**FRAME II-1:** Levels of analysis of the care relationship

Various levels of analysis of the care relationships have been found in the reviewed articles. As it is the case for all the research design elements, the level of analysis may influence the results. Some of these levels (like the dyad or the network) are less well-known than the others. For this reason, a scheme showing the different levels of care analysis applied to a fictive care situation has been drawn. The two triangles represent the elderly spouses (Lola and Victor) and the three diamonds, their children (Ana, Georges and Peter). Black is used for men and grey for women). Both elderly spouses are potential care-receivers and have four potential care-givers (the other spouse and the three children). Each child is therefore a potential care-giver for both parents. The elderly family care relationships in this family can be studied in various ways.

The most global is the care-givers network[14] approach: *Is Lola receiving family care from any family member* (1)? It is also possible to specify a sub-network (children, men, etc.): *Is Lola receiving care from children* (2)*?* One can consider the care provided to the couple by this sub-network: *Is there any child providing care to a parent* (3)? Or by a given potential care-giver: *Is Georges providing care to his parents?* (4).

Then, we move to the individual approach when we will focus either on a (potential) care-receiver and consider all the care relationships: *Who is providing care to Victor?* (5a, 5b, 5c and 5d) or on a (potential) care-giver and consider all the care relationships: *To whom is Ana providing care?* (6a and 6b). The dyadic approach can be viewed as a kind of individual level analysis which focuses on a given relationship (e.g. the potential care relationship between Ana and Victor (5b)). However, studies proposing a dyadic analysis differ from the individual level analyses by accounting for the individual characteristics of both care 'partners'. The most common dyadic analysis is the one studying the care relationship between the elderly and his main care-giver.

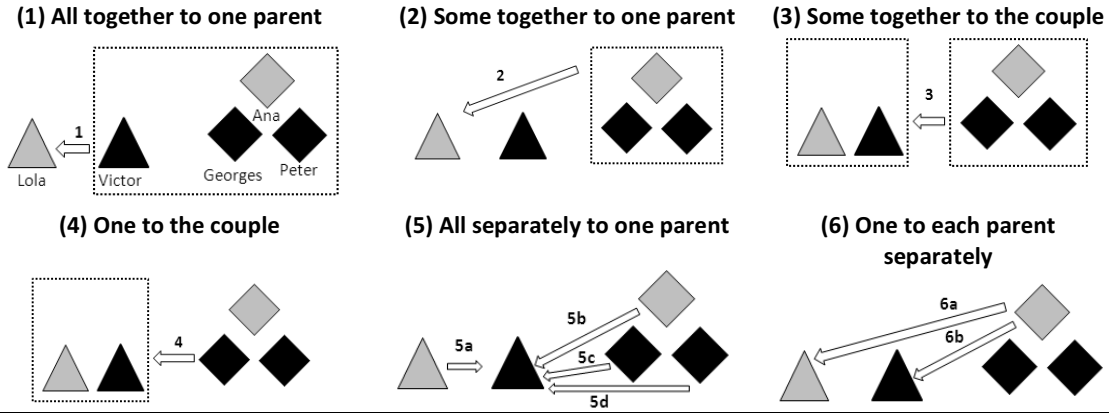
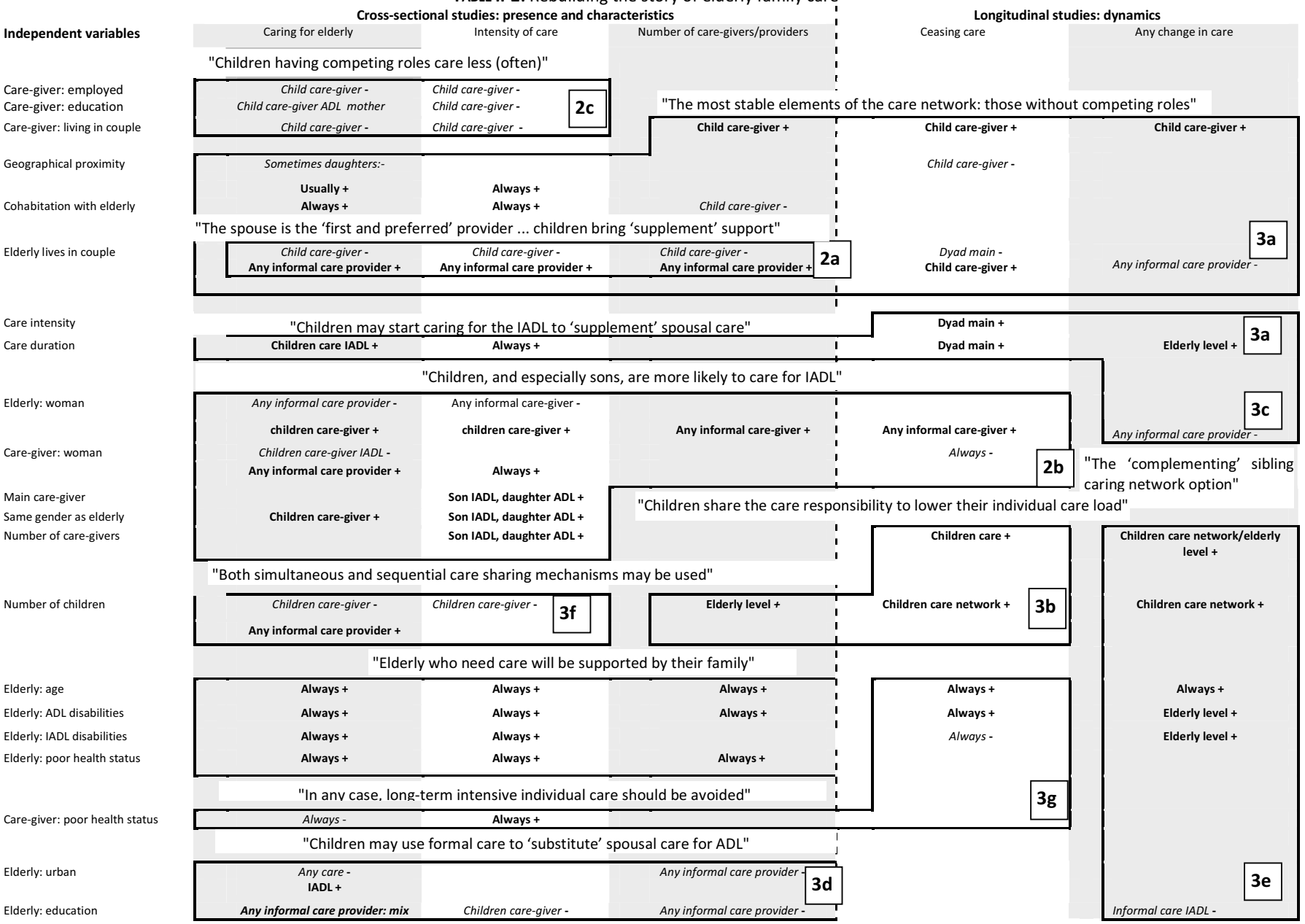



Table II-2 presents a synthesis of the literature analysis[15]. The dependent variables are in column. The order (left to right) follows the order of the 'story': presence of care, cross-sectional characteristics of the provided care: intensity, the number of care providers (or on family care-givers), longitudinal changes (ceasing or any changes). The key explanatory variables are in line. They are grouped according to the stage (block 1-3g) of the story to which they contribute. A short sentence summarises the message (e.g. block 1 showing that poor health and disability is positively associated with the presence, the intensity of family care and the number of care-givers can be synthesised by: "Elderly who (really) need care will be supported by their family". The purpose of the table is to show on which empirical results the (narrative) story is based.

[14] Note that this 'network' approach differs from the 'social network analysis' technique described in Snijders (2001) which requires very specific data.

[15] The table II-2 and the entire results presentation are only based on significant results in multivariate analyses. It might have been interesting to study the non-significant results as well and to make hypotheses on why a given variable is significant in a study and not in the other. However, this would have made the analysis of the review very long, technical and full of speculations. Focusing on significant results might over-simplify the reality but has the advantage of giving a clear picture of the main trends in family care.

**TABLE II-2:** Rebuilding the story of elderly family care



*Note:* Positive relationships are indicated in bold and negative relationships in italics. 'Always' means that whatever the analysis level/population, significant relationship was always in this direction. If significant results in one direction coming only from studies using a specific level of analysis or a sub-population, this last is mentioned (e.g. 'elderly level -' means that the studies showing a negative relationship between the 2 variables were all done at the elderly level).

To tell the Life Course story of family care, the comment is structured as follows: 'Who is receiving family care?', 'Who is providing care?' and 'How do the family care characteristics evolve over time?' Note that the questions are not exactly the same as the dissertation main research questions and this is because the literature review goes beyond: it includes articles based on the elderly (potential) care-receivers' population but also articles based on (potential) care-givers' population. At this stage of the dissertation, the choice of the care-receiver option has already been made. It involves that some of the individual characteristics of the (potential) care-givers will not be accounted for in the analysis. The literature review may allow identifying the characteristics of spouse and children which influence their decision to care and the characteristics of the care provided. Later, in the methodological part, we will see if it would be possible to include them in the analysis and, if not, the relationship observed in the literature could still be used to nuance the results of the dissertation analyses. For this reason, it was decided to make a specific point on the care-givers characteristics: who is providing family care? The 'Life Course' aspect of the comment appears in the third point when I try to rebuild the different stages of the family care trajectory.

### *1. Who is receiving family care?*

*Elderly who need care will be supported by their family* (table II-2: block 1)

A positive relationship between a poor health status [15,26,28,30,35,40,49,51,60] (or cognate variables such as ADL disability [5,7,8,9,11,16, 22,23,20,27,35,38,46,49,58,59,60], IADL disability [2,8,9,11,16, 27,20,30,49,57,58] or very old age [2,8,9,11,15,18,20,30,32,35,49,50,51,55,56,58,59]) and the presence of family care were found in all the reviewed studies, whatever their design. Moreover, the older [25,39,42,43,51,61] and unhealthier [3,4,21,23,25,27,34,41,43,45,47,48,51] elderly receive more intensive care. They also tend to have more care providers [1,36,62]. These results are consistent with the intergenerational solidarity theory [developed in studies 5,25,26,28,38]: in case of needs, the elderly can rely on family support.

*But, at this stage of the story, we do not know who is providing care nor for how long.*

### *2. Who is providing family care?*

*Spouses are the 'first and preferred' care-providers but they may ask children to 'supplement' their support* (table II-2: block 2a)

The spouse appears to be the first care-provider: elderly are more likely to receive care from any informal care-provider if they live in couple [2,30,35,49], but are less likely to receive care from children [11,16,20,28,51,55,56,58,59]. Children could supplement if needed, they are more likely to give less intense care when parents live in couple [42,43,47,61] probably because the care responsibility is partly assumed by the spouse.

*Children, and especially sons, are more likely to care for IADL* (table II-2: block 2b)

Several studies investigated gender differences in care-giving (see Miller & Cafasso 1992 for a review). Some concluded that women are more likely to care, others that family members of the same gender as the elderly are. Although the literature does not allow favouring either the 'women', or the 'same gender' hypothesis, it highlights three design aspects that may explain mixed findings.

The first is the study population: three studies concluding in a 'same gender' effect [20,38,42] are restricted to elderly women or to daughters as potential care-givers. This did not contradict the 'women' hypothesis. The second design aspect refers to the concerned activities: if both sons and daughters could be the main care-giver, sons are less likely to care for ADL; but more likely to care only for IADL [22]. This is supported by the presence of a gender difference in the relationship between being the main care-giver and care intensity [21,39]. However, daughters - like sons - provide less intensive care individually, when they share the care responsibility with others [21]. This suggests that gender differences between children do not concern the decision to care, but rather the kind of activities and the stability of the support over time [58]. The third design aspect to consider is whether or not spousal care is controlled for: on the one hand, studies restricted to children care show that women were more likely to be cared [11,16,18,20,22,27,55,59], to receive intensive care [25,43,48,54] and to have many care-givers [36]. On the other hand, studies on any informal care (including children but also the spouse and other informal care providers), showed that men are more likely to receive care [2, 30], and to be cared intensively [23,37]. The gender effect on the child caring decision does not mean the same in both cases: when daughters are more likely to care for a parent even if the other parent is already caring (usually the case of elderly men), it shows a 'women' effect. It could be interpreted as a stronger feeling of duty to care for women, even when others are already caring. If daughters are more likely to care for a parent who lives alone, it is more difficult to distinguish the 'women' from the 'same gender' effect, as the care-receiver is usually the mother.

*Those having competing social roles care less often and less intensively* (table II-2: block 2c)

At the individual level, children facing competing roles (still working, married, having young children, etc.) tend to be less likely to care and if they ever do, they would do it less intensively: married children [11,16,20,22,40,42] and working children [11,16,40,46,55] are less likely to care, and when they care, they provide less intensive care (married children [29,40,42,47], and working children [21,27,34,43,47,51,54]). The effect of having young children is less obvious (sometimes positive, sometimes negative, and often not significant). This is probably because it is very much associated with the age of the adult child and, to a lesser extent to the age of the elderly. High educated children (often having a more demanding job, being more likely to live far away from their parents and to be work oriented) also seem less likely to provide care, at least for ADL [58].

### *3. How do the family care characteristics evolve over time?*

*What is stable? What is changing? Are changes positive (showing flexibility) or negative (showing limitations) for a sustainable informal care?*

*The most stable elements of the care network are those facing no competing roles… like the spouse* (table II-2: block 3a)

Tennstedt *et al.* (1993) tested if the cohabitation status was more determining than the relationship in the care decision. They found that cohabitants, whatever their relationship with the elderly are more likely to provide care than no-cohabitants. Similar results were found in other cross-sectional studies: cohabitant children are more likely to care [11, 20, 47, 50] and care more intensively [25,39, 43,47]. The same is true for non-cohabitant children but living close to their parents (for caring [1,5,13,14,16,18,20,22,40,46,51,55]; for care intensity [13,28,31,45,47,51]). However, two studies [13,26] found a positive relationship between distance and daughters' caring (daughters could be less influenced by distance).
Longitudinal studies looking at the care involvement stability led to nuance the 'proximity' hypothesis. Similarities between spouse and cohabitant or close living children were still found: these care-givers have a lower probability of ceasing care [8,31,52]. However, the children (whatever their

geographical proximity) are more likely to change some of the characteristics of the provided care [24,53] especially when they face competing roles (e.g. married children are more likely to cease or change caring [16,53,58]). Proximity and the absence of competing roles (own family, work, etc.) are characteristics associated with a higher and longer care involvement for children but are also characteristics of the spouse (cohabiting, retired, having no other family responsibilities).

*Children try to share the care responsibility in order to lower their individual care load and keep their other social roles* (table II-2: block 3b).

The number of children is positively associated with the number of care providers: they are likely to share the care responsibility [29,36]. It also means that, regardless of the presence of other care-givers, having more children increases the probability that at least one of them decides to care. As the number of effective or potential children care-givers is negatively associated with ceasing care [10,53], it is also associated with a longer duration of care.

*Children may start caring for the IADL to 'supplement' spousal care (*table II-2: block 3c)

Over time, the care load becomes heavier [4,27,41,48] or the spouse starts to have health problems as well [62,63], and children are more likely to start caring for IADL [27,28, 38] in order to support the spouse: thus long-term care is associated with a higher probability of changes in the network [17,63] but still with a lower probability of ceasing for the main care-giver [24] thanks to those changes.
This is somehow supported for men care-receivers who are less likely to cease receiving care [32]: *their wife maintains commitment to care and they are more likely to experience changes in their caring network,* children entering the network as second care-givers [48,52].

*Children may use formal care services to 'substitute' for the ADL support when the spouse is no longer able to assume it* (table II-2: block 3d)

The reviewed studies did neither provide direct information on the use nor on the kind of formal care services. However, relationships between the socio-economic characteristics of the elderly (such as education and urbanization) and family care characteristics allow formulating some hypotheses.

Higher educated and urban elderly tend to receive less intensive care from their children [43] and to have fewer family care providers [1,36]. *A possible interpretation would be that they are more likely to use formal care services for ADL to not depend on their children. Having a higher income or living in an urban area gives them access to a larger panel of services.*

*But, when IADL are concerned, formal care is not always preferred.*
The fact that some studies found that the lower educated elderly are more likely to receive IADL care from their children [2,9] while other studies [30,44,59] found the opposite, may be explained by differences in formal care policies: *if formal home care services are of low quality but cheap, the lower educated are more likely to use them, while children of higher educated elderly would care for their parents (IADL care is not too demanding). Now, if formal home care services are private and of good quality, the higher educated elderly would be able to afford them, while the lower educated elderly would have to rely on family care only.*

*An alternative is to redistribute the care responsibility among siblings and to organise a 'complementing' sibling caring network* (table II-2: block 3e)

When the parental care responsibility is shared by siblings, changes over time are more likely [12,52, 53,58]. This was especially true when the elderly needs ADL care**:** a positive association between the probability of changes in the caring network and disabilities [17,48] or a very old age [48] are

observed. As seen previously, children seem capable to maintain individual long-term care involvement with IADL, but try to share the care responsibility with siblings, spouse [31,52] or professionals [37], if more intensive care is needed.

*In this case, both simultaneous and sequential sharing mechanisms may be used* (table II-2: block 3f)

The number of children is positively associated with the probability of receiving any informal care for IADL [2,8,30,35,56], but negatively associated with the probability of caring for each child [11,13, 16,20,40,42,50,55,58,59]. In other words, elderly having children are more likely to receive care for IADL by at least one of them, but each of them is less likely to care. This observation would favour the hypothesis of 'sequential care sharing': not all the children are caring at the same time but they endorse the care responsibility one after the other. But other studies [13,29,39,40,43,45,61] found the number of children to be negatively associated with the intensity of the care provided by each child. This would favour the hypothesis of 'simultaneous care sharing': several children are caring at the same time. Both mechanisms (sequential and simultaneous care sharing) seem to co-exist.

*In any case, long-term intensive individual care should be avoided as it increases the frailty of the care-giver (*table II-2: block 3g)

*A children's caring network seems the better solution to provide long-term community care for the elderly. Despite the instability of the care provided by any care-giver, children find flexible solutions to meet the elderly care needs.*

*Overall, spouses and children seem capable to assume part of the elderly care responsibility when it is for a short time or for the IADL activities, but they need help when long-term intensive care is required.* Caring may affect the care-giver health: being healthy was associated with a higher probability of caring [42,46,57,59,51,62], but intensive care-givers tend to have a poorer health status [13,21,62]. If there is no possibility to share intensive care, the probability to cease caring is higher: a positive association between the probability to cease caring for each care-giver and intensity [24], presence of ADL disabilities [10,16] or age [32] was found.

## C. Discussion on research design effects

The most striking fact in this literature review is probably the huge variety of the studies (in terms of used survey, study population, level of analysis, studied care characteristic(s), statistical methodology, etc.). In the results presentation, we have already seen how differences in the level of analysis or the study population may lead to apparently contradictory results. It will be impossible to analyse the potential impact on the research results for all the inter-studies differences. However, it is interesting and possible to discuss some of the main research design differences (cross-sectional/longitudinal; network/dyad/individual level of analysis; care-receiver/care-giver population; potential/effective care-giver or receiver population) because all these choices have still to be made or confirmed for the dissertation research.

### *1. A first general design bias: studying elderly population living at home and having potential family care-givers*

The results of this literature study are in accordance with previous research concerning the determinants of presence of care ('Who is receiving family care?'): an unambiguous positive relationship between a poor health status (or cognate variables) and the presence of elderly family care was found in all the reviewed studies. This shows that family solidarities are still strong in the today's society. However, the reviewed studies are based on community population samples and restrict their analytic sample to the elderly people having a family. This selection bias may over-

estimate family solidarity and does not allow extending the conclusions to the general population of elderly. **This selectivity bias is unavoidable as it concerns the definition of the 'at risk' sample.** It would be useful to make a first descriptive analysis comparing the characteristics of elderly people living at home and in institution and, among those living at home, of the elderly having a family and those being family-less. However, the first comparison is seldom possible as most of the surveys are restricted to the population living at home. The second comparison is usually possible and will be done with the PSBH data.

### *2. Illustration of the impact of other research designs on the answer to the question 'who is providing care'?*

The analysis of the literature contributes to explain the mixed findings for the question - *Who provides family care?* - by showing how research design differences may lead to contrasted but not necessarily contradictory results.

*Cross-sectional studies* found that the proximity of the care-giver is more influential than the nature of the relationship or, in other words, that the cohabitant children and the spouse show similar caring behaviours. *Longitudinal studies* led to nuance the prevailing proximity effect: in the long-term, the caring behaviour of children greatly differs from the spouse's. Children were more likely to change and adapt their care responsibility to their other current competing roles and are more influenced by the care decision of the other potential care-givers. The spouse commitment to care is more stable over time.

Comparing *network and dyadic or individual level analyses* gave other evidence of stability: intensity of spousal caring was not influenced by the presence of other care-givers, while children tend to care less intensively (individual or dyadic care-giver level) if they can share the care responsibility (network level).

Mixed results on gender effect may be explained by differences in the care-giver definition or the considered activities: a 'same gender' effect is only found in *studies on care provided by children.* As women are more likely to be cared by their children, those results are not contradictory with the 'women' effect found in *studies on the care provided by any informal care-giver*: in both cases daughters are more likely to care than sons, at least for the *ADL*.

The decision to work on an effective or a potential care situation has an impact on the characteristics of the elderly (those who are 'effective care-receivers' have a poor health condition and are usually older) and therefore on the influence of some care determinants (because they are already 'selected' on these variables, the health and age variables may have less impact on the care characteristics when working on 'elderly effective care-receivers). A similar selection effect may be observed for care-givers (working on a sample of intensive care-givers may reduce the impact of work or other competing roles on the caring hours, because intensive care-givers are likely to be more prompt to care and less attached to other social roles than the other potential care-givers). **In the dissertation research, the willingness is to work on a population as large as possible and to avoid selectivity whenever possible. This allows studying the determinants at different stages of the family care trajectory: starting to be cared, continuing, stopping or changing care characteristics over time. For this reason, the study sample will be defined as those being 'at risk' of being in a care situation since the beginning of the observation period.**

**Each specific design** provides a different insight into family care and has its own limitations. *Dyadic analyses* allow studying the effect of a given (potential) care-receiver and a given (potential) care-giver on the care relationship, but do not account for the presence of other (potential) care-givers. *Individual (potential) care-receiver analyses* allow studying the determinants of the care provided by

each (potential) care-giver of an elderly, accounting for the characteristics of the elderly and some basic characteristics of the (potential) care-giver. *Individual (potential) care-givers analyses* allow studying the determinants of the care provided by a given (potential) care-giver to multiple (potential care-receivers) accounting for the characteristics of the (potential) care-giver and some basic characteristics of the (potential) care-receivers. The two main drawbacks of these individual approaches are (1) detailed individualised information is often available for the chosen unit of observation (care-receiver or care-giver) and not for the other[16]; (2) the (potential) care relationships observed in a given family are likely to be interdependent: they should either be studied separately or using methods accounting for the non-independence of these relationships (like multi-level analysis). *(Potential) care-receivers' couple analyses* are not frequent and usually conditioned by data availability. This choice is defendable because the care received by one of the spouses tends to indirectly benefit to the other but this option has the disadvantage of not accounting for the individual characteristics (e.g. How to measure the health needs at the couple level?). The global network analyses allow considering the structure of the network or of the family and measuring the overall care received by the elderly. This approach remains general and does not tell how the care load is concentrated or shared among the potential care-givers. The choice depends on the research focus and the possibilities offered by the analysed dataset.

***For the dissertation research*, the decision is to focus on the elderly (potential) care-receiver: it was already partially justified in chapter I (as the elderly is at the centre of the situation, he would be more able to identify the various care providers and their care involvement). This choice is confirmed in this chapter: choosing the elderly as observation unit allows having detailed information on his health status (highlighted is a key determinant of the elderly care characteristics and of their evolution over time). Choosing the elderly potential care-receiver as unit of observation implies that it would not be possible, in the PSBH, to have detailed information on each potential care-giver. However, the maximum will be done to extract the basic information (gender, age, relationship with the elderly, geographical proximity, etc.). The choice between an individual and a network approach will depend on the operationalisation of the family care dependent variables (see chapter VI).**

**The longitudinal approach is chosen because it is the only way to study the evolution of family care over time. Different types of longitudinal designs were identified in the literature (retrospective survey, panel study or 'before-after' design). The panel design seems to be the best suited to the dissertation research because it allows measuring the effect of the health status and its evolution over waves on family care.**

[16] If the elderly is the observation unit, and thus the survey respondent, detailed information on health, family composition, etc. will be available, but only basic and usually indirect information is available on his potential care-givers: the respondent is asked on the number of children he has, their age, gender, contact frequency and the care provide. Sometimes, he is asked to specify their marital and employment statuses, etc. Similarly, if the (potential) care-giver is chosen as observation unit, the information available on the elderly parent characteristics is often very vague and general. An exception is the case of multi-generational surveys (e.g. The "Longitudinal Study of Three-Generation Families" in Bengtson & Robert (1991) or the Survey of the *Caisse nationale d'assurance vieillissement* (CNAV) "Trois-Générations" in Attias-Donfut (2000)): (selected) members of three generations are personally interviewed. Detailed and direct information is then available for each potential care-giver or receiver. Unfortunately, such a research design is not frequent because it is highly time and money consuming: the different generations may live far away one from another and the interviewer has to cover long distances, appointments are difficult to fix, etc.

### *3. The selection criteria may produce a 'cultural bias'*

If the selection criteria aimed at defining a minimum homogeneity and comparability among the studies reviewed, then the setback is that potentially interesting contributions to answer the research questions were not included in the systematic analysis of the literature[17].Most of the multivariate studies which did not survive the selection process were filtered out either because informal care played as independent and not as dependent variable or because they were not published in an English-written journal.

**Family care as the dependent variable criterion** led to eliminate a great deal of studies investigating the impact of family care on the health or working status of the care-giver. **It means rejecting most of the economic, psychological[18] and labour market studies on family care.** The causal direction is blurred (as seen earlier, potential care-giver having a good health status are more likely to provide care in general but less likely to provide intensive care). It makes sense to think that valid research questions can be addressed in both directions (characteristics of the potential care-givers to explain the presence of care or the consequences of caring on the care-giver characteristics). Studies of the effect of family care characteristics on the move to other care settings (care-services, institution or death) were removed as well. Considering them could have increased the number of studies on ceasing informal care because, indirectly, studies on the move to a new care configuration inform on the reasons for leaving the previous one (family care only).

**The journal publication criterion filtered out most of the articles dealing with the European countries** because they were in a working paper format (with the exception of the Dutch one). It must be said that the US started to conduct surveys on ageing populations far before the European did. The first wave of the SHARE project (Survey of Health, Ageing and Retirement in Europe) was launched in 2004 and the second in 2006. The first cross-sectional results on family care were published in journals in 2007 and the longitudinal results in 2010. This explains why the European studies are concentrated in the most recent years. The journal publication and the language criteria also explain, at least partially, why there is no Belgian study included in the review: most of the elderly or care-givers specific surveys (see chapter IV for an overview) were carried out in Flanders and published in book format or in Dutch-written journal[19]. There are also national surveys and some other based on Brussels inhabitants and/or Walloon sub-population but the results usually only descriptive are nearly always published in report format. One exception is the study of Bracke *et al.* (2008) based on the PSBH data. This article was however excluded because it studies the 'expectations' towards care and not the objective care characteristics.

Except from the analyses based on the SHARE data, articles from only five of the Western countries survived the selection criteria. This does not mean that they are the only ones researching on family care. Actually, many contributions from France and the UK were found, but excluded because they were only descriptive or based on projections. Therefore, the question is: do the regularities observed and the rebuild family care trajectory reflect the situation in the Western world? The answer is twofold: each country has its own way of coping with the need of the aged. Especially, the availability of home care services and institutional care, and whether older adults consider them as valuable options, differ from one country to another and will affect family care. However, the fact that spouses and children are the first line care-providers and the evolution of the family in the

[17] The exclusion only concerns this chapter. Many reports, descriptive studies, working papers and other types of scientific documents were read and used in the other chapters (for the interpretation of the analyses, the global understanding of the family care phenomenon, etc.)

[18] The exclusion of studies measuring the effect of subjective variables on family care also explains the quasi absence of psychological literature.

[19] I found one article in English which used the Flemish survey 'Mantelzorg in Vlaanderen' (De Koker 2009), but it was excluded because it was not specifically targeted on elderly care.

society regarding geographical distance between generations, affective bonds, marital disturbances, etc. seem to be common to all the Western countries.

# *SECTION 2. Additional literature*

## A. Classifying the care determinants through the behavioural model

The 'behavioural model' (Andersen 1968; Andersen & Newman 1973 revised in Andersen 1995) was developed to explain the use of care services. According to this model, the determinants can be classified into 'predisposing', 'enabling' (or resources) and 'needs' (or illness level) factors.

The **'predisposing'** factors include the demographic characteristics of the care-receiver (such as gender, age, marital status, etc.); the socio-structural characteristics (such as education, occupation, family size, religion, etc.) and health beliefs (such as attitude toward health services, knowledge about the disease, etc.). These characteristics are related to individual life styles and attitudes and are likely to influence the care preferences. The **'enabling'** factors include the family resources (like income, health insurance, transportation and distance to care) and the community resources (like urbanisation level, region, price of health services, etc.) influencing the quantity and quality of the available care services. The **'needs'** factors include the disability level, the general health status, diagnoses, etc.

This typology was initially conceived to explain the determinants of the use of **care services** in the **general population** and was mainly applied to **cross-sectional** data in public health studies. But it was also used to explain the care use in sub-populations like the elderly (e.g. Bass & Noelker 1987 use this model to study the effect of family care on home care services use) and, more recently to the cross-sectional study of the family care determinants (Geerlings *et al.* 2005).

The proposed typology seems useful to the study the evolution of the elderly family care determinants in Belgium. This for three main reasons: First, it allows **regrouping** the family care determinants identified in the systematic literature review. Second, the term **'enabling'** highlights the fact that resources should not only be present, but also available for use. Applied to the family care determinants, it means that being married or having children does not necessarily mean that these family members are available to care. The spouse may be institutionalised and the children may live too far away to provide care. It is therefore more interesting to consider the fact of being in couple (married or not) rather than the marital status and to not only consider the number of children but also their geographical proximity. Third, the term **'predisposing'** is especially interesting in longitudinal studies because it introduces the idea that some characteristics, already present before the period of observation, make some individuals more likely than others to receive care at any moment regardless of their current situation (enabling and needs factors). For instance, the lower educated are more likely to 'ever' receive family care because their health status is generally poorer and they are more likely to prefer receiving care from a relative rather than going to the hospital or let an 'unknown' professional enter their home to provide them with care.

However, before using the typology, some changes should be made to adapt it to family care reality:

- Some characteristics should be suppressed, because they are not meaningful for explaining family care (e.g. having a private health insurance or the diagnoses should not influence family care very much) or related to subjective aspects and thus beyond the scope of the dissertation research. In return, other characteristics should be added (e.g. the number of children) or changed (e.g. the presence of a spouse is a better indicator of family resource than the marital status).

- As the model aims to explain the use of care services, the **family characteristics** (family size and marital status) are considered as 'predisposing' factors: the family context will play a role in the use of preventive care services and may also delay hospitalization or institutionalisation and reduce the amount of care services needed. Now, if it is the use of family care that we want to explain, then the family characteristics should be considered as 'enabling' factors: the number of sons/daughters and the presence of a spouse will make some family care configurations possible and others impossible. If the elderly has no family, he is 'unable' to receive family care. The income can also be considered as an 'enabling factor' because having a high income may allow the elderly to buy care services to supplement the family care provided and alleviate the care responsibility assumed by his spouse and/or children. In case of heavy dependency, the inability to buy quality home care services can lead to institutionalisation (if the family is not able to assume the entire care load).
- On the opposite, the region and the urbanisation level, which are considered as 'enabling' factors in the Andersen and Newman model should be considered as 'predisposing' factors when studying the determinants of family care. Indeed, the geographical context is used as an indicator of cultural and lifestyle aspects: the elderly living in town are often more independent and less family oriented. As we will see in chapter III, the Belgian regions main differences in elderly care policies, reflect cultural differences.
- Although the Andersen and Newman model is not presented as a causal model, the arrow from 'predisposing' factors to 'enabling' factors and from 'enabling factors' to 'needs factors' in the theoretical scheme suggests a **sequential order** "where the predisposing factors might be exogenous (especially the demographic and social structure), some enabling resources are necessary but not sufficient conditions for use, and some need must be defined for use to actually take place." (Andersen 1995:2). Applied to family care, it seems more logical to make the needs factors preceding the enabling factors: even if there is a need, family care cannot be provided if there are no potential family care-givers.
- The status of **age** is ambiguous. In the Andersen and Newman model, it is considered as a predisposing factor. But this model was built to be applied to cross-sectional data in which age and cohort effect cannot be disentangled. If the typology is applied to longitudinal data, the age increases over waves and this ageing process can be considered as a need factor (as the respondent is growing older, the probability that he needs and receives care is increasing). But, it is also possible to favour the birth cohort approach and to consider that the historical and demographic contexts in which the respondent has grown up influences his needs and his care preferences when they become old. In this case, the birth cohort will be considered as a predisposing factor.

## B. Informal-formal care articulation theories

The systematic literature review focuses on the determinants of family care only. However, even if the dissertation topic is family care, it is not possible to completely discard the other sources of elderly care (e.g. from friends, neighbours, volunteers, professionals etc.): because the characteristics of family care and of its evolution are **influenced** by the availability and the characteristics of the other care sources (e.g. quality and affordability of home care services, institution, etc.). An **example** of this influence is mentioned in the systematic literature review (when the hypothesis of differences in home care policies was proposed as an explanation for the bi-directional effect of education on family care: if the services are of high quality and/or expensive, the higher educated are more likely to use them and are less likely to receive (intensive) family care. On the contrary, if services are means-tested and of low quality, the relationship is inversed. It also

shows that it is very difficult to interpret the effect of home care service use on family care without knowing the regional elderly care policies.

The main theoretical models of 'formal-informal care articulation' do not account for the country or regional care policies particularities. Most of these models do not only theorise the articulation between 'formal' and 'informal' care providers but also the articulation (or preference) within 'informal' care providers. In this respect, some links can be made between the theories and the results of the systematic literature review.

The first model, **'task-specific'** (Litwak 1985) argues that each 'primary group' (spouse, children, friends, neighbours, health professionals) can be classified according to various characteristics (level of intimacy, geographical proximity, level of expertise, duration of the relationship with the care-receiver, etc.). According to their characteristics, each 'primary group' is better 'suited' to assume some tasks rather than others (e.g. the spouse is better 'suited' to assume regular non-technical tasks such as housework, bathing etc., the professionals are the best 'suited' to do medical or other technical acts, friends should provide affective care, etc.)

This is consistent with the systematic literature review showing that the children are likely to provide intensive care for a short time in case of necessity (emergency, post-hospitalisation care), while the spouse more often provides daily care (non-specialised ADL care, like bathing or IADL care, like housework).

The **'hierarchical compensation'** model (Cantor 1975) claims that there is an order of preference among potential care-providers (spouse, children, other family members, friends, neighbours, acquaintances,… professionals arriving at the end of the list). If the first choice care provider is no (longer) available, the second choice is called upon to care, and so on.

The existence of a hierarchical order within the 'care-givers' (spouse, then daughters, finally sons) is supported by the literature review: spouses are the first to provide care and are not much influenced by the care provided by others, children are less likely to care for a parent living in couple and sons tend to provide less intensive care than daughters do.

According to the '**substitution'**[20] model (Greene 1983), the use of formal care service implies a reduction or a suppression of the informal care provided previously.

The global substitution model (formal care replacing informal care) found little support in the literature (except in extreme cases like institutionalisation). However, a more specific model was developed by Shanas (1979): the 'kin substitution' model (an informal care provider replacing another informal care provider). This model seems to be more realistic and is consistent with the systematic literature review which shows that children are more likely to care for a spouseless elderly parent: the children substituting the spouse who is not available for caring.

The fourth model, named '**supplementation'** was mainly developed by Edelman (1986), Soldo *et al.* (1989), Stoller (1989) and Tennstedt *et al.* (1990). It states that the worsening of the health status (decline of health) and the related increase in needs imply the use of formal care services in addition to the existing informal care.

[20]The 'crowding-out' hypothesis is more often used in economic or social policy literature (e.g. Künemund & Rein 1999; Motel-Klingebiel *et al.* 2005) to refer to the substitution model, or the fact that the use of formal services implies a reduction in the informal care given. Its contrary, the 'crowding-in' hypothesis, refers to the supplementation model.

Evidence of supplementation can be found in the systematic literature review: the children can supplement spousal care when the needs become more intensive. Children caring for a spouseless elderly are likely to buy home care services: sharing the care responsibility allows them to maintain their individual care involvement low and to assume their other competing roles.

The four main models should not be considered as **'concurrent models'** but as 'various **mechanisms'** of the care articulation.

There is no one 'best' model able to better understand the reality: empirical evidence was found for each of them, but counterexamples as well. Some empirical results validate two of the models at the same time (e.g. Mitchell & Krout 1998). This suggests that each of the four models highlights one specific **mechanism** of care articulation. Some of them may be more likely to occur in particular contexts (substitution when informal care is no longer available, task-specific when professional medical care is needed, etc.). The elderly can experience various 'contexts' (especially if he receives care over a long period). Therefore he may have to use more than one mechanism during his care history.

This section point only introduced the four main models (substitution, hierarchical compensation, task-specific and supplementation) which are nearly always included in the reviewed articles on formal-informal care articulation (Messeri *et al.* 1993; Denton 1997; Lyons & Zarit 1999; Patsios & Davey 2005). Earlier theories which were abandoned because of a lack of empirical evidence (like 'additive model' and 'asymmetric model' presented in Cantor 1979) are not approached here. More recent models are excluded because they usually consist in a revision of one or two of the main models. It can be a combination of models (e.g. the complementary model of Chappell & Blandford (1991) combines the 'hierarchical compensation' and the 'supplementation' models).

All in all, **the scope of the care sources considered in the models is broader than those studied in the dissertation**: formal care is not restricted to home care services but also include other types of formal care (transmural and institutional); informal care is not restricted to nuclear family care but also includes care provided by other family members, friends, neighbours, etc.

However if these models are considered as mechanisms and not as concurrent theories to test, they may be useful to understand the articulation of any source of care at any moment in time and over time. In the dissertation, the four 'mechanisms will be **used to study the articulation of family care and care services and the preferences order within the care-givers** (spouse, daughters and sons): Which mechanism is used in which care configuration? (Is substitution more frequent among the higher educated? Are children care-givers more likely to use care services in supplementation, than are spousal care-givers? Etc.)

## *CONCLUSION*

**The purpose of this chapter** was to give an overview of the existing literature on the determinants of the elderly family care aspects: to what extent does it answer the three main dissertation research questions? What can we learn about the choices to make for studying family care in Belgium and their consequences?

The first section presented the systematic review of the international quantitative literature on family care. It was decided to structure the results in three parts (each corresponding to a given question): Who is receiving family care? Who is providing family care? How does family care evolve over time? For the first question, the results converged and are, actually, well-known: there is a positive effect of poor health, age and disability on the presence of care and its intensity. The second question aimed at identifying the characteristics of the (potential) care-givers which may influence their care involvement. Having competing roles and living far away are two characteristics which seem to have a negative effect on the presence and the intensity of the provided care. Interestingly, the number of children is associated with a higher probability of receiving children care for the elderly, but with a lower probability of providing care for each individual child. It suggests a kind of negotiation or maybe a sequential care sharing between siblings. This is worth being studied from a longitudinal point of view. Unfortunately, most of the reviewed articles present only cross-sectional results and the few longitudinal analyses study global changes in elderly care and none of them concerns the Belgium case. **The dissertation research will therefore bring an original contribution to the literature by studying the evolution of the elderly family care over time in Belgium.** The discussion suggested that the best way to study the determinants of family care evolution over time would probably to make an analysis based on the general population of **elderly potential care-receivers** and for the use of longitudinal data, especially **panel data** which allow analysing the evolution of the elderly health needs and received care.

In the second section, the behavioural model is introduced as a way to structure the care determinants identified in the literature into three groups (predisposing, enabling and needs factors). Finally, the main formal-informal care articulation models were presented to complement the literature review. There is indeed a large number of empirical studies on the care articulation, but it was decided to not make a systematic international review in this topic because the articulation between family care and care services is highly dependent on the (sub-)country elderly care policies. Introducing the main articulation theories is already useful here because it gives an analysis framework, but a general presentation of the Belgium context would be needed before formulating hypotheses on the care articulation.

# CHAPTER III

## THE HISTORICAL AND DEMOGRAPHIC CONTEXTS OF THE STUDY COHORTS 1900-1929

According to the Life Course approach (Chapter I), it is crucial to situate the study phenomenon (here the family care) and the study population (here the study birth cohorts 1900-1929) in their historical and demographic contexts (time and place principle). The underlying idea is that for understanding the determinants of the family care provided to the Belgian elderly in the 1990s-2000s, it is necessary to be aware of the key elements of the context in which they have grown up and in which they live in their older ages when they became (elderly) potential care-receivers (Lifespan principle).

The objective of this chapter is to describe the contexts of the study cohorts when they are potential care-receivers and before that.

This chapter is structured like a life story: it starts in 1900, when the oldest study cohorts are born and ends in the 2000s, when all the study cohorts have reached (very) old age. **Section 1** refers to the lifetime 'before' old age. It presents the main elements of the historical and demographic contexts of Belgium between 1900 and 1990 which could have exert some influence on the lifestyle and the 'generational culture' of the cohorts 1900-1929. **Section 2** refers to the old age lifetime. It presents the elderly care orientations in Belgium at the time when the study cohorts are getting older (in the 1990-2000s). It gives an overview of the expectations of the birth cohorts 1900-1929 towards elderly care, of the available home care services and of the actual policy orientations.

We saw (Chapter I) that there are three main ways of approaching the time: either focused on the period, the age or the cohort effect. For the dissertation research, it was decided to concentrate on the (birth) cohort effect. The major argument for this choice was that we assume that the characteristics of the care received by an elderly person are influenced by his past life and by the socio-economic and cultural environment in which he has grown up. Another argument was that this approach would allow questioning the validity of the research results for the future cohorts of elderly. The cohort approach adopted in the dissertation is not a 'cohort analysis' as demographers do and usually oppose to the period and the age effect. Here, the cohort approach links the three time aspects: when trying to characterise the study cohorts, one has to identify the main historic events they have experienced (related to the period) and at which life-stage they did occur (related to age). This is why the purpose of this chapter is to describe the main characteristics of the study birth cohorts (1900-1929)[1]: it allows resituating the study sample used for the analysis in their own history[2] and because knowing the cohort characteristics will be useful to interpret the birth cohort effect in the data analysis (part III) and to identify some of the main challenges regarding family care for the future cohorts of elderly.

Mannheim (1990 [1928]) uses the concept of 'generation' to refer to a group of birth cohorts who have shared some socio-economic, cultural or political events which contributed to create a 'generation' identity and common values. In the dissertation research, the birth cohort group is quite large (1900-1929) and one cannot assume that they all belong to one 'homogeneous' generational culture. For instance, the World Wars experiences are likely to have a different impact on the oldest study cohorts (1900-1909) who experience World War I during childhood and World War II in their adulthood, and on the youngest study cohorts (1925-1929) who were born just before the economic crisis of the early 30s and who have experienced only World War II. For this reason, the birth cohorts will be divided into five groups for the analyses: 1900-1909, 1910-1914, 1915-1919, 1920-1924, 1925-1929 (see chapter VII).

In the present chapter it will not always be possible to distinguish and compare these five groups because the data came from a variety of published sources (population statistics, census results, etc.). The **birth cohorts sub-divisions** do not necessarily correspond to the one applied in the dissertation. In most cases, the figures are based on the **total population** regardless of the nationality (while the dissertation focuses on the population of Belgian nationality). All the figures are related to the **situation in Belgium**. Finally, in some cases, the results are **not available by birth cohort,** but a correspondence can be made with the birth cohorts (e.g. the mean number of children by region is only available by marriage cohorts but it is possible to make a link with the birth cohorts by accounting for the mean age at marriage of the birth cohorts). In short, the presented figures do not allow having a detailed picture of the differences between the five cohort groups but it should allow **identifying the major events and demographic trends characterising the birth cohorts 1900-1929 and to see if there are significant differences between the older and the younger birth cohorts**.

[1] A quite similar work - comparing the characteristics of elderly cohorts in preparation to a quantitative analysis of the cohort effect on panel data - was done by Cribier (2005) for the Parisians born in 1907 and in 1921. Another example can be found in Renaut (2006), who compares the lifestyles and care needs at 75+ in 1989 and in 1999. Both studies were done on the French samples.

[2] The data analyses will be done on respondents who are aged 65+. It means that they have 'survived' at least up to this age. Studying the characteristics of their cohort, from birth to old age makes aware of the context in which they have grown up and to measure how selected they are to have 'survived' until 65.

## *SECTION 1. Growing up during World Wars and the Interwar crisis: the common past experiences*

Major historic events experienced by the birth cohorts 1900-1929 will be described in this section because they are supposed to influence the lifestyle (and thus the health status) and the culture and traditions (and thus the expectations towards the society and the family). The main life-transitions of our birth cohorts will be considered too because they will influence the availability of potential family care providers.

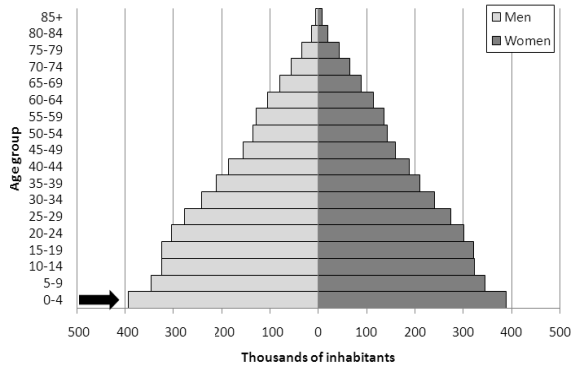
This first section is structured like a life story. It follows the chronological order of the main life transitions occurring before old age: birth, childhood and education, entry into the labour market, marriage, and birth of the first child. Each of these transitions is contextualised: what were the historic and demographic contexts in which the study cohorts were born? Have spent their childhood? Etc.

Whenever possible, the demographic figures of this section are given from 1900 to the most recent available data. This allows situating the study birth cohorts (indicated by an arrow or a frame in the graphs) in their context but also to see how the demographic phenomena did evolve over the XX$^{th}$ century in Belgium. At the best, the data are available by region. This allows identifying regional differences. Unfortunately, this is seldom the case for the data related to the period before the institutional reform of 1985. In general, the older data are less detailed and does not allow producing the most adequate indicators.

### A. The early years

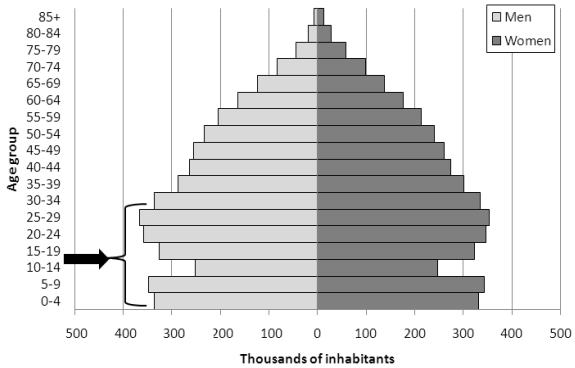
The older cohorts were born in 1900, in a demographic context when fertility and mortality were still high. It implies that the age structure of the population was quite young as is shown by the age pyramid of that year (graph III-1): with a large basis (% of young children) and a rather narrow summit (% of elderly). At that time, the 65+ represent only 6.2% of the population and the 80+, no more than 0.7% (see appendix tables III-2 and III-3). The masculinity ratio (men per 100 women) for these age groups equals 85 for the 65+ and 72 for the 80+. Graph III-2 shows the age pyramid (Belgium) in 1930, just after the younger cohorts (1929) were born. We can clearly observe the birth deficit linked to World War I (shrinkage of the pyramid for the age group 10-14 corresponding to the people conceived during the World War I). **It means that this cohort group is less numerous than its surrounding cohorts.**

**GRAPH III-1:** Belgium: 1900 age pyramid




*Source:* INS/NIS 1951b (figures in appendix table III-1).

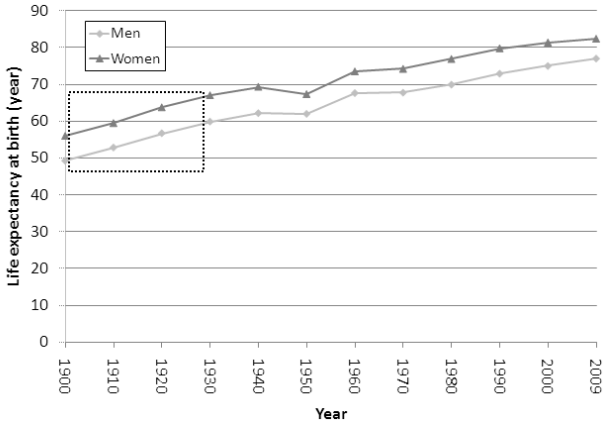
**GRAPH III-2**: Belgium: 1930 age pyramid




*Source*: INS/NIS 1951b (figures in appendix table III-1).

In 1900, the life expectancy at birth was rather low: 55.9 years for women and 49.2 years for men (graph III-3).

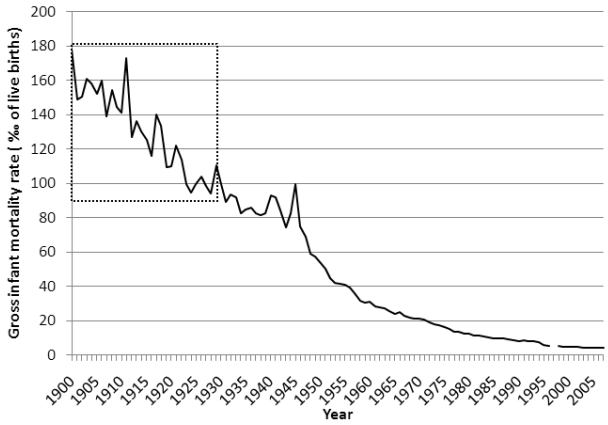
**GRAPH III-3:** Life expectancy at birth by gender, Belgium (1900-2009)




*Sources*: **1898-1902 to 1943-1945**: Schoen *et al.* (1984); **1946-1949 to 2009**: INS/NIS (2011), (figures in appendix table III-4).

Infant mortality was still very high in the beginning of the century (graph III-4): in 1900, over 1000 live births, 178.2 died before their first birthday. A very clear linguistic regional pattern was observed, showing an excess mortality in the North of the country (Flanders) in comparison to the South (Wallonia). Those strong regional inequalities could be explained by several factors: the Flemish and Walloon patterns of industrialisation and modernisation during the XIX$^{th}$ century led to a dual form of economic development in Belgium (Lesthaeghe 1977). The prevailing adverse economic situation of the Flanders was also probably one of the causes of its intense women activity, higher illiteracy rates and overall lower wages. In contrast to the highly industrialised Walloon provinces were fertility started to be controlled around 1870, fertility was still largely uncontrolled in the Flanders at the turn of the century. Breast feeding was since decades on the decrease overall in the country, and if practised, of a shorter duration in the Flanders. In addition, strong regional differences were observed in the quality of water supply: the hilly Walloon region could largely benefit from spring water, which was not the case for the Flanders, resulting in higher risks of contamination in the absence of breastfeeding (Masuy-Stroobant 1983).

**GRAPH III-4:** Infant mortality rate, Belgium (1900-2007)




*Source:* Vital registration, (figures in appendix table III-5).

After their first birthday, children were not completely 'out of risk'. Although decreasing since the second half of the XIX$^{th}$ century, was the mortality in childhood (between 1 and 5 years) still high and mainly due to infectious diseases. Alongside, preventive medicine was in its childhood: for instance, well-baby clinics started their development in the last decade of the XIX$^{th}$ century and the use of Vitamin D supplement as preventive treatment for infantile rickets started by the mid 1920s, (see McCollum *et al.* 1922; Steenbock & Black 1924). It means that only the youngest study cohorts may have benefited from this treatment.

Infant mortality started its decline at the beginning of the XX$^{th}$ century reaching a level as low as 4.09 ‰ in 2007 (graph III-4**)**. Mortality rates at all the other ages continue their decline over the century, due to a general improvement in socioeconomic conditions of the population and to advances in medicine, including access to preventive and health care. As a consequence, life expectancy at birth reached 76.7 (men) and 82.2 (women) years in 2007.

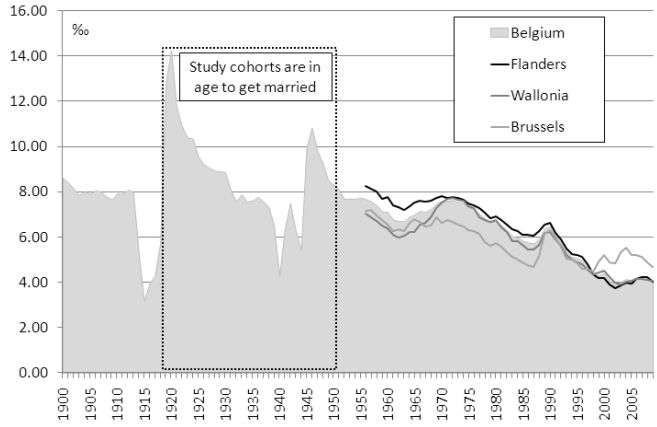
## B. Grown up in a context of World War(s) and economic crisis

All the members of the study cohorts have experienced a World War as a child or as a young adult. This is, of course, a traumatic experience, at the collective and at the individual levels. Most of them had probably lost a member of their family, neighbour or friend in this context. Precarious life conditions usually strengthen the family solidarity: the most important is to remain alive and together as long as possible (Sullerot 1999). But poor hygiene, nutrition and precarious economic conditions will also have had long-term consequences on their health status. The War will also influence the frequency and the timing of the main life-transitions:

- The crude marriage rate was quite stable in the beginning of the century with about eight marriages for 1000 inhabitants each year. World War I brought about a steep drop in marriages frequency: in 1915, it felt to 3.2‰. The after war catch-up was quick and important (Wattelar & Wunsch 1967) reaching 14.3‰ in 1920. Although less important, a similar catch-up effect is observed in 1945 after World War II. A first recovery stage having already occurred in 1941-1942. The post-war period shows an overall decrease in marriage rate, partly due to the increase in cohabitation starting in the 70s. Past regional nuptiality patterns showed a rather restrictive access to marriage in West and East Flanders and in the more rural provinces of Limburg and Luxemburg, while the Walloon provinces of Hainaut and Namur showed consistently higher proportions of ever married people during the period 1846-1961[3] (Lesthaeghe 1977: 54-56); the ever married proportions of the provinces of Brabant, Antwerpen and Liège were close to the national figures almost over the whole period. Marriage was thus less frequent in the Northern provinces, Antwerp being close to the national average. Recent trends in crude marriage rates show a different picture, with higher rates in Flanders up till 1975, when similar figures are observed for Wallonia and Flanders. Later on, the Brussels region will take the lead, due to the high proportion of its migrant population of foreign nationality. Recent regional differences are to be interpreted with caution, as cohabitation is on the increase since the late 70s and its frequency differs across regions.

[3] Proportions 'ever married' are produced by census data and reflect past marriage frequency. It comprises not only current married people but also widowed and divorced people.

**GRAPH III-5:** Crude marriage rate by region, Belgium (1900-2009)




*Sources*: Compilation of various INS/NIS reports, (figures in appendix table III-5 to III-8). *Note:* Until 1962, Brussels refers to the 'arrondissement of Brussels'.

- As often observed in a crisis context, a drop in the crude birth rate is observed during the two World Wars (graph III-5). From 22.57 live births for 1000 inhabitants in 1913, it decreases to 16.12 in 1915 and reached a minimum in 1918 (11.26). After resuming its pre-war level in the early 20s, the birth rate continues its long term decrease during the Interwar period: the general economic instability did not prompt people to have children (Wattelar & Wunsch 1967) and the secular decrease in marital fertility initiated in Wallonia during the second half of the XIX$^{th}$ century have spread over the whole country (Lesthaeghe, 1977). During World War II the crude birth rate decreased again, reaching a minimum of 12.18‰ in 1941. The 'catch-up' phenomenon starting in 1945 and lasting unexpectedly until 1964 was called the 'baby-boom'.

  The impact of the two World Wars on differences in our study cohorts' fertility behaviour is well summarised by Karel Neels (2006):

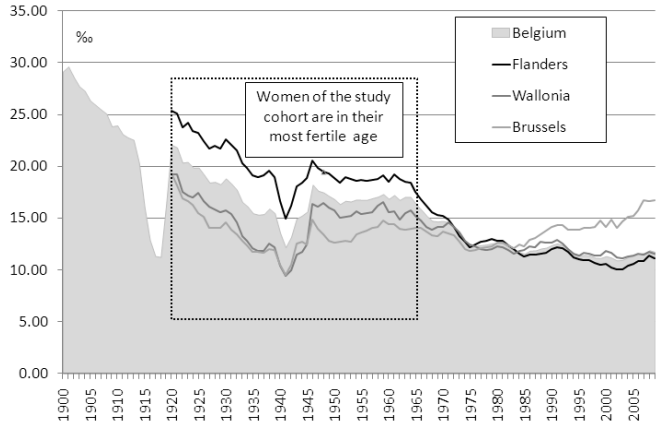
  > "The cohorts of women born in the early 20$^{th}$ century – living through World War I and the subsequent economic depression in their prime reproductive years – show fertility just below the replacement level […]. After World War II, the reinforcement of the family as an institution becomes fully evident in the 1950s. The cohorts born in the late 1920s and early 1930s again show higher fertility levels than the preceding cohorts. At the same time, younger women exhibit considerably earlier patterns of family formation and childbearing." (Neels 2006: 14).

  As the live birth data are available at the regional level[4], it is interesting to compare their evolution over the XX$^{th}$: at the beginning of the century, is the crude birth rate much higher in Flanders. Evidence favouring the hypothesis of a 'compensation' for their higher infant mortality could never be shown. The most likely explanations are cultural and economic: in Flanders, modernisation and industrialisation arrive later. The secularisation process was very strong in Wallonia, while adherence to organised religion remains at a high level in the North of the country. Lesthaeghe (1977) found also clear cultural differences (he used data on voting behaviour, occupational sector, Church attendance, etc.) between the North and

[4] The crude birth rate is only a gross measure of fertility because it reports the number of live births to the total population and not to the specific population 'at risk' of childbearing (women aged 15-50 years), but it allows identifying period effects such as Wars and other crises and general trends.

the South of Belgium alongside the linguistic border. He considered that these differences could explain discrepancies in the intensity and the timing of the demographic transition over the period 1800-1970. Since the 1980s, the regional differences did reverse: the lowest birth rate is found in Flanders and the highest in Brussels (mainly because of the high proportion of Brussels inhabitants of foreign nationality who tends to have a higher fertility).

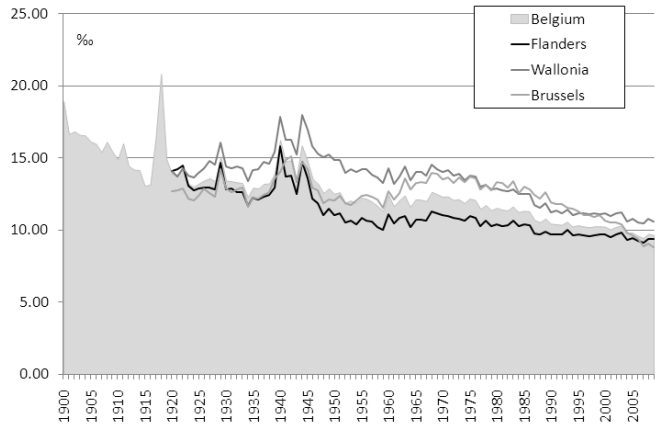
**GRAPH III-6:** Crude birth rate by region, Belgium (1900-2009)




*Sources*: Dufrasne (1943), Belgium vital registration and compilation of INS/NIS reports, (figures in appendix table III-5 to III-8). *Note:* Until 1962, Brussels refers to the 'arrondissement of Brussels'.

- The overall increase in life expectancy over the XX$^{th}$ century was already documented earlier. As for the other crude rates, the death rate does not offer a true picture of the level of general mortality and underscores its decrease over time as this indicator does not take account of the age structure, but it reveals period effects like mortality crises very accurately. (graph III-7). In Belgium, the War related mortality was considerably higher during World War II than it was during the World War I. Between 1914 and 1918, Belgium was occupied by the German army but was not as directly and as massively involved in the conflict, than its neighbouring countries, like France or the Netherlands. A mortality peak is nevertheless observed at the end of the War period: the Spanish flu of 1918-1919 contributed more than the War to the increase of the death rate over this crisis period, with a rough excess death toll of about 50,000 units. Except for these 'historic perturbations', no other crisis mortality is observed over the century. It is interesting to notice that regional differences in crude death rates have been reversed over time: at the beginning of the century, the mortality rate is the highest is Flanders (mainly due to high infant mortality) but Wallonia took the lead in the Interwar period and this new regional mortality pattern persists over the whole century.

**GRAPH III-7:** Crude mortality rate by region, Belgium (1900-2009)




*Sources*: Dufrasne (1943) and compilation of various INS/NIS reports, (figures in appendix table III-5 to III-8). *Note:* Until 1962, did Brussels refer to the 'arrondissement of Brussels'.

The conjunction of the natality and mortality decrease observed in the beginning of the XX$^{th}$ century in the graphs but already initiated in the XIX$^{th}$ is called the first 'demographic transition'. It brings about an ageing of the population structure that is intensified by the still increasing life expectancy at older ages.

## C. Brought up in traditional and gender-specific principles

### *1. Catholic education at school and at home*

Although the secularisation process started in the South of the country with the industrialisation of the XIX$^{th}$ century in Belgium, the Catholic religion and its principles played an important role in the education provided at school and within the family at the beginning of the XX$^{th}$ century, when the study cohorts were in their childhood.

The intensity and the timing of secularisation differed across regions. Without entering into details, one can say that in Wallonia, the modern industrialisation process had reinforced secularisation: the socialist unions in the XIX$^{th}$ were created partly because the clergy refused to meet the demands of the working class. In Flanders, it was quite the opposite. When industrialisation started (in the early XX$^{th}$), the clergy had decided to revise his strategy: in order to keep his influence on the working classes, they create catholic labour unions, youth and women movements (Witte *et al.* 1997). This resulted in a lower secularisation level in Flanders where adherence to organised religion was still high at the turn of the century (Lesthaeghe 1977). These regional differences persist over the century.[5]

Since the late XIX$^{th}$ century, the Belgian society is structured according to three pillars (the catholic, the socialist and the liberal one) [6]. But in the educational system, the catholic ideology remains predominant, at least until the *Pacte scolaire/Schoolpactwet*[7] in 1959 (Wynants & Paret 1998). At

[5] Voyé *et al.* (1992) used Episcopal data on religious practices from 1967 to 1989 to compare religiosity across regions. The results confirm that religious weddings and other catholic celebrations were the most frequent in Flanders and the least frequent in Brussels. But, an over time decrease is observed in the three regions.

[6] The pillarisation of Belgium and its impact on elderly care policies will be discussed in section 2.

[7] In Belgium, there are two streams in the educational system: the *réseau officiel d'enseignement/officieel onderwijs* (non-confessional) and the *réseau libre/vrij onderwijs* (confessional). The *Pacte scolaire/Schoolpactwet* allows the parents to choose if they want to put their children in a 'confessional' or in a 'non-confessional school'; it also reduces the influence of the Church on part of the educational system.

that time, the youngest study birth cohorts were already aged 30. Before 1959, the influence of the Church played through two channels. First, the family education: Servais (2001) studied the relation between the Church and the family for the period 1850-1914. He noticed that many manuals were written by ecclesiastical authors to highlight the importance of the family, to give advice for the catholic education of children and to remind the reciprocal 'duties'. Second, the school education: the clergy was against the creation of *réseau officiel d'enseignement/officieel onderwijs* (non-confessional) in the 1850s. They used many means to stop the progression of this parallel educational system and the Government had to make several compromises to make this idea acceptable to the clergy. This necessity to account for and to negotiate with the clergy highlights its key role in educational matters.

### *2. School attainment and professional careers: gendered patterns*

In 1914, the school became free and compulsory by law for all the children aged 6 to 12 years. The compulsory education leaving age was further raised to 14 years in 1919 and finally to 18 years in 1983 (Depaepe *et al.* 1998). This means that the study cohorts (except for the oldest) should have, at least, a primary school level. The proportion of higher educated is rather low for the cohorts born at the beginning of the century, especially for women.

The census data providing figures on the education level of the population are rather difficult to compare over time. Until the Census 1947, people were only asked if they are able to read and/or write. The literacy rate in 1947 is published by age group. Among the 21-60 (age group corresponding to the study cohorts), the literacy rate is about 97%[8] whatever the gender and the region (INS/NIS 1951a, see appendix table III-9). Since the Census 1961, seven education levels are distinguished (primary, unfinished secondary, secondary, unfinished higher education, non-university high education, university high education, artistic education). Gender and regional differences became then visible: the proportion of those having at least a secondary diploma is higher for men in the three regions (9.9% in Flanders, 10.8% in Wallonia and 19.5% in Brussels against, respectively, 5.8%, 5.9% and 9.6% for women).The education level in higher in Brussels as it is often the case in the Capital cities (INS/NIS 1966a, see appendix table III-10). Unfortunately, the data does not allow isolating the study cohorts. The results from Census 1970 (INS/NIS 1974b, 1975) are published by age groups (see appendix table III-10). The group 45-64 includes most of the survivors of the study cohorts: the figures highlight the gender and regional differences.

After having left school, not many women will start a professional career. The global women declared activity rate is not higher than 22.7% in 1920, when the older study cohorts reach their active age (table III-1). The activity rate is much higher in the lower social class, where the women income is a necessary complement to insure a decent life standard. In the bourgeoisie, women had to follow the male-breadwinner model: married women should not have to work[9] (Gubin & Piette 2004a). There are also regional discrepancies: the women activity rate is the lowest in Wallonia: in 1930, 33.8% of the women aged 15+ are active in Brussels and in Flanders against 25.8% in Wallonia (INS/NIS 1937). These differences reflect the regional pattern of the activity sectors: the textile industry (in Flanders) and the development of services and administrations in Brussels require women workers and employees; while the agriculture and metallurgy industry in Wallonia mainly employed men.

[8] The literacy rate of those aged less than 15 years equals 80.4 % in 1900 and 86.6 % in 1920 (Wynants & Paret 1998).

[9] Some of the occupations usually practised by women (e.g. nurse, school teacher) were for a long time not accessible to married women: when a nurse or a schoolteacher got married, she had to abandon her work.

The generalisation and the lengthening of compulsory education, the development of the services sector, the feminist movement and later on a general societal evolution favouring gender equality have led to a progressive increase in the women activity rate[10] over the XX$^{th}$ century[11].

**TABLE III-1:** Activity rate of women aged 14+, Belgium (1900-2001)

| YEAR | AGE OF THE STUDY COHORTS | | ACTIVITY RATE |
|---|---|---|---|
| **1900** | 0 | | 29.2 |
| **1910** | 0-10 | | 23.1 |
| **1920** | 0-20 | | 22.7 |
| **1930*** | 1-30 | active age | 31.0 |
| **1947** | 18-47 | | 23.6 |
| **1961** | 32-61 | | 25.2 |
| **1970** | 41-70 | | 25.3 |
| **1981**** | 52-81 | | 35.0 |
| **1991**** | 62-91 | | 35.3 |
| **2001**** | 72-101 | | 42.4 |

*Sources:* **1900,1910** : Masuy-Stroobant (1983); **1920, 1930** : INS/NIS (1937) ; **1947,1961** : INS/NIS (1966b) ; **1970**: INS/NIS (1974a) ; **1981, 1991**: INS/NIS (1996b) ; 2001 ; INS/NIS (2011) [figures from the Labour Force Survey-LFS, first semester 2001]. *Note:* *= Among the 16+; **= among the 15+.

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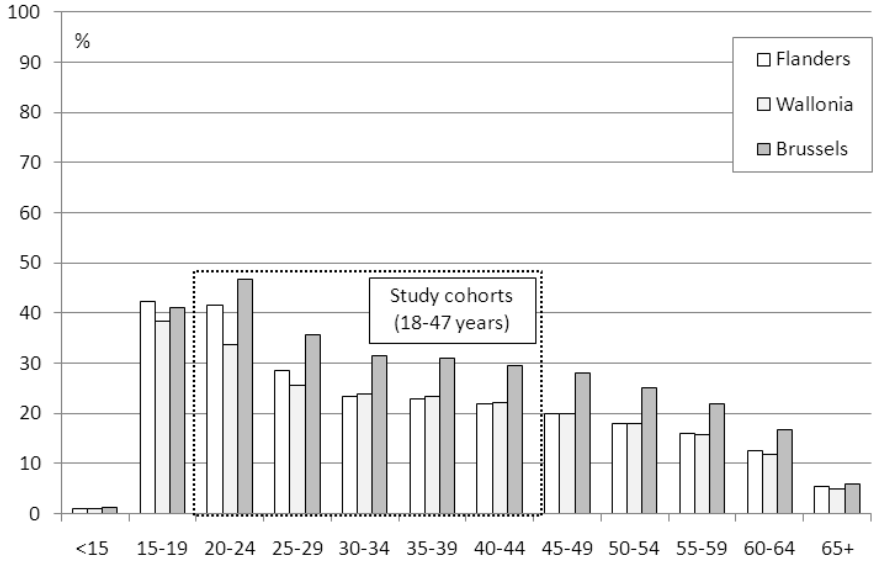
But the evolution slowed down between the 30s and the 60s: the fertility decreased during World War I. To recover the birth rate prevailing before War the maternity role of women has to be promoted. Women activity is seen (again) as an obstacle to their first 'duty': to be a good mother (Gubin & Piette 2004b)[12]. Graph III-8 offers a good overview of the situation in 1947: the women activity rate (1) is higher in Brussels for all age groups, (2) is very low under 15 years of age (due to compulsory education), (3) is the highest for the age groups 20-24 and 25-29 (when women are not yet married). It is important to notice that **the study cohorts are aged 18-47 at that time,** their age group employment rate is relatively low and they were under the influence of the campaigns promoting motherhood, especially during the Interwar period. This rather low women employment rate will have an impact on their later life and especially on the level of their pension benefit.

[10] Feminists will say that the women employment rate has always been high but women work was not recognised as such (either because they worked in the private sphere or because they worked as a helper for their husband or their family) (Gubin & Piette 2004a). The real change occurring during the XX$^{th}$ Century is the increasing proportion of women having a recognised working status, but not the increasing proportion of working women.

[11] It was rather difficult to trace this evolution because the published figures change over time. The figures of table III-1 come from various sources and the employment rate was sometimes computed on the women aged 15+ or 16+. The figures do neither account for the change occurring in the compulsory education leaving age, nor for the introduction of unemployment benefits, pre-pension schemes, childcare services, etc. There is no doubt that the introduction of these measures will, have had an influence on the propensity and the timing of entry of women in the labour market.

[12] Pontanus (1968) contradicts this dichotomised view. He found that, in 1961, the increase of the women employment rate was accompanied by a fertility increase.

**GRAPH III-8:** Women activity rate by age group and region, Belgium (Census 1947)




*Source:* INS/NIS 1966b, (figures in appendix table III-12). *Note:* Brussels = 'province of Brabant'.

## D. Parenthood in the Post-War period

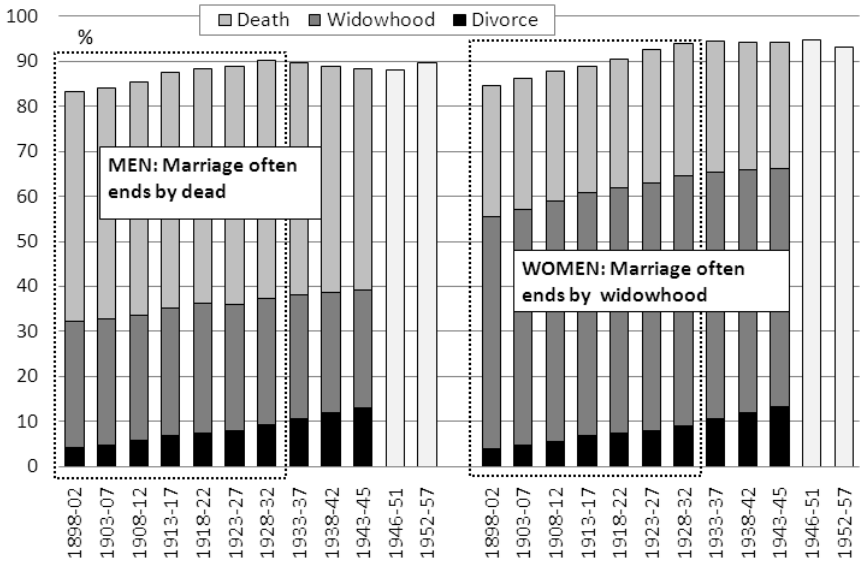
When World War II ends, all the survivors of the study cohorts have reached adulthood. The younger may have had to delay their family projects because of the War. In the late 40s and the 50s, the 'catch-up' phenomenon starts: the sudden increase of the crude birth rate (graphs III-5) initiated the baby-boom. The regional differences are less marked than before War. Évelyne Sullerot describes the birth cohorts who gave rise to the baby-boom (which correspond to the youngest study cohorts):

> "Parce que les jeunes ménages n'avaient rien, ni maison, ni voiture, ni espoir d'en acquérir, en somme rien à perdre à avoir des bébés. Les loisirs étaient rares, les voyages inabordables : on n'avait pas à balancer entre une croisière et un bébé. [Ils] ont été adolescents dans un monde où prévoir était impossible et économiser insensé. Vivre au jour Ie jour, avec enthousiasme et insouciance, c'est Ie nouveau mode de vie des jeunes familles. Leurs parents posaient des jalons, mettaient de l'argent de coté, assuraient prudemment leurs arrières : aussi s'effraient-ils de voir leurs enfants vivre comme 'des adolescents mariés' assez immatures […]. Les bébés arrivent comme ça, sans avoir été réellement prévus ni explicitement désirés. Les jeunes femmes ne savent guère tenir une maison ni faire de la fine cuisine. Les petits logements sont embarrassés de couches qui sèchent, de bassines, de couvertures d'avant guerre trouées, de seaux de charbon. Les jeunes pères bricolent des étagères et, vaille que vaille, préparent des examens la nuit, pendant que les enfants dorment." (Sullerot 1999: 293-294).

The life transitions are much standardised in the study cohorts:

1. **Marriage is the norm**. Graph III-9 shows the proportion of 'ever married' (corresponding to the sum of the piled up bars: e.g. the proportion 'ever married' men of the birth cohort 1989-1902 equals 83.2% (= 4.2% divorced + 28.0% widowed + 51.0% married men). Among the study cohorts, the proportion of ever married lies between 83.2% and 90.2% for men and between 84.5% and 94.1% for women. To get divorced is very rare, especially in the oldest cohorts. For men, their marriage usually ends when they dies; for the women, when their husband dies (she becomes a widower). The 'gendered' marriage ending is a consequence of the higher women life expectancy and of their usual younger age at marriage.

**GRAPH III-9:** Frequency of marriage and its various endings for the birth cohorts 1898-1902 to 1946-1951 by gender, Belgium

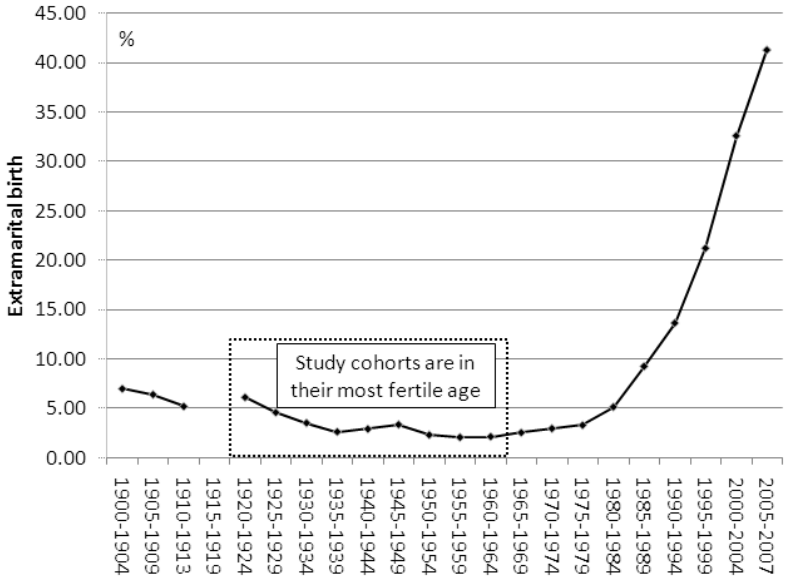



*Sources:* **1898-1945:** Schoen *et al.* (1984): (a) ever married computed on those surviving to age 15; **1946-1957:** INS/NIS (2011) (b) ever married = 1-proportion of single for age group 50-54 in 2001 for the birth cohorts 1946-1951 and in 2006 for the birth cohorts 1952-1957. *Note:* no information on marriage ends is available for the cohorts 1946-51 and 1952-1957, a different colour is therefore used to indicate that the bar refers to the proportion of 'ever married' regardless marriage ends. The level of the bar can be compared to the top level of the other bars (figures are in appendix table III-13).

**2.** Women of the study cohorts usually marry men somewhat older than themselves: their mean age at marriage was around 23-24.5 years against 25.5-26.5 years for men (appendix table III-14).

**3.** The birth of the first child often occurs within one or at most two years after marriage for the study cohorts. Extramarital births are very rare in the period when the study cohorts are in their fertile age, graph III-10). The increase in extramarital births started in the late 70s, when modern contraception was widely used and cohabitation preceded and progressively became an alternative to legal marriage. In almost 25 years (1980-2005) the proportion of extramarital births rose from around 5% to more than 40%.

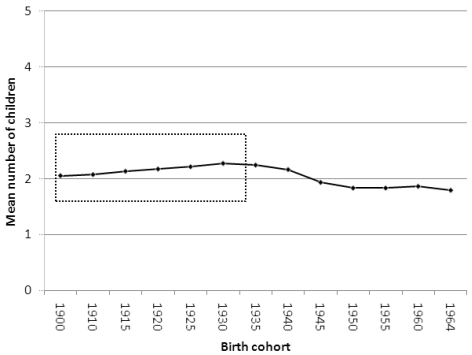
**GRAPH III-10:** Evolution of extramarital births (%), Belgium (1900-2007)




*Source:* Vital registration (figures are in appendix table III-5).

**4.** If birth control is already a preoccupation of the study cohorts, having a numerous family (3 children or more) is quite common, especially in Flanders. The proportion of childless women is about 17% only for the study cohorts (Festy & Rychtarikova 2008).Graph III-11 gives the final offspring by birth cohorts for married people in Belgium. It shows that, the married women of the study cohorts have, on average 2 children. Graph III-12 allows regional comparison but for Belgian couples only. The data are given by marriage cohorts since 1921-1925 to 1941-1945. It corresponds to the period when the study cohorts are in age to get married. It shows that the Belgian Flemish have on average 2.5 children against 1.8 for Wallonia and 1.7 for Brussels.

**GRAPH III-11:** Final offspring of women birth cohorts 1893-1902 to 1964, Belgium




*Sources*: **1900 to 1935**: Festy (1979) [mobile means computed on 10 successive birth cohorts; **1940 to 1964** : Sardon (2006) [final offspring of the indicated birth cohort], (figures in appendix table III-15).

**GRAPH III-12:** Final offspring of marriage cohorts 1921-1925 to 1941-1945 by region, Belgium (Population of Belgian nationality only)




*Source:* Jadin (1967), (figures in appendix table III-16).
*Note:* the figures are computed on married couples. As the extramarital births are exceptional in these cohorts, this should not be a problem.

*The study cohorts are therefore likely to have a spouse and children, who can, potentially, take care of them when they will reach old age.*

## *SECTION 2. Getting old after the regionalisation: the differential development of elderly care policies*

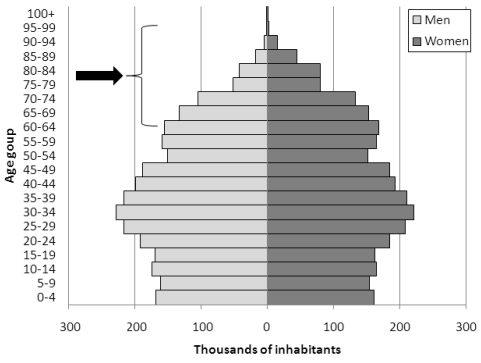
### A. What do the birth cohorts 1900-1929 expect for their old days?

In 1994, all the study birth cohorts have reached 65 years. Among those who have ever worked, the oldest are retired since a long time and the youngest have just or will soon exit the labour market[13]. In 1994, their age group (the 65+) represents 15.6% of the population (nearly three times the 1900 figures).

Graphs III-13 to III-15 show the age pyramids by region in 1994[14](population of Belgian nationality only). The global shape of the pyramids is very different from those of 1900 and 1930. In 1994, they do not look any more like pyramids: the base has considerably narrowed and the summit became larger over the XX$^{th}$ century. This is due to the combination of the secular birth and death rates decrease. Now, if one compares the regional pyramids for 1994, Brussels has a particularity: its summit (proportion of older people) is larger, especially for women. Although the general resident Brussels' population is younger than the general population of the two other regions - due to the younger age structure of its migrant population - its population of Belgian nationality is older. In Brussels, 22.7% of the population of Belgian nationality is aged 65+. The masculinity ratio equals 54 (54 men per 100 women) and 6.5% are 80+, with a quite lower (masculinity ratio of 35. In the two other regions, the population of Belgian nationality is relatively younger: the 65+ represents 21.3 % of the Belgian-Flemish, with only 3.7% of 80+ and 22.1% aged 65+ of the Belgian-Walloons and 3.9% for the 80+.

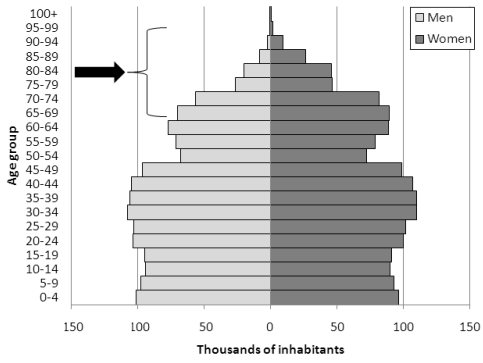
In 1994, the life expectancy at 65 years equals 19.0 for women and 14.8 for men; at 80 years, it equals 8.3 for women and 6.4 for men. As shown in graph III-16, these figures have impressively increased over the XX$^{th}$ century (in 1900, there were respectively 11.3, 10.3, 4.7 and 4.4) with a visible decrease during the World War II[15]. The gender gap slightly increases over time.

**GRAPH III-13:** Age pyramid of Flanders in 1994
(Population of Belgian nationality only)




*Source:* INS/NIS 1994,
(figures in appendix table III-17).

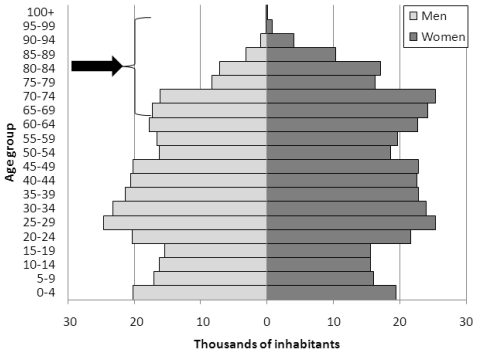
**GRAPH III-14:** Age pyramid of Wallonia in 1994
(Population of Belgian nationality only)




*Source:* INS/NIS 1994,
(figures in appendix table III-17).

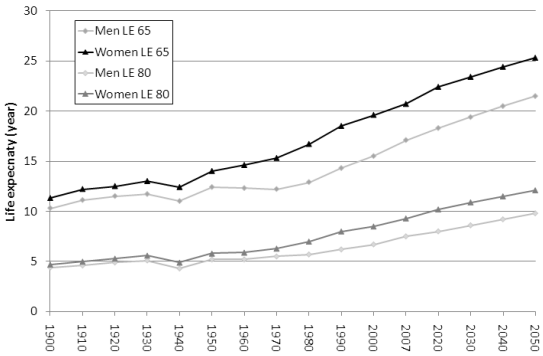
[13] Until 1996, the legal retirement ages in Belgium is set to 65 for men and to 60 for women, but the self-employed often work longer.
[14] As the data analysis will be restricted to the Belgian citizens, it might be interesting to look at the relative 'weight' of the birth cohorts 1900-1929 in the Belgian population by region.
[15]The graph is based on data collected in 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, and 2007 and on the projections for 2020, 2030, 2040 and 2050. This is why the decrease in life expectancy due to World War I (1914-1918) does not appear.

**GRAPH III-15:** Age pyramid of Brussels in 1994 (Population of Belgian nationality only)




*Source:* INS/NIS 1994,
(figures in appendix table III-17).

**GRAPH III-16:** Life expectancy at 65 and at 80 years, Belgium (1900-2060)




*Sources*: **1900-2007**: Human Mortality Database; **2020-2050**: Mestdagh & Lambrecht (2003a). *Note:* figures from 2010 to 2050 are based on projections, (figures in appendix table III-4).

The life expectancy in 'good health' is of course lower. This measure is usually computed on survey data (because information on the health status is needed) and it is therefore not possible to study its evolution over a long period of time. Demeuse *et al.* (1992) estimated the life expectancy in good health at 65 years to 15.7 for women and 12.4 for men using the 1990 Eurobarometer of 1990[16]. Comparing those figures to the total life expectancy at 65 years for 1990, one can say that both men and women can expect to live about 85% of the remaining years in good health[17].

When they are 65+, the willing of the majority of the cohorts 1900-1929[18] is to remain at home as long as possible. This is what several opinion survey questions reveal:

In the questionnaire of wave 2001 of the PSBH, a specific module on the 'representations of ageing' included questions on which kind of care sources the respondents would prefer to use in their old ages. Casman & Mortelmans (2005) analysed the answers provided by the 16+ (n=2,268) and showed that persons 65+ (cohorts born before 1937) prefer remaining at home by combining 'formal and informal care' (39.9%) or 'formal care only' (29.2%), when necessary. The solution 'informal care only' is less often cited (8.6%) and the prospect of an intergenerational cohabitation is seldom envisaged (6.2%). It seems that the questioned elderly would still prefer to be placed in institution (13.4%), than to be dependent on their children[19].

A special Eurobarometer on long term care was carried out in 2007 among the 15+ in 27 of the Member States (n=1.040 for Belgium), (European Commission (2007b). It showed that the tendencies observed among the 65+ is also found in the population of Belgium among the 15+: they want to

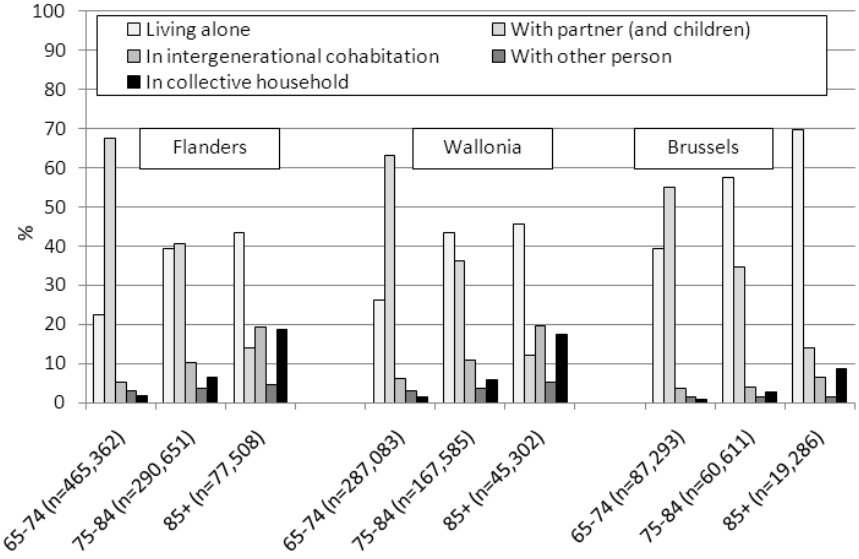
[16] These are the data which are closest in time to the beginning of the PSBH data. More recent computations have been done based on the Health Interview Surveys of 1997 and 2001 by Mestdagh & Lambrecht (2003a).
[17] These measures are influenced by the quality of the dataset used, the choice of the health variable, the age group considered and, of course, the period. Mestdagh & Lambrecht (2003a), for instance, found a gender difference in the proportion of healthy years at old age (lower for women) but they considered people aged 85 in 2001.
[18] Note that the definition of the '65+' in the following surveys does not necessarily correspond to the birth cohorts 1900-1929.
[19] According to the Belgian Civil Code, there is a legal duty of financial support to the partner (spouse, former spouse or people living in consensual union), ascendants (parents and parents-in-law), and descendants (children and children-in-law) (Sayn 2008). But, in the facts, the descendants obligation is seldom called upon by the elderly people themselves; it may be used by the CPAS/OCMW when social workers try to evaluate what are the care and the financial potential resources of an elderly beneficiary.

avoid intergenerational cohabitation and/or to be dependent on his children; they tend to consider that elderly care responsibility should be assumed partly by the State and partly by the individuals themselves, (via taxes, for example). These tendencies are the same as those observed in neighbouring countries: France, Germany, Luxembourg and the Netherlands. Previous Eurobarometers (1992, 1993, 1999) posed similar questions - but which are not totally comparable – as to the responsibility for elderly care: they highlight the relative stability of the Belgians' opinions over time.

## B. Where do the elderly actually live?

The data rather conforms to the prevailing opinions: in the 90s, the vast majority of the 65 + lived at home. Institutionalisation is rather rare (5.0 % in 1992[20]) and arrived at a very old age or when the elderly became severely dependent (Poulain 2005). However, there are important regional discrepancies due to the difference in the orientation of the elderly care policies taken since the mid-80s: favouring community care in general and reserving institutionalisation to the severely disabled in Flanders; favouring (semi-)institutionalisation in Wallonia and Brussels, even when the dependency level is considered moderate (see next points).
Graph III-17 gives the distribution of living arrangement of the 65+ by region in 1991.

**GRAPH III-17:** Living arrangement of the 65+ by region and age group, Belgium (Census 1991)




*Source:* de Koker *et al.* 2007, based on Census 1991 (figures in appendix table III-18).

The proportion of isolated elderly increases with age and is higher in Brussels for all age groups: as in most of the capital cities, the proportion of isolated is higher for all the age groups. The phenomenon may be reinforced at old age because the elderly who are family-less or want to avoid depending on their family are 'attracted' by the big cities where proximity and health services are usually better developed and more accessible (Rodwin *et al.* 2003). The proportion of elderly in intergenerational cohabitation (living in their child household or 'with children and no partner'[21]) also tends to increase with age but remains quite low, especially in Brussels

[20] Decoster *et al.* 1994 quoted by Pacolet *et al.* 1998.
[21] The category 'with partner and child(ren)' is not considered as 'intergenerational cohabitation', because it often refers to situations where an adult child has not yet left the parental home (most frequent for younger elderly), while the other cases most often refer to a (re-)cohabitation occurring mostly when the parent is older and might need care.

(Mestdagh & Lambrecht 2003b). The last category ('in collective household') should refer to the proportion of institutionalised elderly. However, the census data (used here) under-estimated this proportion because it is based on their legal and not on their *de facto* address. This may also explain why the regional differences in policy orientations are not visible on the graph. More reliable figures on institutionalisation rate are those provided by the INAMI/RIVIZ[22] (Geerts & Breda 2007). They show that, consistently with the current policy orientations, the global institutionalisation rate is the highest in Brussels and the lowest in Flanders. The regional differences tend to disappear for the very old, especially in the more recent years: in 2003, 51.12% of the Flemish aged 90+ lived in an institution against 53.19% in Brussels and 54.83% in Wallonia (Pacolet *et al.* 2005). The reason is that Flanders favoured the institutionalisation of the very old and the most disabled; this is why the regional differences in institutionalisation rate mainly appear for the younger age groups. This difference in orientation is also marked by the higher nursing homes ratio in Flanders. In Belgium, there are two types of institutions[23]: the rest homes (*maisons de repos*-MR*/rustoorden voor bejaarden*-ROB*)* and the nursing homes (*maisons de repos et de soins*-MRS*/rust- en verzorgingstehuizen*-RVT*).* For the first type, access depends solely on an age criterion (being 60+), while the second type is only accessible to people having past a dependency level assessment. The regional authorities may decide to favour one type rather than the other. The more 'targeted' institutional care policy in Flanders lead to favour the MRS/RVT type, while the MR/ROB were relatively more developed in Wallonia and Brussels.

## C. The elderly care policies of the 1990s-2000s: their complexity and origins[24]

As the study cohorts want to stay home as long as possible, we will look at the elderly care policy orientations taken in Belgium in the 1990s-2000s and assess whether or not they are in favour of maintaining the elderly at home.

### *1. The Complexity*

Belgium is far from having a global and integrated elderly care policy.

If one wants to cartography the supply of home care services, he would have to account, not only for the public services (such as those provided by the CPAS/OCMW[25] or other municipality services) but also for those proposed by the private sector, by the *mutualités/mutualiteit* and the other actors of the non-for-profit sector. The same difficulty occurs for institutional care. Some authors made this kind of exercise for a well-defined geographical area (e.g. Deboosere *et al.* 2007 for the home care services available in Brussels) or for a given service (e.g. The 'Proxima' project in 2003-2004 for the family helper's services[26]) or for a specific type of beneficiaries (e.g. Breda *et al.* 2002 for the elderly 'recognised' as dependent). But still, all of them acknowledge the important limitations of their task and the impossibility of having a clear idea of all the offered services, their accessibility and their affordability. This raises the question of the visibility of the services and its impact on their use by the elderly which is beyond the scope of the dissertation.

[22] Institut National d'Assurance Maladie Invalidité/Rijksinstituut voor Ziekte- en Invaliditeitsverzekering.
[23] In fact, a same institution may host both MR/ROB beds and of MRS/RVT beds. The level of the INAMI/RIVIZ subsidies will be different according to the type of bed.
[24] This part of the chapter is based on an article I published in the *Revue Belge de Sécurité Sociale* (Masuy 2010) on the policies supporting the informal care-givers in Belgium.
[25] *Centres Publics d'Aide Sociale/ Openbaar Centrum voor Maatschappelijk Welzijn*.
[26] In this case, it is not really cartography, but a tentative inventory of various types of home care services in each region (see Ver Heyen et al. 2003 for Flanders, Letont & Van Daele 2004 for Wallonia and Léonard & Van Daele 2004 for Brussels). Each report also explains how the home care services are structured in the region.

For the stake of this chapter, we will focus on **the main policy measures and the care services which can be used by the elderly[27] in order to receive IADL and/or ADL care at home**. These measures and services may be **directly** beneficial to the elderly (such as home care services or the dependency allowance) or it can be **indirect** (such as the leave policies allowing a care-giver to temporary stop or reduce his working time to care for an elderly relative). Financial supports which are not aimed at paying home care[28], home care services which does not concern IADL and/or ADL care[29], institutional, transmural care and alternative collective housing[30] are not reviewed here as they do not provide 'at home' care.

### *2. The origins of the home elderly care services in Belgium*

For understanding the variety and the organisation of home (elderly) care available in Belgium in the 1990s-2000s, it is necessary to briefly go back to the origins of home care services sector.
Like the majority of the Belgian social policies initiated in the XIX$^{th}$-XX$^{th}$, home (elderly) care is characterised by a 'pillarisation' and a 'bottom-up' development (Gillian & Nyssens 2001):

- The '**pillarisation'** (the organisation of actors and institutions in social life around an ideological affiliation) has been a characteristic feature of Belgium since the beginning of the XX$^{th}$ century. It has often been said that one can be born, live, work and die in the institutions concerned, supported by the same pillar. The *mutualités/mutualiteiten*, hospitals, trade unions, associations and even teaching associations, maintained - and still maintain - privileged bonds between themselves and the political world, depending on whether they are of socialist, catholic or liberal tendency, which are the three 'pillars' of the Belgian social and economic system. Even if they have all three been present in the whole country, one might say that the catholic pillar has been more strongly represented in the Flanders and the Socialist in Wallonia. This contributes to explaining certain differences in the orientation and organisation of social and health policies[31]. Today, the structuring role and attachment to these institutions are less strong and other tendencies are making themselves felt on the Belgian political scene. Nevertheless, the three pillars continue to play a symbolic role in the political options, just as their role, so structuring in the past, still imposes a kind of 'dependency path'. Lastly, this pillarisation has supported the development of policies based on the cooperation of various actors (associations, politicians, *mutualités/mutualiteiten*, etc.) and that remains as relevant as ever.

- The **'bottom-up' principle** (meaning policies resulting from local or citizens' initiatives, which are then structured at a higher power level) operates as follows: a social problem is identified

[27] Note that some of the mentioned measures and services are not necessarily delivered to the elderly population: if some of them are conditioned to an age criterion (usually 60+ or 65+), others are also accessible to disabled and sick people (dependency criteria, e.g. family helper, nurse home) or to the general population (e.g. services cheque).
[28] In Belgium, there are several social financial advantages aids/measures that can be used by the elderly (specifically or not) to ensure a minimum/decent standard of living (e.g. the *Garantie de revenus aux personnes âgées*-GRAPA/ *Gewaarborgd inkomen voor ouderen*- IGO), cheaper public transports, reduced phone rental charge, reduced tv licence fee, etc.) or to assume the costs related to specific life events (e.g. moving in a more adapted place/accommodation). For an overview of the social aids/measures available in the mid 1990s, see Pacolet *et al.* (1998).
[29] E.g. sit-in services, ladies' companion (people, usually women, who spend time with the elderly for discussion, reading or simply being present), personal alarm and other technical supports, etc.
[30] These kinds of care setting can, however, allow the elderly to remain longer at home, especially if they are used to complement or to temporarily substitute home care (e.g. the use of day-care services can alleviate the care load of the family). For more details on institutional and transmural care available in Belgium, see Breda *et al.* (2002), Carlson (1998). For more recent information on alternative collective housing, see Guffens (2006).
[31] The community care orientation of the Flemish Region can be linked to the fact that the Flemish Christian party, *de Christelijke Volkspartij-*, has been in charge of the Ministry for Welfare and the Family (*Ministerie van Welzijn en Gezin*) during the 80s and the 90s.

by the actors of the associative sector; then citizen initiatives (via voluntarism), or private (via the associative sector, or the mutual insurance companies, etc.) and public (via the CPAS/OCMW) actions are developed at the local level or directed to a particular public (in the case of the *mutualités/mutualiteiten*, for example); then they multiply, all the while keeping regional, local or pillarised characteristics; lobbies are formed; finally, political measures are taken leading to more structured interventions, even to the installation of a policy on a higher level. Until the mid-80s, this 'higher level' is the Federal State. Frame III-1 lists the main steps of the elderly care policy development until 1985.

**FRAME III-1 :** Milestones of home elderly care in Belgium (until 1985)

**FIRST INITIATIVES (BEFORE 1949)**

**XVIII$^{th}$ century:** Saint-Vincent-de-Paul asked the confraternity of the *Dames de la Charité* to provide home care.

**XIX$^{th}$ to World War II**:

- Many nuns provide home care but the number of religious vocations decreases over time.
- Several scattered initiatives of family helper services are developed.
- The *Mouvement ouvrier* **develops solidarity cooperatives**. They will be at the origin of the *mutualités/ mutualiteiten*. The State should subsidy the health care system.

**End of the 40s:**

The first initiatives of home care are coming from the associative and volunteering sector (*Bureaux de bienfaisance*).

**1944**: An *arrêté loi/besluitwet* states that the insurances for sickness, disabilities, unemployment, old age, premature death, family allowance and annual holidays are compulsory.

**1945**: Several *arrêtés lois/besluitwetten* fix the social security system for all the workers.

**1947:** An *arrêté du Régent/besluit van de Regent* related to the accreditation of the care infrastructures (a first regulation of the home care services).

**DEVELOPMENT OF THE CARE SERVICES IN THE FRAMEWORK OF SOCIAL POLICIES (1949-1979)**

**1949:** The public health department creates a financial intervention in favour of hospitals and rest homes.

**1950:** An *arrêté royal/koninklijk besluit* related to the promotion of family helper services (targeting the 'traditional' family).

**1954:** The elderly became one of the target groups of the family helper services.

**1955:** The Federal State fixes the contents of the home care services and the qualification degree of the personnel.

**In the 60s-70s**: Elderly care is mainly provided in institutional settings (hospitals, rest homes) but this solution is considered to be too expensive for the society. Community care must be developed.

**1963:** A *loi/wet* which institutes and organises a compulsory insurance scheme on sickness and disability is voted. It includes a clause on nurse care and sit-in services (the general health insurance scheme reimburses the nursing care provided out of the hospital infrastructures).

**1965:** An *Arrêté loi/besluitwet* organises the training of the senior helper.

**1970s:** Organisation of the cleaning home care services and meals-on-wheels services.

**1976:** A *loi/wet* creates the CPAS/OCMW (reforming the ancient Public Assistance). These local centres have the mission to create family aid services at the municipality level.

**1978:** A *loi/wet* which allows the accreditation of home care services aiming at avoiding (long-term) hospitalisation of the elderly is voted.

**1985**: A *loi/wet* on the social care issues includes the home care services in the list of reimbursable care services.

*Sources:* Leroy 1993 ; Pacolet *et al.* 1998 ; Gillian & Nyssens 2001.

## D. Elderly home care 'facilities' in the 1990s-2000s: description and regional orientations

At the time of the 1985 institutional reform, Belgium was divided twice: first into three Regions on a territorial basis (the Brussels Region, the Flemish and the Walloon Regions), but also into three Communities on the basis of the usual spoken language (the Flemish, French and German-speaking Communities plus three commissions responsible for the Flemish, French and bilingual institutions in the Brussels Capital Region[32]).
The 'territorial matters' (e.g. infrastructures, housing policy, environment protection, agriculture, transports, etc.) were transferred from the Federal State to the Regions[33] while the 'person-related matters' (e.g. social welfare, health care, youth), the education, the culture and the use of languages were transferred to the Communities. The Federal State is still responsible for the justice, defence, federal police, social security, nuclear energy, monetary policy and public debt, and other aspects of public finances; but also for the obligations of Belgium and its federalised institutions towards the international institutions. The Federal State controls substantial parts of public health, home and foreign affairs and has the 'residual'[34] matters under its authority. (Gerlache *et al.* 2000).

This new distribution of responsibilities complicates and sometimes slows down the ongoing processes in the domain of social policies (by multiplying the actors to be consulted) and *a fortiori* in the case of the policies regarding elderly care. To say it in a very simplistic way[35] institutional care is under the Regions authorities as it is related to the housing policy, but the Federal State is competent for the programming[36]; home care services are organised by the communities as it is a 'person-related matter, but medical care (such as nurse home care services) is refunded by the social security through the Public compulsory health insurance system[37] which is a Federal State matter.

The *protocoles d'accord* (in French) or *protocolakkoord* (in Dutch) can be used to solve problems or to coordinate matters which are under the authority of different levels of power, such as elderly care. However, the main policy orientations in long-term care and elderly care remain under the authorities of the federated entities (Karakaya 2009). This is why regional differences[38] can clearly appear. In the North of the country, the Flemish Community corresponds[39] to the territory of the Flemish Region and the two federated entities have decided to merge under the name of the Flemish Community and so join their resources. That has allowed them to develop social policies more rapidly

[32] They are, respectively, the *Commission Communautaire française/ Franse Gemeenschapscommissie* (COCOF/FGC), *Commission Communautaire Commune/ Gemeenschappelijke Gemeenschapscommissie* (COCOM/GGC), *Commission Communautaire Francophone/Vlaamse Gemeenschapscommissie* (COCON/VGC).
[33] The Regional authorities supervise the provinces, municipalities and inter-communal utility companies.
[34] The 'residual' matters are all the matters which have not been transferred to another level of authority.
[35] For a more detailed explanation of the elderly care organisation in Belgium after the regionalisation, see De Lepeleire *et al.* (2004) for a comparison of home care coordination across regions, Willemé (2010) for a more recent overview of the Belgian 'long-term' care system, Van Damme (2010) for a critical approach to the current elderly care policies in Belgium and the challenges for the future.
[36] "A part of the budget corresponding to the maximum number of beds set at the federal level is allocated to the Regions, which can decide on the allocation over services in different semi-residential and residential settings or to support home care" (Willemé 2010: 4).
[37] For a comprehensive and detailed view of the public compulsory care insurance system in Belgium, see Schokkaert & Van de Voorde (2005).
[38] For simplicity purpose, in the rest of the dissertation, 'regional differences' will be used to refer to differences observed between Brussels, Flanders and Wallonia whatever it concerns the 'Community' or the 'Region'.
[39] Except for the Dutch-speaking minority living in the Brussels Region: for them is the COCON/VGC qualified in persons-related matters. It should be noted that this entity is a kind of satellite of the Flemish Community in Brussels and that it has less autonomy than its French-speaking counterpart, the COCOF/FGC. The COCOM is in charge of bilingual person-related matters (mainly the CPAS/OCMW and the institutions depending on it, as it is the case for the public rest homes in Brussels).

and in a more structured way. Such a regrouping was not possible in the South of the country because Communities and Regions did not sufficiently coincide: the German speaking Belgians live on the territory of the Walloon region but depend on the German-speaking Community and the majority of Brussels inhabitants, being French-speaking, depend on the French Community while living on the territory of the Brussels Region (COCOF/FGC) [40].

In the 1990s, the French Community transferred a part of its person-related matters (including home care services) to the Walloon Region and the COCOF/FGC for the Brussels French-speaking inhabitants. Since then, at the federal level, policies of assistance to the elderly are mainly managed by the Flemish Community, the Walloon Region, the COCOF/FGC and the German-speaking Community[41]

Since the 1980s, the Flemish institutions, which have already been merged into the Flemish Community, developed political measures in favour of maintaining the elderly at home (community care oriented) and, in this context, rapidly showed interest in informal care[42] (Derieuw 1993). In Wallonia and the Brussels Region, institutional care was initially favoured (Kinna & Cherbonnier 2002; Pacolet *et al.* 2005). However, in the mid 90s, home care began to be favoured too (Balthazart 1996).

Three kinds of measures favouring home elderly ADL and IADL care are reviewed below: the care insurance, the home care services and the leave policies.

***1. The development of a care insurance scheme***

The installation of a mechanism of care insurance scheme[43] seems to be a key component in a sustainable elderly care policy. It often contains a clause making it possible for dependent persons to have money to pay their informal care providers. That indicates that the public authority recognises - at least symbolically – the role of informal care providers and the individual cost of the assistance provided. Sometimes the 'recognition' goes further: the installation of a register of informal care providers (in the Flemish Region)[44] or the creation of a specific status (in Germany) which makes it possible to take into account the caring hours for calculating their pensions, the experience gained being subsequently assessed.

It is interesting to briefly describe the characteristics and the development of the Flemish care insurance scheme because the related debates illustrate well the regional differences in elderly care policy orientations.

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[40] The structure of the elderly care policy has been set up by a succession of decrees in Flanders (*Bejaarden decreet* 1985, *Thuiszorgdecreet* 1998, *Kwaliteitsdecreet* 2003, *Woonzorgdecreet* 2009). In the French-speaking part of the country, home care is regulated mostly by the Décret 'Picqué' 1989 (Declercq 2004).

[41] The policies specific to this community will not be considered here.

[42] In 1988, the *Hoger instituut voor de arbeid* (HIVA) published a study on the 'mantelzorgers'. A survey on the 'mantelzorgers' in the Flemish Region dates back to the 80s (Hedebouw & Winters 1988). The informal care provider is regarded as being a key actor and plays also as coordinator of the delivered assistance at home. In political speeches, it is very clear that the role of home care services must be used complementary to and not as a substitute for informal care (Geerts & Breda 2007).

[43] In certain countries, one speaks of 'assistance' (if the income of the recipient is taken into account to qualify for the allowance), rather than 'insurance' (implying a mutual contribution to cover a 'risk'). Sometimes the term of autonomy (more positive, showing what they want to maintain) is preferred to that of dependency (more negative, showing the risk to be covered). Following Willemé (2010), the term of 'care insurance scheme' will be used in the dissertation.

[44] The original intention of the register is to make sure that there exists a true informal care provider and that the dependent person does not use the benefit as an additional income. Potentially, the register can be used as a basis of surveys on the population of informal care-providers (as for the *Mantelzorg in Vlaanderen* survey, see chapter IV). But, in their article of 2007, Geerts & Breda note that registration is no longer compulsory.

The first Belgian benefit relative to a dependency situation is the allowance for the assistance of a third person (*allocation pour l'aide d'une tierce personne/ tegemoetkoming voor de hulp vanwege een derde)*. This is a benefit complementing the disability indemnity, which is a lump sum, independent of the income level (12 € a day on the 01/01/2007). The target group is the workers on disability leave for at least 4 months who need of a third party assistance to manage their daily life activities (a minimum threshold of dependency is required). This benefit was founded in 1970 and applies to the whole of the territory (regionalisation having not yet taken place)[45].

But according to Pacolet *et al.*, (1998), the real debate on the care insurance in Belgium only began in 1985, when the Prime Minister Dehaene favoured a participation in the costs of home elderly care (including the informal care related costs), in order to decrease the financial discrimination between hospital care and home care.

In 1987, the 'integration benefit' (*allocations d'intégration /integratietegemoetkomingen*) appeared. It was granted to handicapped persons who, because of their reduced autonomy, have to support additional expenses. The granting of the benefit (a federal matter) is subjected to conditions of handicap or dependency and the maximum amount (on the 01/09/10, it varies from 1,082€ to 9,741€ yearly) is calculated according to the composition and incomes of the household. It should be noted that, compared to the previous measure, it is no longer the status of worker, but the health condition which entitles to the benefit.

In 1989, the allowance for assistance to the elderly (*Allocation d'aide aux personnes âgées*-APA*/Tegemoetkoming voor hulp aan bejaarden*-THAB) replaced the integration benefit once the beneficiary as reached 65 years.

The maximum amounts (ranging from 925€ to 6,210€ yearly on the 01/09/2010) are calculated according to the degree of dependency, but the allocated amount depends on the household composition and the incomes. In 1990, only 2,432 persons were beneficiaries. Five years later they were 59,980 (1995) and currently (on the 12/31/2009) 152,694 persons receive this allowance (FPS Social Security[46], 2010), meaning roughly 12% of the over 65 year olds. The conditions for its granting related to households were eased at the end of the 90s. Yet the APA/THAB still remains an assistance measure aimed at the most deprived publics and is not always accessible to those who find themselves in a borderline situation. The characteristics, and especially the limits of the APA/THAB, call for other initiatives aiming at supporting the cost of elderly long-term care and set the bases of a care insurance not conditional on income.

During the 1990's, other complementary benefits were proposed (Pacolet *et al.* 1998): for example, an INAMI/RIZIV lump-sum can be granted (since 1991) on the basis of a level of dependency (Katz scale[47]) for financing institutional or home care; several *Mutualités/Mutualiteiten* propose complementary insurances to their affiliated; sometimes the CPAS/OCMW intervenes in the costs of home care, via subsidies. Nevertheless, they intervene especially in the institutional care costs borne by the beneficiary. Like the APA/THAB, these benefits carry weaknesses: those of the INAMI/RIZIV are based on the care provider supply and not on needs, those of the *Mutualités/Mutualiteiten* are only accessible for their affiliates and the CPAS/OCMW support only concerns the most deprived elderly.

[45] It should be noted that this only concerns workers. This is typical of the Bismarckian model of social security which initially based its social policies on wage-earning and work related risks.
[46] Service Public Fédéral (SPF) *Sécurité sociale/Federale Overheidsdienst* (FOD) *Sociale Zekerheid*.
[47] The Katz scale measures dependency for the ADL. It is one of those generally used in Belgium (sometimes in combination with the Zarit's scale to take cognitive dependency into account).

The need for a global elderly care policy is increasingly obvious and has been written into the declaration of the federal government in 1999. This declaration will not be followed by concrete measures taken at the federal level, their cost being presented as one of the major obstacles.

The government of the Flemish Community has decided to take the initiative in creating an insurance scheme at the regional level. The idea of a care insurance scheme[48] fits in well with the community-oriented elderly care policy developed in Flanders[49].

The French Community did not agree with this measure and brought it to the Court of Arbitration (*Cour d'arbitrage/Arbitragehof*) for non-respect of the responsibilities division: a care insurance should be related to the social security, which is a federal matter. The case was rejected, because the means of financing proposed by the Flemish Government (a non-progressive tax) excludes automatically the *Zorgverzekering*[50] (ZV) from the social security system, which is based on a progressive taxation. In 2001, the ZV came into effect[51].

It is indeed an insurance: partly financed by the contributions of its potential beneficiaries (compulsory within the Flemish territory - optional in Brussels - for those aged 26+, at a rate of 10€ a year), whatever the income level. The monthly amount of the allowance is fixed at 125€ for at home care and 160€ when living in an institution. It aims at compensating non-medical expenses[52] related to the state of dependency. If the recipient decides to use it to pay his informal care providers, they must be registered as such. In fact, the ZV is mainly used to pay informal care providers.

By 2003, the ZV became already a victim of its success and rapidly ran into financial problems. The Flemish Government thus decided to raise the annual contribution to 25€ and diminishes the level of the intervention (90€ for at home care and 125€ when living in an institution). Meanwhile, the number of recipients continued to increase: from 149,694 in 2004, they were 200,843 in 2009, (*Agentschap Zorg en Gezondheid* 2011). From 2004 onwards, persons living in a MR/ROB, MRS/RVT or in psychiatric institutions automatically receive the benefit. Persons living home must have passed a needs-assessment[53] to be entitled to receive the benefit. The Walloon Region had envisaged the implementation of a regional insurance in its 2003 budget, but was discouraged by the high cost of the experience in the Flemish Region and went no further.

In 2008, the ZV is questioned once more: the European Court of Justice sees the affiliation criteria (linked to the place of residence) as an obstacle to the free movement of workers. The Court asked for a modification of the Flemish decree so that Europeans who work in the Flemish Region but do not have the Belgian nationality can benefit from the ZV. With regard to Walloons, working in the Flemish Region, the decision depends on the Constitutional Court[54]. Finally, in the latest development (2009), the amount of the monthly contribution was raised (to 130€) and became standard for recipients living at home or in an institution.

[48] Initially, this insurance was meant to target those 65+, but the Flemish Parliament decided differently.
[49] A detailed analysis of the determinants and the development of a global elderly care policy in Flanders can be found in Vanderleyden (2007).
[50] It is the Dutch name of the insurance implemented by the Flemish Government.
[51] During the implementation process, studies have been carried out to evaluate the number of potential beneficiaries (e.g. Breda & Geerts 2001).
[52] Medical care, (such as nurse home care services), are usually refunded by the public compulsory health insurance system.
[53] The scale used is the Bel-scale. It evaluates the level of physical, mental and social (DLA and IDLA) dependency. A more detailed scale of dependence for the elderly population, the BEL-RAI is in its development phase. More information can be sought at http://wiki.belrai.org/fr/ [accessed on 07/02/2011].
[54] Since 2007, the Court of Arbitrage is replaced by the Constitutional Court (*Cour constitutionnelle/ Grondwettelijk Hof*).

### *2. Home care services*

The sector of home care services has been greatly developed and diversified since the 90s (Gillain & Nyssens 2001). Elderly, disabled and sick people can benefit from a large variety of home care services: nurse home, cleaning helper services, family helpers, physiotherapists, meals-on-wheels, odd-jobs services, personal alarms, etc.

These are, in general, coordinators who assume the organisation and the follow-up of the home care services[55]. The coordination services are dependent on a municipality or on a *mutualité/mutualiteit*. Most of the (para) - medical care services are refunded by the public compulsory health insurance. Other services (cleaning helper, family helper, meals-on-wheels) are (partly) paid by the beneficiary (according to his income level) and may be needs-tested.

Other organisations having a larger public (not restricted to the elderly and the disabled) offer similar services, but they are charged to the client: the ALE/PWA[56] for odds-jobs services or the Service-cheques for housework help[57], etc. There are often several organisations proposing the same services on the same territory. It permits a freedom of choice, priced by Belgians, but that does not prevent from specific or local shortages of the offered services (mainly nurses and family helpers). Another limitation concerns the lack of flexibility in schedules: visits are short and only during office hours. When a greater need is to be met, recourse has to be made to private services.

Several Flemish provinces propose an indirect financial aid to informal care providers via the 'Mantelzorger' benefits (the dependent person receives a benefit to pay his informal care providers. However, there are no means to control whether the money is actually given to the care provider).

### *3. Leaves*

Several types of leave policies and plans of career interruption (or reduction in working time) make it possible for the worker to take time off for caring without being liable to loose his employment and social coverage. They are federal measures, applied throughout the Belgian territory.

In 1985, the Belgian **career break scheme** *(interruption de carrière /loopbaanonderbreking)* was first introduced for both the public and private sectors. Since 2002, the private sector career break scheme was replaced by a broader and **more flexible time-credit scheme** (*credit-temps/ tijdskredit*). This formula makes it possible for people to take a definite number of days off while stopping working partially or completely, in a continuous or divided way, without particular reasons being given. This type of leave and its methods must be anticipated and defined with the employer, so that it does not disturb the business of the institution or association. This type of interruption can be taken several times until exhaustion of the 'time-credit'. It should be noted that a very similar type of interruption exists, specifically for workers aged 50+ (in the public sector) who want to gradually reduce their working time before retirement.

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[55] There also exist services specialised in nurses or cleaning or family helpers.

[56] *Agence locale pour l'emploi/ Plaatselijk werkgelegenheidsagentschap.* These agencies aim at activating unemployed people by proposing them a work contract as temporary helper to people (sick, disabled or elderly people who needs help with odds jobs or sit-in service*) or to institutions (municipalities, schools, etc.). More information on the conditions can be found online: http://www.minfin.fgov.be/portail2/fr/themes/advantages/pwa-ale.htm [accessed on 08/11/2010].

[57] *Titres services (pour aide ménagère)/Dienstcheques* (*voor huishoudelijke hulp*): every particular can buy 'housework help service-cheques' and exchange them in a 'services-cheques' office against a defined amount of help with housework. The service can be delivered at home (washing-up, ironing, etc.) or outside the house (help with shopping, ironing center, etc.). Unlike the housework assistance, the use of 'services-cheques' is not needs conditioned. Actually, this 'services' was set-up to create employment and to reduce the use of housemaids paid 'in-black'. More information can be found online: http://www.minfin.fgov.be/portail2/fr/themes/advantages/cheques.htm [accessed on 08/11/2010].

There are also **thematic leaves** (since 1995-1997), which are related to a specific situation (on the model of the maternity leave): palliative care leave *(congé palliatif/palliatief verlof),* leave for providing medical care to a close relative (*congé pour assistance médicale/loopbaanonderbreking in het kader van de medische bijstand).* The worker providing care must deliver a doctor's certificate attesting the situation and his involvement in care. The worker may stop working completely or partially for 1 to 3 months (with the possibility of prolongation). This type of leave can be used only once for a given care-receiver but a same worker can use it again to care for another person. The amount of the replacement benefit varies according to the specific case.

Finally, when it is necessary to take a short-term leave and for reasons which do not enter into the context of the thematic leaves, there are 'circumstances leave' (*congé de circonstance/omstandigheidsverlof)* 'leave for pressing reasons' (*congé pour raison impérieuse/ verlof om dwingende redenen*), 'leave for a major force' (*congé pour force majeure/ verlof wegens overmacht*), 'leave for sickness or accident occurring to a cohabitant' (*congé pour maladie ou accident survenu à un cohabitant /verlof voor ziekte of ongeval van een huisgenoot),* and, as a last resort, 'unpaid leave' (*congé sans solde/verlof zonder wedde*).

General regulations concerning interruptions or reductions in working time are fixed by the ONEM/NDAW[58] (Federal level), but their practical modalities can vary according to the branch of industry concerned and the characteristics of the workplace (the size of the company, etc.). The amount of the benefits can be increased by a premium, as is the case in the Flemish Region, when a person stops or reduces his/her working time to take care of a sick, a handicapped person or a person aged 70+. A recent and detailed overview of the different types of leaves and their regulations can be found in Flohimont (2010).

[58] *Office national de l'emploi/Nationale Dienst voor Arbeidsbemiddeling en Werkloosheid.*

## *CONCLUSION*

The purpose of this chapter was to contextualise the lifetime of the Belgian birth cohorts 1900-1929 who will constitute the study population of this dissertation.

This contextualisation is important for two reasons: the first is that it is a Life Course approach' requirement: the 'time and place principle' states that knowing the context of the study phenomenon is necessary to understand it: **What is the socio-political context of the study cohorts when they become potential care-receivers?** The description of the past context also refers to the 'Lifespan principle' which highlights that past life events may have an impact on later life events: **How do the education, the historic events and the demographic trends experienced in the childhood and the adulthood of the study cohorts influence their care needs and resources?** All These contextual elements would help to interpret the results of the analysis of family care. The most relevant are probably the following:

- The experience of World Wars and other crises: the study cohorts have survived in a period were infant and childhood mortality were still very high, all of them have experienced a World War and most of them have spent a part of their childhood or young adulthood during the Interwar economic crisis. The oldest cohorts went through the Spanish flu and survived the epidemic. In short, the elderly study cohort can be considered as '**survivors'**.

- The influence of religion: the study cohorts did grow up in a society where the catholic religion and its principles were still very influential. The **family solidarity** and **filial duty** are some of the basic principles which may have an impact on their care expectations at old age.

- Gender differences: women have a higher life expectancy at birth and are therefore more likely to experience widowhood than men and to stay in an institution. But they are also less educated and most of them have never worked. Therefore, they are more likely to be poor and alone when they will need elderly care. This is a consequence of the strict gender role division prevailing during their adulthood (Hank & Jürges 2007). Another consequence is that the perception of the care provided by the members of these cohorts is likely to differ: women will tend to consider it as 'natural' because it is a part of their 'job' (being a good wife, a good mother and a good care-giver for the family members) while men will tend to consider it as a 'special' or 'exceptional' activity. This gender difference in the perception of the care provided to the spouse as been well documented in the literature: showing that men are more likely to report any light care activities while women tend to under-declare the provided care (Dwyer & Seccombe 1991; Rose & Bruce 2002; Milne & Hatzidimitriadou 2003).

The second *raison d'être* of this chapter is that the main contextual differences would be identified in order to be controlled for in the analyses part: beyond the 'common' experiences of the birth cohorts 1900-1929, regional and cohort groups variations appear and justify to introduce a 'region' variable and to divide the study cohort 1900-1929 into sub-groups.

- The regional differences are probably the most obvious: the history of Flemish and Walloons largely differ and this influences their fertility behaviours, their lifestyle and the elderly care policy orientations. In a very schematic way: the industrialisation in Wallonia arrived earlier and strengthened the ongoing process of secularisation, the labour unions and the whole society were structured along socialist principles. The universalism and the State responsibility are both characteristics of the policy measures. The elderly care policy is

orientated towards (semi)-institutional care (the State should be responsible for the elderly care) and the access to services tends to be open to a large target group (universalism). Flanders was industrialised later. The catholic and traditional values remain stronger. The fertility rate declines later too and at the time when the study cohorts were in age of having children, fertility was still high. The social policy measures tend to be more structured, integrated and the State intervention more targeted (Lambrecht & Fasquelle 2007). The elderly care policy is community-oriented and the institutional care targeted to the most dependent elderly. It is more difficult to draw a clear policy orientation in Brussels because this region depends on various policy institutions. As the majority of inhabitants are French-speaking, the elderly care policy is, in fact, closer to the Walloon one, but there are also some influences coming from the Flanders as the Brussels inhabitants have the possibility to subscribe to the ZV. But, the particularity of Brussels probably lies in the composition of its elderly population. As it is often the case in large cities, the proportion of isolated elderly (of Belgian nationality) is higher and they are globally better educated. The phenomenon of urban migration at old age is well-known (Christel 2006): after the loss of the spouse or when the health status starts to decline, elderly people may decide to move to a smaller accommodation in town where proximity and health services are well-developed. In Belgium, the favourite destinations of the elderly are the new suburban areas and the North Sea coast cities (Eggerickx *et al.* 2007).

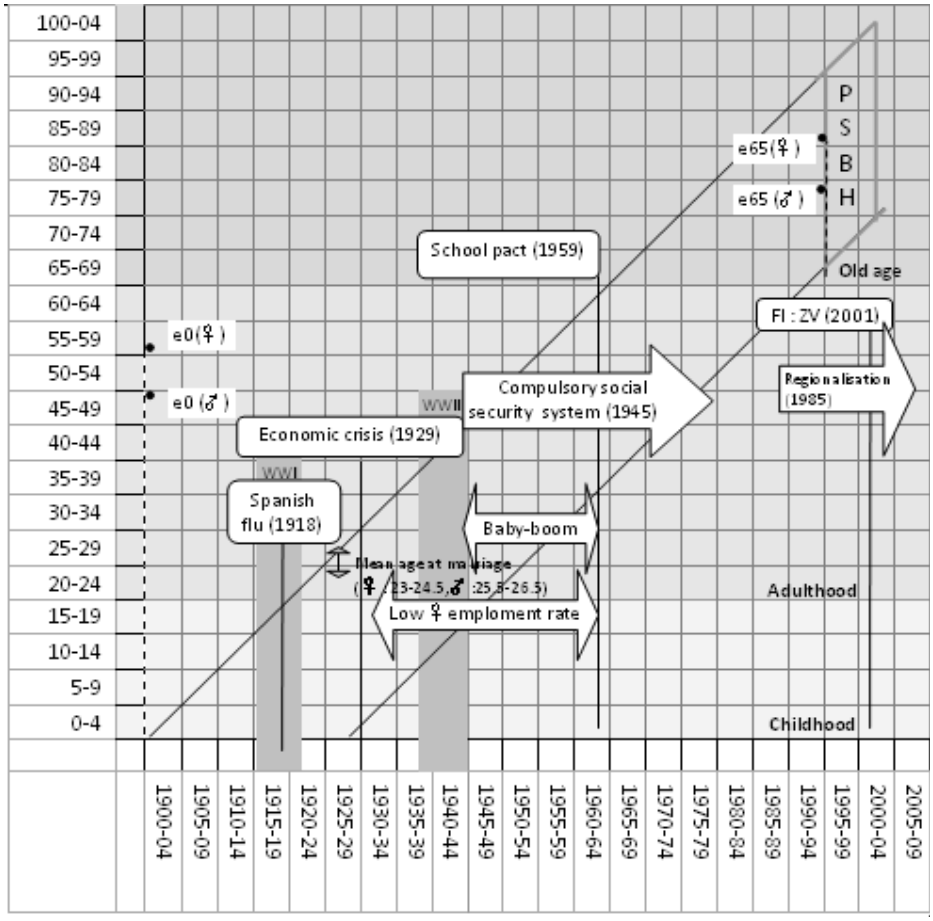
- The inter-study cohort differences are probably less highlighted in the text. Due to legibility and technical reasons, it was decided to 'tell the study cohort story' as if it is a homogeneous cohort whose members did experience childhood during one of the two World Wars, parenthood after the World War I or II and who reached old age in the 90s. This is indeed an over-simplification which allows highlighting the main trends and 'common experiences' but which discard inter-cohorts differences. Some specificities were nevertheless mentioned (e.g. the oldest cohorts could not benefit from the preventive treatment against rickets, the cohorts born during World War I are less numerous than their surrounding cohorts, etc.) but differences in timing of transitions (to adulthood, parenthood, labour market entry and exit, etc.) were not accounted for: the women of the oldest cohort are no longer in their reproductive period (around 20 to 45 years at that time) in 1945 and are therefore not concerned by the baby-boom. Likewise, the youngest women cohorts may have had fewer difficulties to be active on the labour market (the opposition to married women employment diminished in the 1960s, when they were 21 years). The Lexis diagram (explained in frame III-2 and displayed in scheme III-1) is a nice way to represent the timing of specific historic events or life-transition for a given cohort. It is also an opportunity to close this chapter with a graphical overview of its content.

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**FRAME III-2:** The Lexis diagram[59]

The Lexis diagram (Lexis 1875) is a tool used by demographers to situate an event according to the three metrics of time (age, period and cohort) simultaneously. The period is measured on the X axis and the age on the Y axis. Any point in the diagram corresponds to a given age at a given time and therefore refers to a specific cohort. The point (1994, 65) which is the left bottom corner of the 'PSBH' parallelogram refers to the birth cohort 1929 because it is the only one who is aged 65 years in 1994. Thus, it is possible to delineate a cohort (group) with diagonal lines. In scheme III-1, the birth cohorts 1900-1929 are delineated by two diagonals: the first goes from the origin (1900, 0) - when the oldest cohort was born - to the end of the PSBH (2002, 102). The second goes from (1929, 0) - when the youngest cohort was born – to (2002, 93). The PSBH parallelogram represents the window of observation that will be studied in the analyses part (the members of the cohorts who survived until that time were included in the PSBH baseline sample and meet the selection criteria specified in chapter V).

**SCHEME III-1:** Life expectancy and main events experienced by the Belgian birth cohorts 1900-1929




[59] For more details, see Vanderschrick (2005).

# CHAPTER IV

## INFORMAL CARE IN BELGIAN SURVEYS

A systematic review of the international literature on family care is presented in chapter II, but the selection criteria led to the exclusion of the Belgian studies. Chapter III focuses on the Belgian context, the evolution of the elderly care policies and their regional differences. The present chapter details the available Belgian survey data on informal care and the main published results they produced: in doing so, it reviews the quantitative literature on care in Belgium; it also introduces the methodological part by presenting the Panel Study of Belgian Households (PSBH) which will be used for the analyses.

The objectives of this chapter are (1) to review the available surveys in Belgium which include question(s) on informal care: it allows contextualisation of the PSBH and highlighting its specificities; (2) to compare the operationalisation of elderly care across surveys: how the study sample, the point of view (either care-giver or care-receiver) and the question wording influence the results; (3) to complement the systematic literature review (see chapter II) with Belgian results: are the results from Belgian literature consistent with the international published literature? How is family care articulated to other sources of care in Belgium? Are there regional differences in informal care?

**Section 1** details the criteria used to select the surveys. **Section 2** presents the question(s) on care and gives practical information on each survey; the methodological aspects are summarised in a comparative table at the end of the section. **Section 3** starts with tables comparing the questions on the provided informal care, the received informal care and on the use of home care services. These three tables serve as a basis for the discussion on operationalisation of the concept of elderly care. **Section 4** summarises - for each of the reviewed surveys - the results on informal care structured by the three main research questions of the dissertation: Who is receiving family care? What are the characteristics of the received family care? How do the characteristics of the received family care evolve over time?

# *SECTION 1. How have the surveys been selected?*

## A. The survey as unit of interest

None of the articles selected for the systematic international literature review provides information on the specific reality of family care in **Belgium**, but this does not mean that Belgium is absent from the family care literature. Belgium actually participated in the large European surveys which include questions on care (such as the ECHP and the SHARE). However, the published studies based on these surveys concern mostly pooled samples (all the participating countries together) or refer to clusters of countries grouped according to the Welfare State typology of Esping-Andersen (1990) revised by Ferrerra (1996): the Social Democratic (Denmark, Norway, Sweden and, to a lesser extent, Finland and The Netherlands); the Corporatist (Belgium, France, Germany); the Liberal (England, Ireland); and the Southern countries (Italy, Spain, Portugal). In doing so, they do not offer the possibility to focus on the Belgian case.

Other international surveys including a Belgian sample ask question(s) on family care (or more broadly, on informal care), but the results are not yet published for Belgium (e.g. GGPS), the care questions were rather marginal and no published articles were found on this topic (e.g. the LFS) or the care questions have mainly been analysed to measure the consequences[1] of providing care rather than to identify the determinants or the characteristics of care (e.g. the ECHP).

Concerning the Belgian national or sub-national representative surveys, the results are rarely published in international journals in English. The few articles written in English I have found (Breda & Geerts 2001; Bauwin & Stassen 2002; Bracke *et al.* 2008; De Koker 2009) present descriptive results or concern the care provided in general but not specifically to elderly[2]. Results on Belgian surveys are more often published in a **report** or in a **book** format (with first results in a working paper format). For national surveys, the publications are usually bilingual (French and Dutch), while they are often unilingual (either French or Dutch) for sub-national surveys.

Therefore, to have an idea of the existing material, the potentials for quantitative analysis of family care in Belgium and of the research results published so far, the 'English-language', 'article format', 'published results' selection criteria applied for the systematic literature review are not tenable. Moving towards using the survey as unit of interest rather than the published articles has proven to be efficient.[3]

## B. Methodology and selection criteria

### *1. Search method*

Surveys databases are not available so far in Belgium to serve as search tool: the starting point of the search was therefore my knowledge of the existing surveys for Belgium. To systematise the search: I firstly collected all the documentation I could find on those surveys (reports, books, questionnaires, methodological notes etc.) and contacted members of the research team in charge for further information if needed.

[1] The articles on the consequences of care are excluded from the systematic literature review (see inclusion/exclusion criteria in chapter II).
[2] For being included in the systematic literature review, the article should present multivariate results. (see inclusion/exclusion criteria in chapter II).
[3] Some surveys may have led to develop international projects with their own acronym differing from the original name of the survey (which are sometimes better known or confounded with the survey itself: like FELICIE (using Census data), MULTILINKS (GGPS), EUROFAMCARE (PSBH), FAMSUP (LOVO) (see lexical for the full names of the projects). It is not possible to list all the projects and this is not the aim of this chapter. Only the results published in any format, in French, Dutch or English until 2010 are considered.

Secondly, if other 'candidate' surveys were mentioned in one of the collected documents, I tried to find more information on it to assess whether or not it should be included.

Finally, I submitted my list of 'selected surveys' and the list of selection criteria to three experts of informal care in Belgium, one for each region: Flanders, Brussels and Wallonia. I asked them if they know other surveys meeting the selection criteria, in order to complete my list.

### *2. Survey selection criteria*

The following criteria are adapted from the 'articles' selection criteria of the systematic literature review.

1. Like for the reviewed articles, only surveys allowing **quantitative** analyses are selected: if the study sample is smaller than 100 or if the questionnaire includes mainly open questions (e.g. the LEDA[4] data), the survey is excluded.

2. Like for the reviewed articles, the surveys must include question(s) related to **ADL and/or IADL care provided by the nuclear family to an elderly (dissertation definition of family care).** But unlike the reviewed articles, a broad definition of informal care is accepted here. In the systematic literature review, the large number of 'candidate' articles allowed to be more selective and to exclude articles which refer to 'informal care' in general but did not allow isolating the care provided by the nuclear family (the 'care-givers'). For the survey selection, such restriction is not tenable. Large scale surveys are expensive. In most cases, the survey is not specific to elderly care and includes questions on the various aspects of the life (health, work, family, economic situation, etc.). One or several questions on care are included in a very multi-disciplinary questionnaire. For international surveys, comparability is also an important issue and leads to avoid too specific questions. The questions on elderly care in these surveys are usually very broad in terms of 'informal care providers' (including family, friends and neighbours) and in terms of the care-receivers (including the sick, the disabled and elderly). The definition of care in international but also in national surveys is often broader than the more specific ADL and IADL care. The decision was to include surveys with questions on effective informal care whose definition may (but must not) refer to the dissertation definition of effective family care. Surveys which only include questions on perceived elderly care or on a general opinion regarding elderly care were excluded (e.g. the European Social Survey-ESS and the International Social Survey Programme-ISSP).

3. Like for the reviewed articles (chapter II), the respondent (or unit of observation) should be either the potential or effective **care-receiver** elderly or the potential of effective informal **care provider**.

4. Like for the reviewed articles, the considered chronological period is limited to **1990 onwards.** However, for the reviewed articles it refers to the publication period (the data collection could be much older). For the Belgian surveys selection, '1990 onwards' refers to the **data collection period**. This is justified by the fact that one of the objectives of this chapter is to situate the PSBH in regard to contemporaneous surveys. Furthermore, older surveys refer to older birth cohorts of elderly and the results might not be valid for the birth

[4] The *Life Event Data Analysis (LEDA)* research unit carried out a qualitative research *Parcours de vie des seniors (*Senior's life-course) among the 55-74 living in Brussels and Wallonia. The research was conducted in 2006, just after the field work of the first wave of the SHARE. One of the purposes of this qualitative survey was to complement the SHARE data. Some retrospective questions (on work trajectories) were also included in the questionnaire but the qualitative aspect is more developed.

cohorts studied in the dissertation (1900-1929). Therefore, the Belgian surveys whose data were collected before 1990 (e.g. Dooghe 1969, Dooghe & Vanderleyden 1976, Dooghe & al. 1988) are excluded.

Some selection criteria are added to ensure that the selected survey provides useful information on informal care in Belgium.

1. Of course, international surveys are selected only if they include a **Belgian national or sub-national[5] sample[6].**

2. Only surveys conducted on a **representative[7]** sample of the population of interest are included**.** In the literature review, it was shown that one of the reasons for the mixed results found is that the concerned studies focus on specific sub-samples (disabled elderly, elderly who already receive (formal) care). For this reason, the surveys carried out on a sample of care services users or allowance beneficiaries[8] (e.g. surveys described in Debry 2001, Breda *et al.* 2002, Royen 2007) or based on a snowball sample (e.g. Leleu 2000) are excluded.

## *SECTION 2. Which are the selected surveys?*

The 13 selected surveys are presented one by one: starting with the (inter)national surveys and continuing with the sub-national surveys (the chronological order is applied within the two groups of surveys).

The presentation begins with an **introduction** including the context of the survey, the organisms or authorities who commissioned the survey and the Belgian research team in charge of its organisation; the main objectives and themes of investigation of the survey; the geographical localisation and the size of the Belgian sample; the follow-up of the survey. Particularities of the surveys are also mentioned in this introduction. For further methodological and technical aspects (design, type of questionnaires, etc. see table IV-1).

The presentation continues with a focus on the **elderly care related questions** provided by the survey. For brevity and clarity reasons, the following decisions were taken:

[5] For language reasons, the search for surveys was not extended to the German Community of Belgium. It is quite unlike that a quantitative survey related to elderly care would have been organised there (its population is rather small and its autonomy regarding the organisation of elderly care policies limited).

[6] In the recent year, numerous national surveys (e.g. the English Longitudinal Study of Ageing-ELSA, The Irish Longitudinal Study on Ageing-TILDA, the Longitudinal Aging Study Amsterdam-LASA, the German Ageing Survey-GSA) and international surveys (e.g. the Gender Analysis and Long-term Care-GALCA) including questions on informal care have been organised in several European countries. International comparisons are beyond the scope of the dissertation and, therefore, European surveys which do not comprise a Belgian sample are excluded. For an overview of the main European surveys including questions on informal care, see Jacobs *et al.* (2005).

[7] Two exceptions are justified in section 2.

[8] This is to avoid samples of elderly people who are, somehow, selected on their care combination' preferences or possibilities: effective users of home care services may be less likely to receive family care than the general elderly population. The restriction only concerns home care services. Samples of 'effective' informal care-receivers or care-givers are accepted.

**FRAME IV-1:** Decisions concerning the presentation of the elderly care related questions

**1. Which questions to present in 'details'[9]?**

- Questions dealing **explicitly**[10] with provided/received **elderly informal care**[11]
- Question on **home**[12] care services:

**2. Where to find information about the other questions on care (not presented into 'details')**

At the end of the frame, under the title 'Information on other questions on care', the presence of question(s) on other aspects of care: (financial, emotional support), care preferences, needs, difficulties, consequences of care are briefly mentioned (to inform the reader of the potentialities of the survey).

**3. The language used to present the questions**

- If there is an 'official' version of the questions in English (PSBH, ECHP, HIS, SHARE, LFS, GGPS, LOVO), this version is used. In this case, the original terminology is kept (e.g. 'meals services' is not changed into the dissertation terminology: 'meals-on-wheels'). In case of ambiguity, the dissertation term is specified between brackets [].
- If there is no 'official' version of the questions in English, the questions are translated using the dissertation terminology. The original versions (in French and/or Dutch) are in appendices. In the text the dissertation terminology is used**.**

**Further information** on the available documentation and the access conditions of the data are given in appendix IV-1.

# A. Surveys on a national representative population

## *1. The Eurobarometer surveys (EB 1992, 1999, 2002, 2007)*

Since 1974, the Commission of the European Communities, through the Directorate-General for Information, Communication and Culture, has organised, twice a year, a standard Eurobarometer[13] (EB) survey on a specific topic. A sample of about 1,000 respondents aged 15+ is drawn in each of the current member states. The Belgian data are collected by private survey firms (changing over time).

This is an opinion survey which aims at collecting information on the public opinion regarding policy-relevance topics (e.g. family, European institutions, environment, etc.). In addition to opinion questions, socio-demographic questions and, sometimes, questions on the 'effective' situation of the respondent (e.g. health status) are asked. This allows assessing to which extent the effective situation influences the opinion. Questions on the provided and/or received 'effective' care are asked in the EB of 1992, 1999, 2002, 2007.

As questions on the provided care seem to be regularly included in the EB since 1992, it is likely that such a question will re-appear in a new EB[14].

[9] For each question presented into 'details', the next elements are displayed: preview questions conditioning the answer to the interest question, code of the question, question wording, valid answers (invalid answers being usually: 'don't know', 'not applicable', 'no answer', 'not specified').

[10] Questions providing indirect information on care are excluded: question on housework division and health status which could be useful to evaluate the real needs or reasons for receiving care are not treated here.

[11] (Sub)-questions on care which are clearly out of the focus (specific questions on emotional care, of care provided to adult children or grandchildren, care received by respondents aged 25-64 in the ZVE°, etc.) are not detailed. On the opposite, (sub)-questions referring to a broader definition of care, than the one used in the dissertation, are detailed.

[12] If a list of services is detailed, only those related to ADL/IADL provided at home are kept (e.g. meals-on-wheels, nursing at home, etc.). Others services that are not related to IADL/ADL (like psychologists, physiotherapists etc.), services provided outside home (day-care centre) or related to specific health conditions (palliative care) or technical devices (e.g. personal alarm) are not detailed.

[13] Alongside the standard Eurobarometers, other means are punctually used to collect more specific data (telephone flash EB for special target group surveys; focus groups; in-depth interviews, etc.

[14] More information on data availability is given in appendix frame IV-1.

**FRAME IV-2:** Questions on elderly home care available in the EB 1992, 1999, 2002, 2007

**Received care**

**1992**

**Q.17.** Do you have any long-standing illness, disability or infirmity, that limits your activities in any way? By long-standing, I mean anything that has troubled you over a period of time or that is likely to affect you for a period of time (answer: yes/no)

> [If yes] The respondent is asked if he receives regular assistance with personal care and household tasks, because he finds it difficult to do these activities by himself. If he receives care, he is asked to specify from whom (spouse, children, other relatives, friends, neighbours, private paid help, public social services, voluntary organisations) [15]

**2007** (see QA9 below)

**Informal provided care**

**1992, 1999, 2002**

**Q.52.** Some people have extra family responsibilities, because they look after someone who has a long-term illness, who is handicapped or elderly.

**a)** Is there anyone living with you who has a long-term illness, who is handicapped or elderly, whom you look after or give special help to ? (*)

**b)** Do you provide some regular service or help to such a person NOT living with you? (*)

(*) More than one answer possible: a husband/wife/partner, <60 years of age; a husband/wife/partner, 60+; a child, <5 years of age; a child, 5+; a relative, >60 years of age; a relative, 60+; a friend, >60 years of age; a friend, 60+; other person, >60 years of age; other person, 60+; none of these.

**2007**

**QA9.** Have either you or someone you are close to ever been in need of any regular help and long-term care over the last ten years? (max. 2 answers: No personal experience with long-term care needs; yes, one of your parents; yes, another relative or friend; yes, you personally; yes, your partner; yes, an acquaintance, colleague or neighbour; yes, one of your siblings (brother/sister); yes, one of your children)

> [If Q9A = yes…]
>
> **QA11.** Thinking about this case of long-term care need you have just told me about, please tell me in what ways, if any, do you or did you personally get involved in helping this person (multiple answers possible: visiting regularly to keep company ; doing shopping ; cleaning and household maintenance ; help with mobility ; cooking and preparing meals; taking care of finances and everyday administrative tasks; help with dressing ; help in bathing or showering; help with feeding; organising professional care; help with using the toilet ; You are/were not personally involved in helping this person)
>
> **QA12.** Still thinking about this particular case of long-term care need you have just told me about, where did this person live for the longest time during this period in which he or she needed care? (possible answers : in a flat/house more than 100 kilometres away ; in a flat/house between 20 and 100 kilometres away; in a flat/house next door; in a flat/house less than 20 kilometres away; in a flat/house in the same neighbourhood; in a nursing home; in your household.

**Other information on care:** no

*Sources*: **1992**: European Communities (1992), Commission of the European Communities (1993); **1999**: European Communities (1999); **2002**: European Communities (2002); **2007**: European Commission (2007b)

[15] I did not find the question in the core questionnaire of 1992. It is probably included in a specific module for the 60+ (which I could not find on the net). Therefore, the question wording is derived from the report (Commission of the European Communities 1993).

## *2. Panel Study of Belgian Households (PSBH 1992-2002)*

The Panel Study of Belgian Households (PSBH) is the first yearly general panel survey ever carried out in Belgium[16]. It is organised in the framework of the *programme d'impulsion 'recherche sociale' du ministre fédéral de la Politique Scientifique.* The initial objective is to collect longitudinal data which will allow strategic and retrospective analyses of social economy and of family sociology aspects (Doutrelepont *et al.* 2004b). The representativity of the sample at the national and regional levels is another important characteristic of the survey. The data collection starts in 1992, the *Université de Liège* (ULg) is responsible for Wallonia and the *Universiteit Antwerpen* (UA) for Flanders. Four thousand, four hundred and thirty eight Belgian private households answered the first wave (8,741 adults and 2,591 children). This initial household sample is re-interviewed each year until 2002[17,18].

**FRAME IV-3:** Questions on elderly home care available in the PSBH 1992-2002

**Informal provided care (individual 'adult' questionnaire)**

**W1A179.**[19] Do your daily activities include looking after, without pay, an elderly, sick or disabled people? (answer: yes/no)
**P01101.** Do the people or persons you look after live in this household? (Answer: yes/no)
**W1A181.** Is your spouse/partner one of those people who need special help because of old age, illness or disability? (Answer: yes/no)
**W1A182.** Are your parents one of those people who needs special help because of old age, illness or disability? (answer: yes/no)
**W1A183.** Are your parents-in-law one of those people who needs special help because of old age, illness or disability? (Answer: yes/no)
**W1A185.** Is another family member one of those people who needs special help because of old age, illness or disability? (Answer: yes/no)
**W1A186.** Is someone out of the family one of those persons who needs special help because of old age, illness or disability? (Answer: yes/no)
**W1A188.** Roughly, how many hours a week do you spend looking after them? (Answer: number of hours)

[Since wave 2 (1993) questions are asked on the content of the provided care. In the 1993 questionnaire, the questions only concern the care provided to a parent. Since the 1994 questionnaire, the questions concern all the care-receivers].

Are you responsible:
**W2AM152.** For the hot meals? (Answer: yes/no)
**W2AM153.** For the laundry? (Answer: yes/no)
**W2AM154.** For the personal hygiene? (Answer: yes/no)
**W2AM155.** For the cleaning of the house? (Answer: yes/no)
**W2AM156.** For following the medication? (Answer: yes/no)
**W2AM157.** For the serving-up of food and drink? (Answer: yes/no)

**Informal care received from non-cohabitant children (individual questionnaire)**

[Since wave 2, if the respondent has children living out of the household, the following questions are asked]
**W2AM297.** Did your children help you during the past three months by keeping house? (Answer: yes/no)

[16] The Socio-Economic Panel (SEP), starting in 1985, is also a panel survey, but the data are not collected yearly and it focuses on socio-economic aspects, while the PSBH considers the various aspects of life (e.g. health, social relationships, etc.)
[17] Attrition, rules for the follow-up and content of the questionnaires are detailed in chapter V.
[18] More information on data availability is given in appendix frame IV-2.
[19] The question code refers to the code of the question at the first wave when it was asked (1992 for the questions asked at all the waves, a later wave if the question is not asked since the beginning of the panel). The questions are presented in the official English translation of the original French and Dutch questionnaires (see the QNFE document (UA, 2004) for the translation). QNFE means 'Questions in Netherlands, French and English'. It refers to a databank built by the UA research team (2004). The contents and use of QNFE will be detailed in chapter VII.

**W2AM298.** Did your children help you during the past three months by giving you aid in case of sickness? (Answer: yes/no)

**Home care services use (household questionnaire)**

Does this household have help from outside:
**W1H082.** For cleaning? (*)
**W1H083.** For shopping? (*)
**W1H084.** For the daily cooking (or for hot meals)? (*)
**W1H085.** For washing and/or for doing the ironing? (*)
**W1H086.** For gardening or for doing odd jobs? (*)
**W1H087.** For completing forms and for doing administrative work? (*)
**W1H088.** For administering the money or for controlling the finances? (*)
(*) possible answers are: paid help[20], unpaid help, no help.

**Other information on care:**

On provided care: number of care-receivers in and outside the household (for waves 1992 and 1993 only)
On care received by non-cohabitant children: financial aid, affective support.

The 1993 survey includes a module on intergenerational relationships.

- The individual questionnaire includes questions on the living and health conditions of the respondent's parents. It is also asked to the respondent if he takes care of his parents. If so, how heavy is the care load and whether somebody else could substitute the respondent to provide it?
In addition to the above-mentioned questions on the provided care, the respondent is asked to precise when he started to care and how heavy is his care load.
Concerning the received care, the respondent is asked if he receives help with finances, housework, shopping, etc. from a daughter, a son… (There is one question for each relationship and each task: e.g. "Do you receive aid from your (step)son, son-in-law with shopping?").
This module includes questions on perceived supports: the respondent has to mention the person he can rely on in case of sickness, household related problem, financial worry, etc. (Similar questions on care preferences are asked at wave 1997).

- The household questionnaire comprises more detailed questions on the use of home care services (nurse, geriatric helper, etc.)

The 2001 questionnaire includes questions on the opinion on the best choice of living arrangement for a dependent elderly and on the place of the elderly in the society.

*Source:* UA (2004)

### *3. European Community Household Panel (ECHP 1994-2002)*

The first wave of the European Community Household Panel (ECHP) was launched by Eurostat in 1994 in 12 European countries[21] (Belgium, Denmark, Germany, Greece, Spain, France, Italy, Ireland, Luxemburg, The Netherlands, Portugal and the United-Kingdom). Sixty-thousands, eight hundred and nineteen private households answer the baseline questionnaire. Data are collected yearly until 2001. Austria joins the panel in 1995 and Finland in 1996. From 1997, Sweden participates by providing cross-sectional data derived from its National Survey on Living conditions. The objective of the ECHP is to collect comparable cross-national longitudinal data on household income and living conditions.

[20] Since wave 6 (1997), "paid help from a particular" and "paid help from a service" are distinguished.
[21] If a national representative panel is already ongoing in 1994, the country can keep the same sample for the ECHP under two main conditions: the national questionnaire must be modified to include all the standardised questions. All the respondents of the 1994 waves must be considered as 'panel members' and followed-up over waves according to the ECHP rules. Therefore, the ECHP is included in the PSBH (Belgium), the German Socio-Economic Panel (GSOEP, Germany), the BHPS (British Households Panel Survey, United Kingdom) and the *Panel Socio-Économique Liewen zu Lëtzebuerg* (SPELL, Luxemburg).

The standardised questionnaire also includes items on health, education, housing, migration, demographic and employment characteristics.

Since 2003, the SILC has replaced the ECHP. Like the ECHP, the SILC is a yearly survey based on representative national samples of European households. However, there are some important differences: first, the SILC focuses on economic issues (it does not include questions on informal care); second, the SILC is a 'rotating panel': it means that only part of the initial sample is followed over the next waves (this reduces the possibilities for a longitudinal analysis of a sample or sub-sample); third, the SILC cross-national comparability is based on a common framework (common guidelines, procedures, concepts and classifications) and not on a standardised questionnaire as for the ECHP. It implies that comparative indicators can still be built, but comparative analyses of a specific question are not always possible[22].

**FRAME IV-4:** Questions on elderly home care available in the ECHP 1994-2001[23]

**Informal provided care (individual questionnaire)**

**PR006.** Do your present daily activities include, without pay, looking after children or other persons who need special help because of old age, illness or disability?
**1.** Yes, looking after children.
**2**. Yes, looking after a person (who needs help because of old age, disability or illness) other than a child.
**3**. Yes, looking after a child and a person (who needs help because of old age, disability or illness) other than a child.
**4.** Not looking after any person.

[if PR006 = 2 or 3]
**PR008.** Number of hours (per week) spent looking after person(s) (who need special help because of old age, illness or disability) other than a child.

**PR009.** Looked after person(s) (other than children) [living] in the household or elsewhere:
**1.** Only [persons living] in the household.
**2.** Only [persons living] elsewhere.
**3.** [Persons living] in the household and [persons who] live elsewhere.

**Other questions on care (individual questionnaire):**

Does looking after children or other persons – prevents you from undertaking the amount or kind of paid work which you otherwise would do?

*Source:* European Commission, Eurostat (2003)

## *4. Census 2001*

The organisation of a Census every ten years was compulsory in Belgium. Data collection is organised by the INS/NIS and published in table's format while in depth analyses are carried out by university research teams. Like most of the national representative surveys, its main objective is to provide useful information for policy makers. A particularity of the Census (until 2001 included), compared to other representative surveys, is that the total population of interest (here the Belgian households[24]) is surveyed and that participation is compulsory by law. The Census questionnaires are rather short compared to sample survey's and a majority of the questions are predefined by a legal framework. Questions on specific topics may however be punctually added to the questionnaire. In 2001, for the first time, subjective health and provided informal care were questioned.

[22] More information on data availability is given in appendix frame IV-3.
[23] There are slight country variations in the questions wording or in the modalities.
[24] People having a legal residence in Belgium, whatever they live in a private or in a collective household and whatever they have the Belgian nationality or not.

The next Census (2011) will be completely different from the previous censuses. Exhaustive population surveys are very expensive and time consuming. Therefore, it was decided to use the available administrative databases (and no individual questionnaire) to gather most of the census-like socio-demographic information[25].

**FRAME IV-5:** Questions on elderly home care available in the Census 2001[26]

**Informal provided care (individual questionnaire)**

**4a.** Do you provide, at least weekly, out of your professional activity, help or care to one or more sick or long-term disabled persons (e.g. reduced mobility)? (YES/NO)

**4b.** If YES, this or these persons are (cross multiple boxes if necessary):
- Household member(s)
- Non co-resident family member(s)
- Neighbours
- Friends or acquaintances, etc.

**4c.** If YES, how much time do you spend providing help or care?
- At least once a week (but not every day)
- Everyday, less than 30 minutes
- Everyday, from 30 minutes to less than 2 hours
- Everyday, from 2 to less than 4 hours
- Everyday, 4 hours or more.

**Other information on care:** no

*Source:* INS/NIS (2001a)

### *5. Health Interview Survey (HIS 2004, 2008)*

The first Health Interview Survey was held in Belgium[27] in 1997 at the request of the federal and sub-federal authorities in charge of health issues. The collection, management and first analyses of the data are done by the ISP/VIW[28] in collaboration with university teams and the INS/NIS[29]. The second data collection takes place in 2001.

Those first two surveys aim to study the health condition of the Belgian population (health status and needs, health consumption and behaviour, availability and use of care services). The 65+ living in the community are included in the 1997 and 2001 samples, but they answer the same questionnaire as the other age groups.

When organising the HIS 2004, it was decided to oversample the 65+ and to add questions on informal care, the ADL and IADL disabilities and being on a waiting list for institution admission. A sub-sample of elderly living in institution is constituted in order to have a representative sample of

[25] More information on data availability is given in appendix frame IV-4.
[26] Own English translation. For original questions in French and in Dutch, see appendix frame IV-5.
[27] Many other countries organise Health Interview Surveys (international comparisons of the HIS 2004 were done with England, Bulgaria, Denmark, Spain, France, Ireland, Norway, The Netherlands, Romania and Switzerland). Part of the data is comparable, but there is no centralised international coordination and management as it is the case for the SHARE and the ECHP surveys.
[28] *Institut Scientifique de Santé Publique/Wetenschappelijk Instituut Volksgezondheid*.
[29] The INS/NIS was in charge of the data collection and importation, the *Centrum voor Statistiek* (*Hasselt Universiteit*) was responsible for the statistical analyses.

the 65+ population and to have a sufficient number of 85+ respondents for doing specific analyses. In the HIS 2008 the 75+ were oversampled. The next data collection is planned for 2012[30].

**FRAME IV-6:** Questions on elderly home care available in the HIS 2004

**Received care (Individual face-to-face questionnaire)**

***Care for the ADL (only asked to respondents aged 60+)***

**IL.03. Can you get in and out of bed on your own?**
**1.** Yes, without difficulty.
**2.** Yes, with some difficulty.
**3.** I can only get in and out of bed with someone to help me.

**[If IL.03. = 3]**
**IL.04.** Who usually helps you to get in and out of bed?
**1.** One of more members of the household (Answer: row number).
**2.** Someone outside the household (multiple answers possible: **01.** son, **02.** daughter, **03.** brother, **04.** sister, **05.** other family member, **06.** friend or neighbour, **08.**[31] elderly care services, **09.**[32] CPAS/OCMW, nurse, paid help, other)

… [The same questions' structure is repeated for the following ADL]:

**IL.05-06.** Get in and out of a chair.
**IL.07-08.** Dress and undress.
**IL.09-10.** Wash one's hands and face.
**IL.11-12.** Feed oneself and cut up food.
**IL.13-14.** Get to and use the toilet.
**IL.15.01-15.02.** Control one's bladder.

***Care for the IADL (only asked to non-institutionalised respondents aged 60+)***
Think about your routine activities you normally do at home, such as preparing meals, shopping, doing routine light housework, and doing the laundry. Please ignore temporary **problems.**

**IL.16.** Do you, usually, do these activities without any difficulty? (Answer: yes/no)
[If IL.16. = 'yes', several questions are asked to evaluate the ability of the respondent to do the activity alone or with someone's help. In case the respondent received help, he is asked to specify who helps (like for the ADL) but also to say if this help is sufficient or not]
**IL.17-23.** Preparing meals.
**IL.24-30.** Doing shopping.
**IL.31-37.** Light housework.
**IL.38-44.** Laundry.

**At home care services used**

**OH.01.01.** Did you have, for yourself, during the past year, a contact with a nurse at home[33] (Answer : yes/no).

[30] More information on data availability is given in appendix frame IV-6.
[31] Code 07 has not been assigned.
[32] I have learnt that a problem did occur in the encoding phase for this question: code '9' instead of '99' was used for missing data. As a consequence, it is not possible to distinguish respondents who declare receiving care from the CPAS/OCMW from respondents who do not answer the question (both are coded '9'). This may affect regional comparisons because the use of CPAS/OCMW differs across regions: according to Breda *et al.* (2002) Flemish elderly are more likely to use home care services organised by the CPAS/OCMW than other (private) services, although the first represents only a small part of the formal care supply. The opposite is true in Wallonia: the public home care services represent a larger part of the services supply, but the elderly tend to prefer private services. Note that the CPAS/OCMW services are mainly used by the 65+ in Flanders (e.g. they represent 84% of the users of the cleaning service against 68% for Wallonia). This difference illustrates the contrast between targeted versus universal services.
[33] *Infirmière à domicile/ Thuisverpleegster*.

**OH.04.06.** Did you have, for yourself, during the past year, a contact with service for home care (Answer: yes/no).
**OH.04.08.** Did you have, for yourself, during the past year, a contact [used services of] with hot meal at home[34] (Answer: yes/no).

**Other information on care:** no.

**Changes applied in the HIS 2008 questionnaire**

The HIS 2008 questions are more or less similar. However, some modifications in content should be noticed concerning ADL: 1° "bathing and showering" is added to the ADL list and "bladder control" is moved to another section of the questionnaire; 2° 'occasional heavy housework", "taking care of finances and everyday administrative tasks", "using the telephone" are added to the list of activities; 3° the identification of the informal care provider is less accurate (only two possible categories: "professional help"; "family or friends"); 4° In case the respondent have difficulties with one activity, but does not receive care, he is asked if he would need help (added question); 5° If the respondent declares to have difficulties doing a given IADL, he is asked why (health related reason or other); 6° If the respondent has contacted a nurse at home or a home care service, he is asked if he had to assume entirely the cost of the service.

These differences make it difficult to compare the HIS 2004 and the HIS 2008 results.

*Source:* ISP/WIV (2004a, b, 2008)

### *6. Survey of Health Ageing and Retirement in Europe (SHARE 2004-2006)*

The Survey of Health, Ageing and Retirement in Europe (SHARE) is a cross-national panel survey on a representative sample of more than 30,000 non-institutionalised[35] individuals aged 50 or over in twelve European countries (Austria, Belgium, Denmark, France, Germany, Greece, Israel, Italy, the Netherlands, Spain, Sweden and Switzerland). The Czech Republic, Ireland and Poland joined the survey at the second wave (2006) of the survey and Slovenia at the third wave (2008).

The Belgium baseline sample comprises 3,827 respondents. Data are collected every two-years since 2004 by the national teams[36]. The objective of the SHARE is to collect comparative and longitudinal data on the health and socio-economic status of the 50+ and on their social and family networks. The SHARE questionnaires are harmonised with the US Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA) and should therefore allow overseas comparisons. As the latter studies, the SHARE project alternates the collection of data on various aspects of life that are subject to rapid changes (2004, 2006) and the collection of retrospective life histories on particular life domains (2008).

The third wave, SHARELIFE 2008, is available since November 2010. This wave differs from the first two because the main questionnaire concerns only the newcomers. Longitudinal respondents (already in the survey in 2004 and/or 2006) are invited to answer a retrospective questionnaire. It aims at collecting information on fertility, partnership, employment, accommodation and the health trajectories[37]. Institutional data will be coupled to individual data to situate the life events in their global context[38].

[34] *Service de repas chauds à domicile/ Dienst maaltijdbedeling* (in the dissertation, the synonymous 'meals-on-wheels' is used).
[35] Respondents of the baseline survey who has moved to an institution are still eligible for answering the questionnaire in institution. If they died, an 'end of life' short interview can be completed by a proxy respondent. It includes questions about the death conditions and the health status during the last months.
[36] For Belgium, the *Centre de Recherche en Économie Publique et de la Population* (CREPP)-ULg is in Charge for the French-speakers sample and the *Centrum voor Sociaal Beleid* (CSB)-UA is in change for the Dutch-speakers sample.
[37] As there is no question on informal care, this third wave will not be analysed in this chapter.
[38] More information on data availability is given in appendix frame IV-7.

**FRAME IV-7:** Questions on elderly home care available in the SHARE 2004-2006

**Informal care received by the respondent in case of difficulties (Individual main questionnaires 2004-2006)**

**PH048.** Please tell me if you have any difficulty with these activities because of a health problem. Exclude any difficulties you expect to last less than three months:
**1.** Walking 100 metres.
**2.** Sitting for about two hours.
**3.** Getting up from a chair after sitting for long periods.
**4.** Climbing several flights of stairs without resting.
**5.** Climbing one flight of stairs without resting.
**6.** Stooping, kneeling, or crouching.
**7.** Reaching or extending your arms above shoulder level.
**8.** Pulling or pushing large objects like a living room chair.
**9.** Lifting or carrying weights over 10 pounds/5 kilos, like a heavy bag of groceries.
**10.** Picking up a small coin from a table.
**96.** None of these.

**PH049.** Please tell me if you have any difficulty with these activities because of a physical, mental, emotional or memory problem. Again exclude any difficulties you expect to last less than three months:
**1.** Dressing, including putting on shoes and socks.
**2.** Walking across a room.
**3.** Bathing or showering.
**4.** Eating, such as cutting up your food.
**5.** Getting in or out of bed.
**6.** Using the toilet, including getting up or down.
**7.** Using a map to figure out how to get around in a strange place.
**8.** Preparing a hot meal.
**9.** Shopping for groceries.
**10.** Making telephone calls.
**11.** Taking medications.
**12.** Doing work around the house or garden.
**13.** Managing money, such as paying bills and keeping track of expenses.
**96.** None of these.

**PH050.** Thinking about the activities [listed in PH048 and PH049] that you have problems with, does anyone ever help you with these activities? (Including your partner or other people in your household).
**1.** Yes
**5.** No

[If PH050 = 1. Yes]
**PH051.** Would you say that the help you receive meets your needs?
**1.** All the time.
**2.** Usually.
**3.** Sometimes.
**4.** Hardly ever.

**Care received by the respondent or his partner[39] from non-cohabitant informal care provider(s) (Individual main questionnaires 2004, 2006)**

**SP002.** Now please think of the last twelve months. Has any family member from outside the household, any friend or neighbour given you [or] [your] [husband/wife/partner] any kind of help?
**1.** Yes.
**5.** No.

[If SP002 = 1. Yes]

[39] Only one respondent per couple, the 'family respondent', answers the SP (support) questions.

[Up to three informal care providers can be declared. For each of them, the following questions are asked:]

**SP003.** Which [other] family member from outside the household, friend or neighbour has helped you [or] [your] [husband/wife/partner] [most often] in the last twelve months?
{one answer possible (show card 1): 1. Spouse; 2. Partner; 3. Child [number x]; 4. Child-in-law; 5. Parent; 6. Parent-in-law; 7. Sibling; 8. Grandchild; 9. Other relative [specify]; 10. Other non-relative [specify].

**SP004.** Which types of help has this person provided in the last twelve months?
**1**. Personal care, e.g. dressing, bathing or showering, eating, getting in or out of bed, using the toilet.
**2**. Practical household help, e.g. with home repairs, gardening, transportation, shopping, household chores
**3**. Help with paperwork, such as filling out forms, settling financial or legal matters.

**SP005.** In the last twelve months, how often altogether have you [or] [your] [husband/wife/partner] received such help from this person? Was it...
**1.** Almost daily.
**2.** Almost every week.
**3.** Almost every month.
**4.** Less often.

**SP006.** About how many hours did you [or] [your] [husband/wife/partner] receive such help altogether [on a typical day/in a typical week/in a typical month/in the last twelve months] from this person?

**Care provided by the respondent to non-cohabitant(s) (Individual main questionnaires 2004, 2006)**

**SP008.** In the last twelve months, have you personally given any kind of help to a family member from outside the household, a friend or neighbour?
**1.** Yes.
**5.** No.

[if SP008 = 1. Yes]

[Up to three care-receivers can be declared. For each of them, the following questions are asked:]

**SP009.** Which [other] family member from outside the household, friend or neighbour have you helped [most often] in the last twelve months?
[One answer among those mentioned on show card 1]: 1. Spouse; 2. Partner; 3. Child [number x]; 4. Child-in-law; 5. Parent; 6. Parent-in-law; 7. Sibling; 8. Grandchild; 9. Other relative [specify]; 10. Other non-relative [specify].

**SP010.** Which types of help have you given to this person in the last twelve months?
**1**. Personal care, e.g. dressing, bathing or showering, eating, getting in or out of bed, using the toilet.
**2**. Practical household help, e.g. with home repairs, gardening, transportation, shopping, household chores.
**3**. Help with paperwork, such as filling out forms, settling financial or legal matters.

**SP011.** In the last twelve months, how often altogether have you given such help to this person? Was it...
**1.** Almost daily.
**2.** Almost every week.
**3.** Almost every month.
**4.** Less often.

**SP012.** About how many hours did you [or] [your] [husband/wife/partner] receive such help altogether [on a typical day/in a typical week/in a typical month/in the last twelve months] from this person?

**Care provided by the respondent to household members (individual main questionnaire).**

**SP018.** Is there someone living in this household whom you have helped regularly during the last twelve months with personal care, such as washing, getting out of bed, or dressing?
**1.** Yes.
**5.** No.

[If SP018 = 1. Yes]

**SP019.** Who is that? [See show card 1 in SP003]

**Care received by the respondent from household members (individual main questionnaire).**

[If the respondent declares having any difficulties with the activities:]
**SP020.** And is there someone living in this household who has helped you regularly during the last twelve months with personal care, such as washing, getting out of bed, or dressing? (regularly means daily or almost daily during at least three months. Do not consider help during short-term sickness of family members.)
**1.** Yes.
**5.** No.

[If SP020 = 1. Yes]

**SP021.** Who is that? [See show card 1 in SP003]

**Home care services used by the household (household questionnaires 2004,2006).**

[Asked if the household respondent has not spent all the 12 last months in an institution.]
**HC032.** During the last twelve months, did you receive in your own home: [multiple choice possible]
**1.** Professional or paid nursing or personal care.
**2.** Professional or paid home help, for domestic tasks that you could not perform yourself due to health problems.
**3.** Meals-on-wheels.

**96.** None of these.

[If HC032. = 1. Professional or paid nursing or personal care selected in HC032]
**HC033.** During the last twelve months, how many weeks did you receive professional or paid nursing care in your own home?
**HC034.** On average, how many hours per week did you receive professional or paid nursing care at home?

[If HC032. = 2. Professional or paid home help, for domestic tasks…selected in HC032]
**HC035.** During the last twelve months, how many weeks did you receive professional or paid help for domestic tasks at home because you could not perform them yourself due to health problems?
**HC036.** On average, how many hours per week did you receive such professional or paid help?

[If HC032. = 3. Meals-on-wheels selected in HC032]
**HC037.** During the last twelve months, how many weeks did you receive meals-on-wheels, because you could not prepare meals due to health problems?

**Other information on care:** financial intergenerational support and expectations regarding elderly care responsibilities.

*Source:* MEA (2004a,b)

## *7. Labour Force Survey (LFS 2005)*

The Labour Forces Survey (LFS) is a compulsory survey organised and coordinated by Eurostat[40]. Belgian data are collected and managed by the INS/NIS. The purpose is to collect comparable data at the European level on the volume, the structure and the evolution of employment and unemployment. Some data on those topics are available through administrative data, Census or firms surveys. However, the LFS is the sole representative survey providing comparative information on topics like motivations for working part-time, temporary work variety, searching for a job, training and geographical mobility. An '*ad hoc* module' on a specific theme is sometimes added to the main

[40] The LFS 2009 differs from the other surveys presented in this chapter: it is not managed and analysed by research teams interested in the themes treated in the surveys (like for the PSBH, the CBGS surveys, etc.). The data are collected by the INS/NIS and some comparative analyses are carried out by Eurostat. But as far as I know, there are no systematic analyses of the national data. In Vanderleyden & Moons (2010), the authors mention that, according to the LFS 2005, 4% of the Flemish respondents provide informal care. This is the only result on informal care I could find.

questionnaire. In 2005, 11,100 respondents aged 15+ answered the Belgian LFS. The *ad hoc* module of that year concerns the work-family life articulation. It includes a question on the care provided to children and/or dependent adults[41,42].

**FRAME IV-8:** Questions on elderly home care available in the Belgian LFS 2005[43]

**Informal provided care *(ad hoc module added to the individual questionnaire) :***

To be completed by each household member aged from 15 to 64 years old:

**95.** Does M [the respondent] regularly provide care to other children or dependent people (sick, disabled, elderly) aged 15 years or older?
- Yes, other children younger than 15 years old
- Yes, family members or friends aged 15 or older who needs care
- Yes, other children younger than 15 years old and family members or friends aged 15 or older who needs care
- No

**Other information on care:** no

*Source:* European Commission Eurostat (2009a)

## *8. Gender and Generation Panel Study (GGPS 2008/09)*

The 'Generations and Gender Panel Study[44] (GGPS) is a household panel study launched by the United Nations Economic Commission for Europe (UNECE) to continue the tradition of the Family and Fertility Survey (FFS). The GGPS is organised in many European and non-European countries (to date, the participants are: Austria, Belgium, Bulgaria, Czech Republic, Estonia, France, Georgia, Germany, Hungary, Italy, Japan, Lithuania, The Netherlands, Norway, Romania, Russia). The data collection and management are assumed by national teams[45].

The objective of the survey is to collect information on relationships between demographic changes (population ageing, fertility decrease, shrinking in household' size) and the various life aspects. On the one side: What are the consequences of the demographic changes in family relationships? What are their consequences on the labour market entry and exit? What are their consequences on the pension scheme? On the other side: How and to what extent do the social, economic and political environments influence the demographic evolutions? To answer those questions, respondents are interviewed on their current situation (family, health, profession, etc.), on their past trajectory

[41] In the LFS 2009, a similar question is included in the main questionnaire but only asked to respondents working part-time. The respondent is asked why he does not work full-time: "What was the main reason for accepting a part-time job? [among the possible answers]: "because suitable care services for ill, disabled or elderly are not available or affordable" Belgian LFS 2009, core questionnaire (European Commission 2009b). On the contrary, in the 2005 *ad hoc* module, the question on informal care is asked to all the respondents aged 15-64 years (population in active age). The information on informal care provided by the main 2009 questionnaire concerns a highly selected sample in a specific situation (those who reduce their working-time because of their care responsibility). For this reason, only the information from the 2005 module is treated here.

[42] More information on data availability is given in appendix frame IV-8.

[43] Own English translation. For original questions in French and in Dutch, see appendix IV-9.

[44] The name of the survey can vary from country to country. The official name of the UNECE project is Gender and Generations Programme.

[45] In Belgium, the data collection is organised by the INS/NIS and scientific supervision and data analyses are performed by Interface Demography at the *Vrij Universiteit Brussel*-VUB, the *Centre de Recherche en Démographie et Sociétés* at the *Université Catholique de Louvain*-UCL, the *Vakgroep Sociologie* at the *Universiteit Gent*-UGent and the *Centrum voor Longitudinaal en Levensloop Onderzoek* at the *Universiteit Antwerpen*-UA.

(through retrospective questions on their partnership, fertility, or employment history) and on their future projects (through questions on intentions, over the 3 next years[46], to get married/divorced, having a child, cohabiting with parents, etc.). To link these individual data to their macro context, institutional and comparative data are collected (health care system, lodging market, pension scheme, etc.). The final objective of the project is to provide useful information to implement meaningful and consistent social and family policies.

The data for the first Belgian wave were collected between 2008 and 2010[47]: a representative sample of 7,163 respondents aged 18-79 living in a private household was constituted.

The second Belgian wave is in the preparation phase[48].

**FRAME IV-9:** Questions on elderly home care available in the Belgian GGPS 2008/09

**Informal care received and care services used**

**7.8.** Do you need regular help with personal care such as eating, getting up, dressing, bathing, or using toilets?
**1.** Yes.
**2.** No.

[If 7.8. = 1. Yes]

**7.9.** Specify in which circumstances you need help. [multiple answers possible][49]
**7.9a.** For eating.
**7.9b.** For getting up.
**7.9c.** For dressing.
**7.9d.** For bathing.
**7.9e.** For using the toilets.

[If 7.8. = 1. Yes]

**7.10.** Over the last 12 months, have you received regular help with personal care from professional persons from the public sector or from a private organisation?
[Answers 1 and 2 may both apply]
**1.** Yes, from the public sector.
**2.** Yes, from a private organisation.
**3.** Yes, but do not know type of organisation.
**4.** No.

[If 7.8. = 1. Yes]

**7.11** Over the last 12 months, have you (also) received such help from other people for whom providing such care is not a job?
**1.** Yes.
**2.** No.

[46] The time period corresponds to the interval between two waves. It means that, at the wave$_{n+1}$, the interviewer can assess whether the intentions expressed at $w_n$ have been realised or not.
[47] Other countries (like France) have already collected the data for their second wave. Unlike the ECHP, cross-national comparison of the results at a given wave does not necessarily refer to the same year or all the countries.
[48] More information on data availability is given in appendix frame IV-10.
[49] This question was added to the Belgian questionnaire. It is not included in the core standardised questionnaire.

| | | Persons who helped R [rank 1 to 5] | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| **7.12** From whom did you get this help? (*) | *List of Providers and Receivers (**)* | | | | | |
| **7.13** Did this person live in the same household with you at that time? | **1 –** yes<br>**2 –** no | | | | | |
| **7.14** Was this person paid for the help? | **1 –** yes<br>**2 –** no | | | | | |

**Care provided by the respondent**

**7.15.** Over the last 12 months, have you given people regular help with personal care such as eating, getting up, dressing, bathing, or using toilets? Do not include the care you may have given to young children.

| | | Persons who helped R [rank 1 to 5] | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| **7.16** Whom have you helped? (***) | *List of Providers and Receivers (**)* | | | | | |
| **7.17** Did you and this person live in the same household at that time? | **1 –** yes<br>**2 –** no | | | | | |

(*) Up to 5 persons can be recorded (Coded using the 'List of Providers and Receivers' (see **). questions 7.13 and 7.14 are asked for all the mentioned persons.

(**) **1.** Partner/ spouse; **2.** Mother; **3.** Father; **4.** Mother of R's partner/spouse; **5.** Father of R's partner/spouse; **6.** Son; **7.** Daughter; **8.** Step-son; **9.** Step-daughter; **10.** Grandmother; **11.** Grandfather; **12.** Granddaughter; **13.** Grandson; **14.** Sister; **15.** Brother; **16.** Another relative; **17.** Friend, acquaintance, neighbour, colleague; **18.** Other person ; **19.** An organisation or a company.

(***) Question 7.17 is asked for all the mentioned persons.

Other information on care: emotional support, living arrangement of the non-cohabitant parent(s) and intentions to cohabit with he/her/them in the future, opinion on who should be responsible for elderly care and on intergenerational transfers.

*Sources:* for the core questionnaire: UN (2004a,b); for the Belgian questionnaire: INS/NIS *et al.* (2008)

## B. Sub-national surveys

### *1. Solidarités sociales et santé des aînés (CRIV°[50] 1992)*

In 1992, the *Centre de Recherche Interdisciplinaire sur le Vieillissement* (CRIV) carries out the survey *Solidarités sociales et santé des aînés*[51]. This survey is commissioned by the COCOM/GGC who wanted to have more information on the living conditions of the 75+ in Brussels. A particular interest is given to the health and care aspects (what are the care needs? Which kind(s) of care is received? Preferred? etc.). The questions on intergenerational relationships are also included in the questionnaire. Three hundred and eight-one interviews are completed by 75+ respondents living in Brussels. The representativity criterion (see surveys selection criteria in section 1.B) is not strictly respected here. It was not possible to use the national register to draw a representative sample of the elderly living in Brussels. However, many efforts were made to have a sample as representative

[50] The '°' indicates that there is no official acronym for the survey, I took the acronym of the research centre to refer to the survey in the dissertation.

[51] Social solidarities and health of the older. Later in the dissertation, CRIV (1992) is used to refer to the survey.

as possible. The register of the *Mutualités chrétiennes, socialistes et professionelles/Christelijke, socialistische en liberale mutualiteiten*[52]*;* were used as sampling basis. In 1993, 81% of the 75+ living at home in Brussels are members of one of these *mutualités/mutualiteiten.* This survey is presented, although not really representative, because it is the only quantitative survey on elderly living at home in Brussels for the study period (1990 onwards).

The CRIV is still active today[53]: not really as a research centre but as a group of researchers working on various aspects of ageing at the UCL. Its activities mainly consist in organising meetings where researchers present and discuss their results (the latter meeting was held in September 2010). As far as I know, no other 'representative' quantitative survey on elderly living in Brussels has been carried out (by the CRIV or another research centre) since 1993[54,55].

**FRAME IV-10:** Questions on elderly home care available in the CRIV°[56] 1992

| **Care received** [from formal and informal care providers]<br>**22.** Abilities and disabilities in the daily life | | | |
|---|---|---|---|
| | Why is there a problem? | Who are the care providers? | How often do they provide care? |
| **22.1.** Do you wash yourself alone? (1) | | | |
| **22.2.** Do you dress yourself alone? (1) | | | |
| **22.3.** Do you get up from your bed or armchair alone and do you move alone inside the house? (1) | | | |
| **22.4.** Can you use the toilets alone? (1) | | | |
| **22.5.** Can you eat and drink alone? (1) | | | |
| **22.6.** Do you go out of the house alone or with somebody and how far do you go?<br>**1.** No limitation for going outside the house.<br>**2.** Going out, in the neighbourhood only.<br>**3.** Never go out of the house.<br>**4.** Never go out of the sleeping room. | | | |
| **22.7.** Do you prepare the meals on yourself?(2) | | | |
| **22.8.** Usually, do you take your main meals?<br>**1.** At home.<br>**2.** At the home of relatives or friends.<br>**3.** In a social restaurant for elderly.<br>**4.** In a restaurant.<br>**5.** Other: … | | | |
| **22.9.** Do you do the daily housework alone? (2) | | | |
| **22.10.** Do you do the weekly housework alone? (2) | | | |
| **22.11.** Do you do the shopping alone? (2) | | | |
| **22.12.** *If you cannot do the shopping alone,* who writes the shopping list?<br>**1.** You, without help.<br>**2.** You, with the person who help you (cohabitant).<br>**3.** You, with the person who help you (non-cohabitant).<br>**4.** Somebody else do it for you. | | | |

[52] In Belgium, each citizen must be member of a sick fund named *mutualité (*or *mutuelle*) in French and *ziekenfonds* (or *mutualiteit* in Dutch). There are Christian, socialist, liberal, professional and neutral ones.

[53] More information on the objectives and the activities of the centre can be found at http://www.sesa.ucl.ac.be/ criv/index2.php?part=1 [31/08/2010].

[54] There are several surveys on beneficiaries of home care services – for instance: de Henau *et al.* (2003) study the care setting of the beneficiaries of the *Centrale de Services à Domicile de Bruxelles* - or analyses of the Brussels sub-sample of national data – for instance: Deboosere *et al.* (2007) analyse of the HIS 2004 data.

[55] More information on data availability is given in appendix frame IV-11.

[56] Own English translation. For original questions in French and in Dutch, see appendix frame IV-12.

| **23. Do you need help for …** | | | |
|---|---|---|---|
| | Why is there a problem? | Who are the care providers? | How often do they provide care? |
| **23.1.** Feet care? | | | |
| **23.2.** Fill in administrative forms? | | | |
| **23.3.** Managing the money? | | | |
| **23.4.** The heating system? | | | |
| **23.5.** Odd jobs? | | | |

**Questions on home care services :**

Among the following services, could you tell me which ones do you know and which ones have you already used?

**1.** 'Meals-on wheels'…(3)
'Restaurant for elderly or not-for profit restaurant …(3)
**2.** Service of family assistant …(3)
Cleaning services …(3)
Private housemaid …(3)
**3.** Nurse at home …(3)
**4.** Personal alarm[57]…(3)
**5.** Accommodations fitting service, odd jobs…(3)
**6.** Service to borrow material… (3)
**7.** Sit-in service ('for sick', at night, during the day) …(3)
**8.** Centre or rest house for a 'short-stay'[58]…(3)

(1) **1.** Yes without help; **2.** Yes, with preparation; **3.** No, partial help is needed; **4.** No, complete help is needed.
(2) **1.** Yes, without help/I could do it without any help; **2.** Yes, with help; **4.** No, somebody helps / does it for me.
(3) **1.** I am currently using it; **2.** I ever used it, but no longer today; **3.** I know this service but have never used it; **4.** I do not know this service.

**Other information on care:**

*On care received*: questions on unmet needs, the number of informal care providers, the identification of the main informal care provider.
*On home care services*: questions on the satisfaction (quality and quantity) with the service (if used) or reasons for not using the service (if the respondent declares to need the services but do not use them.)

*Source:* CRIV (1992)

[57] *Télé-alarme/Personenalarmering.*
[58] *Centre de court séjour/Centrum voor kortverblijf*.

## *2.* Leefsituatie Onderzoek bij Vlaamse Ouderen *(LOVO 2001/02)*

The *Leefsituatie Onderzoek bij Vlaamse Ouderen* (LOVO 2001/02) was organised by the *Centrum voor Bevolkings en Gezinsstudie* (CBGS). This research centre has a long tradition of elderly living condition studies: since 1966, it has organised a representative survey every ten years. The first one (1966) was carried out on a representative sample of Belgian elderly living at home, the next surveys (1974, 1985) restricted their samples to the elderly living in Flanders. No such surveys could be organised in the 1990s[59]. But, in 2000, the CBGS came back to its tradition by launching the LOVO (Vander Boer *et al*. 2004). Like the previous CBGS-surveys, the main objective of the LOVO is to collect information on the living conditions (health, accommodations, care, social relationships etc.) and the quality of life of the elderly. The LOVO is a three-time project. First, a sample of elderly living in the community is interviewed in 2001/02 (LOVO-1). Second, a sample of elderly living in institution is interviewed in 2004 (LOVO-2). Finally, it was planned to interview a specific elderly cohort on the topic of intergenerational transfers with qualitative and quantitative interviews. Only the LOVO-1 is analysed here[60]. This first survey includes 2,462 respondents aged 55-90 who answer an individual questionnaire[61]. Certain questions differ according to the gender and the age-group of the respondents. This allows capturing life-stage's and gender's specificities. In addition to the questionnaire, each respondent receives a diary in which he has to write how he uses his time.

Since 2004, the SHARE project (see above) provides similar information: the Belgian SHARE sample includes a representative sample of the Flemish elderly aged 50+ living at home and the questionnaire treats most of the topics included in the LOVO-1. Furthermore, the SHARE data allow international comparisons[62]. See for example Geerts (2009).

**FRAME IV-11:** Questions on elderly home care available in the LOVO 2001/02

**Received care**

We will first present a number of activities (*) which have to be carried out on a daily or weekly basis. We would like to know whether you usually carry out those activities yourself or whether someone else does them.
We are not asking about your ability to perform the activity in question, but about who carries it out (you or someone else). We'll begin with the activity 'light domestic work'.
**G.1A.** Do you do usually (*) yourself or does someone else do it?
**1.** Usually self
**2.** Someone else

**G.1c.** If someone else [G.1A. = 2]: Who does the light domestic work?[Circle maximum three persons]
**1.** Spouse/partner.
**2.** Daughters.
**3.** Sons.
**4.** Daughters-in-law.
**5.** Sons-in-law.
**6.** Grandchildren.

[59] No representative survey of the elderly population was carried during this period. However, several surveys on specific themes (intergenerational relationships, health conditions, etc.) or on specific populations (the oldest old, the elderly with cognitive diseases, etc.) were carried out by the CBGS members in the 1990s.
[60] The LOVO-2 does not concern 'at home' informal care. The CBGS closed in 2006 and did not have the opportunity to launch the LOVO-3. Since 2006 *the Studiedienst van de Vlaamse Regering* and *het Vlaams Steunpunt Welzijn, Volksgezondheid en Gezin* (SWVG) is in charge of the studies and surveys related to the elderly population living in the Flemish region. See
http://aps.vlaanderen.be/survey/mvg_survey/welzijn/survey_mvg_welzijn2.htm [13/08/2010]
[61] Some questions are extended to the other household members (like the use of care services: Do you or does a member of your household currently make use of [specific home care service]?)
[62] More information on data availability is given in appendix frame IV-13.

**7.** Sisters or brothers (sisters-in-law/brothers-in-law).
**8.** Other family.
**9.** Neighbours.
**10.** Friends/acquaintances.
**11.** Nurse/home care attendant/help from cleaning service/meals service.
**12.** Private help (private cleaner, restaurant, catering service).
**13.** Other, namely?

**Care provided to non-cohabitant(s)**

**G.3A.** Do you yourself provide help to other persons outside your household regularly, occasionally, rarely or never? We are talking here about informal help, not help provided through an association or organisation
**1.** Regularly.
**2.** Occasionally.
**3.** Rarely or never.

**G.3B.** If regularly or occasionally [G.3A. = 1, 2]: Who do you help? [More than 1 circle possible]
**1.** spouse/partner not living at home
**2.** Daughters.
**3.** Sons.
**4.** Daughters-in-law.
**5.** Sons-2in-law.
**6.** Grandchildren.
**7.** Parents or parents-in-law.
**8.** Sisters or brothers (sisters-in-law/brothers-in-law).
**9.** Other family.
**10.** Neighbours.
**11.** Friends/acquaintances.
**12.** Other, namely?

**G.3C.** If regularly or occasionally [G.3A. = 1,2]: With which activities do you offer help?
**a.** In the event of help provided to **daughters/sons/daughters-in-law/sons-in-law** […][not of interest here]
**b.** In the event of help provided to **parents or parents-in-law:**
**1.** Sitting with/providing company.
**2.** Doing shopping.
**3.** Domestic help.
**4.** All kinds of odd jobs at home.
**5.** Help with personal activities (e.g. washing, dressing).
**6.** Garden maintenance.
**7.** Other, namely?

**Home care services**

There are all kinds of services and provisions available for people whenever they need help for any reason.
**H.1A.** Do you know of the existence of the following services and provisions? (Answer: yes/no)
**H.1B.** If known [H.1A. = yes]: Do you think that you or a member of your household needs this service
**1.** Yes (now).
**2.** Sometimes.
**3**. No.
**H.1C.** If known [H. 1A. = yes]: Do you or does a member of your household currently make use of (*)
or has someone made use of ... in the past year?
**1.** Using now.
**2.** Used in the past.
**3**. Not used.

(*) List of the 17 activities: [ADL] help to dress and undress, to wash oneself, to do feet care; [IADL] help to prepare coffee or tea, to prepare hot meals, to do light housework, to do heavy housework, to do the washing up, to do the ironing, to put the garbage outside, to do the shopping, to manage the household

[63] *Service d'aide aux familles et aux personnes âgées (incluant l'aide ménagère)/Dienst gezins en bejaardenhulp (inclusief poetsdienst)*.
[64] *Service de petits travaux/Klusjesdienst.*

tasks to do the gardening, to do administrative work, to manage money, to buy material, to prepare medicines.
(**) Home care services included in the list of professional services: service providing assistance to families and elderly people (including cleaning service)[63], odd-jobs service[64], home nursing service, meals service, sit-in service, at home care service, social worker assistance.

**Other information on care:**

On received care: in case the respondent does not receive care, he is asked whether he would need help. In case the respondent receives care for informal care provider(s), he should specify whether he gives compensation (in cash or in kind) to these person(s).

On provided care: in case the respondent provides care, he is asked whether he receives compensation in cash or in kind.

On care services used: for each service used, the respondent is asked to evaluate whether it meets his expectations?

On care preferences**:** 4 scenarios, defined by the time perspective (1 month or less versus more than 1 month care) and the activities concerned (ADL versus IADL), are presented to the respondent. For each scenario, the respondent is asked whether he would prefer to receive care from (1) a household member, (2) a non-cohabitant, (3) both or (4) none of them. According to the answer, the respondent is asked to identify 1 (if choice 1 or 2) or 2 (if choice 3) 'preferred care provider' in the relationship list. Finally, the respondent is asked whether he would be more likely to use informal care if the government provides a financial compensation to the informal care providers. Note that the 'preference' should not account for the economic or family situation of the respondent.

***Source:*** Official English translation provided by the research team, original questionnaire in Dutch: *Ministerie Vlaamse Gemeenschap* & CBGS (2001)

### *3. Zorg in Vlaanderen (ZVE°[65] 2003) and Mantelzorg in Vlaanderen (MVE° 2003)*

A global discussion on care in Flanders is commissioned by the *Vlaams Minister van Welzijn, Gezondheid, Gelijke Kansen en Ontwikkelingssamenwerking*[66] in 2003. Various expert commissions are set (on psychological, social, etc. aspects of care) and are asked to present their conclusions and recommendations in December 2003 at the *Zorgcongres*. In this context, two surveys on informal care are carried out jointly by the CBGS in the Flemish Region. The first, *Zorg in Vlaanderen* (ZVE°), targets citizens in active age (2,826 respondents aged 25-64[67]) and permits to evaluate the frequency and determinants of informal care in the general population. The second, *Mantelzorg in Vlaanderen* (MVE°), target registered informal care providers (2,735 respondents): it permits to focus on the experience and consequences of informal care. Alongside those specificities, the main part of the questionnaire is common to both surveys to allow comparative analyses. No new data has been collected after 2003[68].

[65] ZVE is used as an acronym for Zorg in Vlaanderen (enquete) and MVE for Mantelzorg in Vlaanderen (enquete).
[66] Flemish Minister of Well-being , Health, Middle Classes and Development
[67] The age limits led to exclude care given by older persons (65+) and by children/adolescents (<25 years old).
[68] More information on data availability is given in appendix frame IV-14.

**FRAME IV-12:** Questions on elderly home care available in the MVE° 2003

**Informal provided care**

**14/34**[69]Below is a list of activities. In the past 12 months **have you yourself carried out these activities** for people who were ill, disabled or otherwise in need of care and who require help for at least one month? If so, how often and for whom?
(*In the first column, circle each activity you have had to do for someone: 1 = no, 2 = yes.*
*If yes, in the second column circle how often you did this: 1 = daily, 2 = one or more times per week, 3 = one or more times a month, 4 = one or more times over the past 12 months.*
*In the third column, circle for whom you did this. If you performed a certain activity for several people, refer to the person for who you did it the most: 1 = household member, 2 = family member from outside the household, 3 = friend/acquaintance/neighbour.*)

**[information for the respondent:] Please note: this does not include activities as part of your profession or caring for healthy children or healthy adults!**

| | Done? | | How often? [70] | | | From whom? | | |
|---|---|---|---|---|---|---|---|---|
| | No | Yes | | | | | | |
| **a.** Just being there, keeping company | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **b.** Listening to problems | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **c.** Support in time of distress | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **d.** Transport/accompanying to doctor or hospital | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **e.** Transport/accompanying to family visit or outings | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **f.** Transport/accompanying on shopping trips, visits to bank, etc. | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **g.** Cleaning | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **h.** Washing and ironing clothes | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **i.** Looking after pets | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **j.** Shopping | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **k.** Fixing things inside/outside the home | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **l.** Preparing meals, washing up | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **m.** Organising the household | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **n.** Helping with paperwork | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **o.** Supervising medication | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **p.** Help with eating | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **q.** Help with dressing and undressing | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **r.** Help with washing | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **s.** Help with bathroom visits and changing incontinence pads | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| **t.** Other (*please specify*)…….. | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |

**Home care services used (in *Mantelzorg in Vlaanderen* only)**

**21a.** Does the person for whom you care receive help from one or more professional carers? (Answer: yes/no)

**Other information on care:**

***Mantelzorg in Vlaanderen*:** number of care-receivers; gender, relationship and living arrangement of the care-receivers (information collected to maximum three care-receivers). More details are collected for the main care-receivers (reason for care, duration of informal care, difficulties, presence of other informal care providers. Many questions on care perception, support (e.g. use of respite care centre[71]), additional costs and rewards.

[69] Questions number in the MVE°/ZVE°.
[70] According to the question wording, there should be 4 modalities but the questionnaire grid only provides only 3 modalities. It is not clear whether the error has to be sought in the grid or in the question.
[71] *Centre de répit/Centrum voor respijtzorg.*

| |
|---|
| ***Zorg in Vlaanderen*:** question on the care provided by another member of the household, questions on the care received[72] by the respondent, on care allowances, on care preferences in general (for ADL and for IADL, for short-term needs and for long-term needs), on opinions about various care situations, etc. |

*Source:* Official English translation CBGS (2003a,b)

### *4. Écouter les aidants proches pour mieux les soutenir (FRB/KBS° 2006)*

In 2006, the FRB/KBS[73] launched a national action concerning the informal care providers. At that time, associations and surveys on the topic were already well developed in the Flemish Region[74] while it was not the case in the Walloon and Brussels Regions. Therefore, if the global objective of the national action (to support, inform and defend the interests of the informal care providers) was the same for all the regions, the means used differ. One of the priorities for the Walloon and Brussels Regions was to collect quantitative data on the informal care provider situation. The FRB/KBS° asked the researchers of the ULg to organise the survey *Ecouter les aidants proches pour mieux les soutenir*[75]. It was not possible to draw a representative sample as it was done in the MVE°. This is because of the absence of a register of informal care providers living in Wallonia and in Brussels. However, various contacts (associations, resource-persons, health care and other professionals) and communication (article published in several magazines) tools were used in order to reach as many and as various care providers as possible. At the end, 487 questionnaires were completed. Although the 'representative criterion' of my surveys selection is not met, I decided to make an exception because it is the only quantitative survey focused on informal care available to date for Wallonia and Brussels. Moreover, the themes treated (characteristics, experience and consequences of the provided care) allow some comparisons with the results of the MVE°. It was a one shot survey. No follow-up or replication was planned[76].

**FRAME IV-13:** Questions on elderly home care available in the FRB/KBS° 2006[77]

| |
|---|
| **Definition of 'informal care provider'** |
| The informal care provider is "a non-professional who cares for a frail relative, friend or neighbour who needs regular and often daily personal care because of an illness and/or a physical or mental disability |
| **Identification of the care-receiver** |

[72] These questions are not detailed because their do not refer to elderly care: Respondents of *Zorg in Vlaanderen* are too young to receive 'elderly care' (aged 25-64). Respondents of MVE° are effective care-givers by definition. This does not prevent them from receiving care (e.g. elderly couple are often care-receiver and care-giver at the same time) but it makes this sample very specific and not representative of elderly potential care-receivers.

[73] The *Fondation Roi Baudouin* (in French) or the *Koning Boudewijnstichting* (in Dutch) is an independent, pluralistic and national foundation. Its mission is to support projects and citizens who try to improve the living conditions of the population. Some of the supported projects (like the above-mentioned survey) are related to the elderly population or to the family care-givers.

[74] The first surveys and associations related to informal care date from the 80s in Flanders (see chapter III) while the first association dedicated to this issue in the French part of Belgium, *Aidants proches*, was only set up in 2006. The initiative was launched by the 'FRB/KBS' at the same time of the organisation of the survey *Écouter les aidants proches pour mieux les soutenir*. Since that time, other researches and projects have been organised in Wallonia and Brussels like the surveys of Royen (2007) and the one of Kirsch & Warrant (2009) among informal care providers.

[75] To listen to informal care-giver to better support them. Later in the dissertation, 'FRB/KBS (2006)' is used to refer to the survey.

[76] More information on data availability is given in appendix frame IV-15.

[77] Own English translation; the original version in French is given in appendix frame IV-16.

An individual may provide care to multiple dependent persons who are restricted in their daily activities. Could you fill-in the questionnaire taking into account only the person to whom you provide care more often/regularly.

**1.** The care-receiver is:
- Your child?
- Your grandchild?
- Your partner?
- One of your parents?
- One of your parents-in-law?
- Your brother or sister?
- Another family member (specify)?
- A non family member (specify)?

**2.** Does this person live in your household? (Answer: Yes/Non)

[If 2 = No]:

**3**. Does the care-receiver lives:
- Alone?
- With one or more member(s) of his family?
- With one or more non family member(s)?
- In institution?
- Other (specify)?

**4.** What is the gender of the care-receiver? (Answer: male/female)

**5.** How old is the care-receiver?

**9.** Which task(s) are you responsible for?

| | Totally | Partially | Not at all |
|---|---|---|---|
| Personal care (e.g. dressing, bathing, eating, getting up or getting out of bed, using the toilets) | | | |
| Household tasks (e.g. odd jobs, gardening, using the means of transports, doing the shopping or housework) | | | |
| Administrative tasks (fill-in forms, manage money or legal issues) | | | |

**10.** How many hours on average do you spend caring for this person?

**At home care services used (in addition to informal care)**

**18. Do you [the care provider] regularly use the following professional care services?**
- Medical care (Answer: Yes/No)
- Nurse at home (Answer: Yes/No)
- Physiotherapist (Answer: Yes/No)
- Speech therapist[78] (Answer: Yes/No)
- Sit-in services[79] (Answer: Yes/No)
- At home care services (e.g. help for bathing). (Answer: Yes/No)
- At home care coordination centre. (Answer: Yes/No)
- Palliative care (Answer: Yes/No)
- Social services (Answer: Yes/No)
- Psychologists (Answer: Yes/No)
- PMS/CLB[80] (Answer: Yes/No)
- Other (specify). (Answer: Yes/No)

*Source:* ULg & FRB/KBS° (2006)

[78] *Logopède/Logopedist.*
[79] *Service de garde malade, service de surveillance/Dienst voor oppashulp.*
[80] *Service de concertation psycho-médico-sociale/Centrum voor Leerlingenbegeleiding.*

### *5.* Sociaal-culturele verschuivingen in Vlaanderen *(SCV 2008)*

The *Sociaal-culturele verschuivingen in Vlaanderen* (SCV) is a yearly survey carried out on a representative sample of Dutch-speaking Belgians in the Flemish and Brussels Regions. The sample is made of 1,500 respondents aged 18 to 85 years (see table A1). This survey instrument is conceived at the request of the *Vlaamse Regering*[81]. The purpose is to collect information on the opinions and beliefs of the population concerning social and cultural aspects of the everyday life linked to policies.

The questionnaire is divided into three parts: the first includes background information; the second includes questions on socio-cultural aspects (e.g. religion, gender roles, etc.). There is a turnover between the themes: for instance, questions on environment are asked every four years. The third part includes questions which are relevant for the current policies (e.g. pensions in 2008).

The survey project started in 1996. In 2002, the SCV joined the European project ISSP[82] and adds the ISSP module to the questionnaire (the First module was 'Family and changing gender roles III').The SCV 2008 comprises two questions on informal care: the first refers to childcare (beyond the scope of this dissertation) and the second to care provided to sick, disabled or elderly people. The survey continues on a yearly basis but other themes are treated. I could not find any information as to the inclusion of care related questions in past or future SCV surveys[83].

**FRAME IV-14:** Questions on elderly home care available in the SCV 2008[84]

| |
|---|
| **Informal care provided** |
| How often, over the 12 last months, have you provided care to a sick, a disabled or an elderly member of your family, friend or neighbour? (Never, once a year, more than once a year, once a month, more than once a month, weekly, daily). |
| **Other information on care**: no |

*Source:* Vanderleyden & Moons (2009)

## C. Methodological and technical information

[81] Flemish Government
[82] Since 2006, the ISSP data are also available for the French-speaker Belgians through the IWEPS.
[83] More information on data availability is given in appendix frame IV-17.
[84] Own English translation. For the original question in Dutch, see appendix frame IV-18.

**TABLE IV-1:** Technical and methodological information on the surveys

| SURVEY | PERIODICITY | TYPE OF SURVEY (QUESTIONNAIRE) | STUDY AREA | SAMPLING | BELGIAN SAMPLE |
|---|---|---|---|---|---|
| (INTER)NATIONAL SURVEYS | | | | | |
| Eurobarometer (EB 1992, 1999, 2002, 2007) | Twice each year (on various topics) | Repeated cross-sectional survey<br>Face-to-face individual questionnaire | EU members (number increases over time) | Multi-stage, random sample | 1992, 1999, 2007 (procedure for standard EB):<br>Target sample of 1,000 respondents aged 15+ living in Belgium.<br>(for 1992 'special EB', a sub-sample of 400 respondents aged 60+<br>***Individual participation rate:*** na. |
| Panel Study of Belgian Household (PSBH 1992-2002) | Each year (11 waves) | Panel survey (individual and household face-to-face or self-completion questionnaires) | Belgium (including the German Community) | Probability proportional to size and stratified sample based on the National register | **1992:** 4,438 household questionnaires completed (8,741 respondents answered the adult questionnaire). All the household members aged 16+ were eligible for interview.<br>***Household participation rate:*** 41% |
| European Community Household Panel (ECHP 1994-2002) | Each year (8 waves) | Panel (individual and household questionnaires (the administration mode differs across countries (face-to-face, postal, by telephone, proxy respondent) | Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Spain, Portugal, Sweden, United Kingdom | Most national samples use two-stage sampling designs | **1994:** 4,189 private Belgian households (60,819 for the 12 countries present in 1994). All the household members aged 16+ were eligible for interview.<br>***Household participation rate*:** 84% in Belgium[85] (overall response rate for the 12 countries: 71%) |
| General Socio-Economic Survey (Census 2001) | Each 10 years | Population Census (postal individual and household survey) | Belgium | No | **2001:** 10,296,349 respondents born before 1996 (aged 6+)<br>***Individual participation rate****:* 96,9% (participation is compulsory by law) |
| Health Interview Survey (HIS 2004, 2008) | Each four years | Repeated cross sectional survey (face-to-face individual and household questionnaires + , self-completion individual questionnaire for the 15+) | Belgium (including the German Community) | Multi-stage stratified sample based on National register + particular design for the 65+ | **2004**: 12,650 respondents (4,719 are aged 65+).<br>***Household participation rate:*** 61.4%<br>**2008**: 11,254 respondents (2,859 are aged 65+).<br>***Household participation rate:*** 55%<br><br>Maximum 4 respondents by household [86, 87] |

[85] The response rate for Belgium is higher than this average and higher than it is in other Belgian surveys. This reason is that the ECHP baseline sample for Belgium corresponds to the households participating in the third wave of the PBSH. Non-cooperatives households have probably already leave the panel at that time.
[86] If the household includes more than 4 eligible members, specific rules are followed to choose the respondent (see Demarest *et al.* 2006).
[87] Some collective households are excluded (prisons, psychiatric and religious institutions) some are included (institutions for elderly).

**TABLE IV-1:** Technical and methodological information on the surveys (continued)

| SURVEY | PERIODICITY | TYPE OF SURVEY (QUESTIONNAIRE) | STUDY AREA | SAMPLING | BELGIAN SAMPLE |
|---|---|---|---|---|---|
| (INTER)NATIONAL SURVEYS | | | | | |
| Survey of Health, Ageing and Retirement in Europe (SHARE 2004-2006) | Each two years | Panel survey<br>(face-to-face household questionnaire, face-to-face and self-completion individual questionnaires) | Austria, Belgium (excluding German Community), Czech Republic, Denmark, France, Germany, Greece, Israel, Italy, The Netherlands, Poland, Slovenia, Spain, Sweden, Switzerland | Multi-stage stratified sample based on a telephone list (*infoBel*) and on the National register (for the Flemish sample)[88] | **2004:** 3,827 members of the private household born before 1954 and their spouse<br>***Household participation rate***: 39.2%<br>***Individual participation rate*** for responding households= 90.5% |
| Labour Force survey (LFS 2005) | Yearly survey since 1983, quarterly and yearly results since 1999 | Face-to-face individual questionnaire (telephone interview possible in some cases) | EU-countries (compulsory in some countries like Belgium, voluntary in others) | Two-stage sampling based on the National register | **2005:** 11,100 households/ 21,700 members of private households aged 15-74.<br>***Household participation rate***: 79.3% |
| Gender and Generation Panel Study<br>(GGPS 2008/09) | Each three years (three waves are planned in total) | Panel survey + retrospective questions | Austria, Belgium (including German Community), Bulgaria, Czech Republic, Estonia, France, Georgia, Germany, Hungary, Italy, Japan, Lithuania, The Netherlands, Norway, Romania, Russia | Two-stage sampling based on the National register | **2008:** 7,163 respondents living in a private households and aged 18-79 (1,149 are aged 65+)<br>***Individual participation rate:*** 42.5% |

[88] The Belgian French-speaking sample (including French speakers living in the Brussels and Walloon Regions) and the Belgian Dutch-speaking sample (including the Dutch speakers living in the Flemish Region) present some difference in their sampling method. The French sample is based on a list of municipalities (first stage) and on the *Infobel* telephone list (second stage). The Dutch sample is divided into two sub-samples. The list of the municipalities is used at the first stage in both sub-samples. For the second stage: one subsample is based on the *Infobel* telephone list, the other is based on the National register. Unfortunately, it was not possible to use the National register as sole and common base for the French and Dutch samples. The *InfoBel* list is a commercial list. People can refuse to be included in this list. Therefore, other techniques have to be used to sample those 'grey addresses'. For more details on the sampling method of the Belgian samples see the Mannheim Research Institute for the Economics of Aging-MEA (2009): Appendices D2-D3.

**TABLE V-1:** Technical and methodological information on the surveys (end)

| SURVEY | PERIODICITY | TYPE OF SURVEY (QUESTIONNAIRE) | STUDY AREA | SAMPLING | BELGIAN SAMPLE |
|---|---|---|---|---|---|
| SUB-NATIONAL SURVEYS | | | | | |
| Solidarités sociales et santé des aînés (CRIV 1992) | Once | Cross-sectional survey (face-to-face individual interviews) | Brussels Region | Sample based on *mutualités/mutualiteit* registers | 381 respondents aged 75+ living at home in the Brussels Region<br>***Individual participation rate:*** *(computed on contacted people):* 57% |
| Leefsituatie onderzoek bij Vlaamse *ouderen* (LOVO 2001/02) | Once | Cross-sectional survey (face-to-face individual interviews + self-completion dairy on time-use) | Flemish Region | Probability proportional to size and stratified sample[89] based on the National register | 2,462 respondents aged 55–90 years living in a private household and having the Belgian nationality (1,596 aged 65+)<br>***Individual participation rate:*** 82% |
| Zorg in Vlanderen (ZVE° 2003) | Once | Cross-sectional survey (postal individual questionnaire) | Flemish Region | Probability proportional to size and stratified sample based on the National register | 2,826 respondents aged 25-64, living in the Flemish region, having Belgian nationality<br>***Individual participation rate:*** 71% |
| Mantelzorg in Vlaanderen (MVE° 2003) | Once | Cross-sectional survey (postal individual questionnaire) | Flemish Region | Sample based on private insurance file of registered informal care providers, corrected with the National register | 2,735 registered informal care providers, living in Flemish the region[90],<br>***Individual participation rate:*** 68.4% |
| Écouter les aidants proches pour mieux les soutenir (FRB/KBS° 2006) | Once | Cross-sectional survey (postal questionnaire: individual questionnaire answered by one household member only) | Wallonia and Brussels Regions (French-speakers only)[91] | Snowball sample and use of various communication means and contacts to reach all kinds of care providers | 487 informal care providers<br>***Individual participation rate:*** na |
| Sociaal-culturele verschuivingen in Vlaanderen ( SCV 2008) | Each year (topics vary from year to year) | Repeated survey (face-to-face individual interview) | Flemish and Brussels Regions (Belgian Dutch-speakers only) | Two-stage random sampling | 1,500 respondents aged 18-85<br>***Individual participation rate:*** 66.5% |

*Sources:* **EB:** European Commission 2007b; **PSBH:** Doutrelepont *et al.* (2004); **ECHP:** European Commission Eurostat (1997, 2003); **Census:** Deboosere *et al.* (2006); **HIS:** Demarest *et al.* (2006), Demarest (2010), Demarest *et al.* 2010a, 2010b. **SHARE:** Börsch-Supan & Jürges (2005), Börsch-Supan *et al.* (2005, 2008); **LFS:** European Commission, Eurostat (2007a); **GGPS:** Deboosere *et al.* 2011, **CRIV°:** Leroy & Neirynck (1992) ; **LOVO:** Jacobs *et al.* (2004a) ; **ZVE° and MVE°:** Jacobs & Lodewijckx (2004, 2006); **FRB/KBS°**: Casman (2007); **SCV:** Vanderleyden & Moons (2010). *Note :* na= not available.

[89] The initial idea was to reach a sample of 3,000 respondents (stratified by age groups 55-64, 65-74, 75-90 and by gender: each of the six sub-samples should include around 500 respondents). The sample was also stratified by province (to be sure to have a representative sample of the two main cities of the region, Gent and Antwerpen constituted separated clusters). The final study sample (including replacement addresses) comprises 2,464 respondents (for men: 448 aged 55-64, 413 aged 65-74, 403 aged 75-90; for women: 418 aged 55-64, 370 aged 65-74,410 aged 75-90).

[90] The Belgian nationality is not required. However the selection criteria (to be registered as informal care-giver, respondent have to live in Brussels or in Flanders and to pay yearly contribution) and the language of the questionnaire (Dutch) reduce the probability that foreign people answer.

[91] Nevertheless 4.1% of the respondents were residents of the Flemish region.

## *SECTION 3. How does the elderly care operationalisation vary across surveys?*

The lack of a consensual theoretical definition of family care was discussed in chapter I. In the systematic literature review (chapter II), the variety of operational definitions of family care was already mentioned as one of the reasons for mixed findings. In this chapter, the aspects of variation between and within Belgian surveys are further investigated. The survey questionnaires are available in most cases. It permits to compare selected parameters of the questions wording (timing of care, need conditions, etc.).

Tables IV-2a to IV-2c compare the operational definition of elderly care used in the selected surveys. The table only includes the information coming *directly*[92] from the questions.

The context of the surveys (section 2), also gives some useful elements to understand those differences. This section discusses the main contrasts in informal care between[93] surveys observed in the next table.

### A. The point of view: informal provided care, received care or both

Most of the international (ECHP, LFS) or opinion surveys (EB 1997, 1999, 2002; SCV) focus on the **provided care**. There is usually a first general question on 'care provided to sick, disabled or elderly people'. In some cases, additional information is collected on the intensity of provided care and the relationship with the care-receivers. The care question in the Census 2001 and in the ZVE° corresponds to this description too. The MVE° and the FRB/KBS° surveys also focus on the provided care but their questionnaire includes much more detailed questions on the experience of caring (see point 2).

The purposes are (1) to measure the importance of the informal care-giving situation in the population: what is the proportion of informal care providers in the population? Who are they?[94]; (2) to forecast how the potential of informal care providers is likely to evolve in the future; (3) to provide useful information to policy makers: which measures should be implemented to promote and support informal care-giving?

Two of the selected surveys only include questions on received care: one is a health survey (HIS) and the other is the oldest sub-national survey (CRIV°). The scarcity of this type of surveys can be explained by the selection criteria: most of the existing care-receivers surveys in Belgium are based on a 'beneficiaries' sample: the authorities providing care allowance or home care services want to have more information on the needs of its 'beneficiaries' population. These surveys were excluded. Another reason may be the change in policy 'paradigm' in elderly care: from a medical care view to a community care view (see chapter I): the focus moved from the 'sick' and 'dependent' elderly to the informal care 'potential' or 'burden'. The two selected surveys refer to a more medical concern: the care question is conditioned to the presence of needs and both surveys include many questions aiming at measuring the dependency level of the respondent.

[92] Later (chapter VI), I will show how more information on care can be *indirectly* obtained (e.g. In the PSBH: information on the 'care received' by the respondent from the household members can be obtained by the information given by the other household respondents on the 'provided care').
[93] The differences in informal care operationalisation 'within' a survey and the operationalisation of home care services are discussed in chapter VI, for the PSBH only.
[94] The socio-demographic questions included in the questionnaire allow measuring the association between care-giving and gender, age, work status, etc.

The remaining surveys are general household surveys (PSBH 1992-2002, GGPS 2008/09) or age specific surveys (LOVO 2001/02, SHARE 2004-2006). They include **questions on the received care and on the provided care**. These questions are often included in a 'social support/relationships' module. The approach is more sociological: the purpose is no longer to evaluate the needs for care or the potential of care providers in the population. It is to understand the logics of intergenerational solidarities or the reality of the 'sandwich' generation.

**TABLE V-2A**: The questions on elderly home care in the selected surveys: Provided informal care

| | (INTER)NATIONAL SURVEYS | | | | | | | | | SUB-NATIONAL SURVEYS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey name and date of data collection | EB 1992, 1999, 2002, 2007 | PSBH 1992-2002 | ECHP 1994-2001 | Census 2001 | HIS 2004, 2008 | SHARE 2004-2006 | LFS 2005 | GGPS 2008/09 | CRIV° 1992 | LOVO 2001/02 | MVE° ZVE° 2003 | FRB/KBS° 2006 | SCV 2008 |
| Care provider | Responding individual | Responding individual | Responding individual | Responding individual | Na | Responding individual | Responding individual | Responding individual | Na | Responding individual | Responding individual | Responding Individual | Responding individual |
| Type of provided care | ADL/IADL | ADL, IADL | Not specified | Not specified | Na | ADL**, IADL | Not specified | ADL | Na | ADL, IADL | ADL, IADL | ADL, IADL | Not specified |
| Timing | Over the ten past years | Currently (at the time of the interview) | Currently (at the time of the interview) | Currently (at the time of the interview) | Na | **SP:** Over the last 12 months | Currently (at the time of the interview) | Over the last 12 months | Na | Currently | Over the last 12 months | Currently (at the time of the interview) | Over the last 12 months |
| Frequency/ intensity | *Condition:* regular help and long-Term | *Condition:* daily care *Precision:* # of weekly hours | *Condition:* daily care *Precision:* # of weekly hours | *Condition:* weekly care *Precision:* # of weekly hours | Na | **SP:** specified | Not specified | *Condition:* regular care | Na | Specified | *Precision:* 1time+/year; 1time+ /month; 1time+/week;dail y | Specified | *Precision* :1/year; ,>1year; 1/month; >1month; weekly; daily. |
| Needs condition | *Condition:* the CR should 'need' the help provided (but no health conditions specified) | *Condition:* disability, sickness or old age | *Condition:* disability, sickness or old age | *Condition:* disability, sickness or old age | Na | *Care to cohabitant:* regular care over the last 12 months *Care to non-cohabitant:* not specified | *Condition:* disability, sickness or old age | No | Na | No | *Condition:* disability, sickness or old age + need care for 1 month or more | *Condition:* disability, sickness + need regular care | *Condition:* disability, sickness or old age |
| Relationship with the care-receiver | *Precision:* relationship, cohabitation or not | *Precision:* relationship, cohabitation or not | *Precision:* cohabitation or not | *Precision:* relationship, cohabitation or not | Na | *Precision* **SP:** relationship, cohabitation or not | Not specified | *Precision:* relationship, cohabitation or not | Na | *Precision:* relationship (non-cohabitant only) | *Precision* (in MVE° only): relationship, cohabitation or not, gender | *Precision:* relationship, cohabitation or not, age, gender | *Precision:* relationship |
| # of care-receivers | Max 2. CR | Not specified (except in 1992, 1993) | Not specified | Not specified | Na | Max. 3 non-cohabitant, 1 cohabitant CR | Not specified | Max. 5 CR | Na | Multiple CR possible | Multiple CR possible | Main CR only | Not specified |

**TABLE IV-2B:** The questions on elderly home care in the selected surveys: received informal care

| | (INTER)NATIONAL SURVEYS | | | | | | | | SUB-NATIONAL SURVEYS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey name and date of data collection | EB 1992,1999, 2002, 2007* | PSBH 1992-2002 | ECHP 1994-2001 | Census 2001 | HIS 2004,2008 | SHARE 2004-2006 | LFS 2005 | GGPS 2008/09 | CRIV° 1992 | LOVO 2001/02 | MVE° 2003 ZVE° 2003 | FRB/KBS° 2006 | SCV 2008 |
| Care-receiver | Responding Individual | Responding Individual | Na | Na | Responding Individual | **SP:** Resp. couple **PH:** Ind. resp. | Na | Responding Individual | Responding Individual | Responding Individual | Na | Na | Na |
| Type | ADL, IADL | ADL, IADL | Na | Na | ADL, IADL | **SP:** ADL**, IADL, **PH:** not specified | Na | ADL | ADL, IADL | ADL, IADL | Na | Na | Na |
| Timing | Over the ten past year | Last 3 months | Na | Na | 'Usually' | **SP:** Over the last 12 months **PH:** currently | Na | Over the last 12 months | 'Usually' | 'Usually' | Na | Na | Na |
| Frequency /intensity | *Condition:* regular help and long-term | Na | Na | Na | Not specified | **SP:** cohabitant: regular care over the last 12 months, non-cohabitant: frequency specified **PH:** not specified | Na | *Condition:* Regular care | Specified | Not specified | Na | Na | Na |
| Need restriction | *Condition:* the CR should 'need' the provided help (no health conditions specified) | Na | Na | Na | Respondent's autonomy level specified | **SP :** no **PH:** long-term disability | Na | Need care for at least one ADL | Specified | No | Na | Na | Na |
| Relationship with the care provider | Relationship not specified | Non-cohabitant children only | Na | Na | **2004: r**elationship specified **2008:** formal and/or informal | **SP:** relationship specified **PH:** relationship not specified | Na | Relationship and whether cohabitating specified | Relationship specified | Relationship specified | Na | Na | Na |
| # of care providers | Not specified | Not specified | Na | Na | Not specified | Max. 3 non-cohabitant, 1 cohabitant | Na | | Max. 3 | Max. 3 | Na | Na | Na |

**TABLE IV-2C:** The questions on elderly home care in the selected surveys: Home care services

| | (INTER)NATIONAL SURVEYS | | | | | | | | SUB-NATIONAL SURVEYS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey name and date of data collection | EB 1992,1997, 2002,2007* | PSBH 1992-2002 | ECHP 1994-2002 | Census 2001 | HIS 2004,2008 *** | SHARE 2004-2006 | LFS 2005 | GGPS 2008/09 | CRIV° 1992 *** | LOVO 2001/02 *** | MVE° 2003, ZVE° 2003 | FRB/KBS° 2006 | SCV 2008 |
| Care-receiver | Na | Responding household | Na | Na | Responding individual | Responding household | Na | Responding individual | Responding individual | Responding household | Main CR of the respondent (MVE° only) | May be the ICP or the CR | Na |
| Timing/ frequency | Na | Currently | Na | Na | Over the last 12 months | Over the last 12 months, frequency specified | Na | Over the last 12 months | Currently or in the past | Currently or over the last 12 months+ frequency specified | Not specified | Regular use | Na |
| Type of services/ activities | Na | IADL (cleaning, shopping, gardening, odd jobs, preparing meals, ironing, administrative tasks) | Na | Na | Nurse at home, at home care services, meals-on-wheels | Nurse at home, meals-on-wheels, help for domestic task | Na | Public services, private services, both | Nurse at home, at home care services, meals-on-wheels, etc. [see list in section 2] | Nurse at home, at home care services, meals-on-wheels, etc. [see list n section 2] | Not specified (the question only refers to the use of professional care) | Nurse at home, meals-on-wheels, other home services | Na |
| Needs conditions | Na | No condition | Na | Na | No condition | No condition | Na | Current Need for ADL care | No condition | No condition | Not specified | Not specified | Na |
| Paid and/or unpaid | Na | Paid, unpaid | Na | Na | **2004:** No **2008:** paid, unpaid | Paid (no precision for meals-on-wheels) | Na | Not specified | Not specified | Not specified | Paid | Not specified | Na |

(*) The table is completed according to the information available in EB 2007 (which includes the most detailed questions on care).
(**) Questions on the care provided to/received from a cohabitant only concern ADL.
(***) For these surveys, information on at home care services can also be obtained through the 'received (informal) care' questions because 'professional' or 'care services' are included in the relationship list.
**SP:** questions asked in the 'support' module of SHARE**, PH:** questions asked in the 'Physical Health' modules. **Na:** not available, **CR**: care-receiver, **ICP**: informal care provider,
If ADL and IADL are separated by a comma (**ADL, IADL**), it means that questions distinguish the two kinds of activities; if ADL and IADL are separated by a slash (**ADL/IADL**): it means that questions do not distinguish the two kinds of activities.

## B. Potential versus effective informal care providers

Among surveys focusing on provided care, a distinction can be made between potential and effective informal care providers samples. The first type is mainly found in international and opinion surveys aiming at providing useful information for (international) policy makers: are the citizen willing and available to assume (part) of the elderly care? Which incentives increase this potential? The second type is found in smaller scale (sub-national) surveys (the MVE° and the FRB/KBS°). The main theme of the questionnaire is the experience of care: duration, characteristics, consequences on other life aspects, etc. The purpose is to understand the reality and the difficulties of the informal care-giving involvement.

These surveys provide very detailed information on the care experience. However, they are not flawless. The main issue is the selection of the sample. The sample of the MVE° survey is based on the register of informal care providers. This register is not representative of the total 'population' of informal care providers in Flanders but only of the 'sub-population' of main informal care providers of very dependent people who are entitled and willing to receive a care allowance. It implies that the lower educated people are likely to be over-represented (more likely to have a relative in need of care[95] and to be interested in the care allowance).

Unlike the MVE°, the FRB/KBS° sample is not based on a register of informal care providers. There is neither a minimum intensity of care need criterion nor an allowance incentive. Therefore, the lower educated should not be over-represented. On the contrary, they will probably be under-represented like it is the case in general population surveys, because, in general, the lower educated are less likely to participate in surveys (Adriaensens *et al.* 2003).

The next table (table IV.3) compares the distribution of education level in the two surveys with the distribution of the Census 2001 regional sub-samples (Flanders for the MVE° and Brussels and Wallonia for the FRB/KBS°). Although the figures are not perfectly comparable (different age groups and years), they highlight that the lower educated tend to be over-represented in the MVE° and under-represented in the FRB/KBS°. This implies that differences or similarities of results between the two 'effective' informal care providers surveys should be interpreted cautiously.

**TABLE IV-3:** Education level by region in the Census 2001, the MVE° 2003 and the FRB/KBS° 2006

| | SURVEY AND AGE GROUPS | | | | |
|---|---|---|---|---|---|
| | **MVE° 2003 (25-64 years old)** | **Census 2001(*) (25-64 years old)** | | | **FRB/KBS° 2006 (22 years old +)** |
| **EDUCATION LEVEL** | Flanders | Flanders | Wallonia | Brussels | Wallonia + Brussels |
| <= Primary school | **26>** | 15 | 16 | 17 | **7** |
| Lower secondary | 26 | 24 | 28 | 20 | 19 |
| Upper secondary | 28 | 33 | 29 | 23 | 20 |
| Higher education | 20 | 28 | 27 | 40 | 53 |

*Sources:* MVE° 2003: Heylen and Mortelmans (2006); FRB/KBS° 2006: Casman (2007); Census 2001: Desmarez (2006). *Note:* (*) on valid answers.

[95] This is due to the well-known relationship between health status and education level.

## C. The scope of the care situation

The definition of care varies from very specific to very broad care situations: the **time** reference varies from care provided "currently" (at the time of the interview) to care ever provided "over the ten last years"; the **relationship** between informal care providers and care-receivers is either restricted to nuclear family or extended to friends, neighbours, etc.; the concerned **activities** can be specific ADL or IADL or defined as 'care' activities in general, without more specification[96]; **needs** (care provided to a person who needs regular care for at least one month to the care/help provided "usually" even in the absence of a care need, etc.).

Once again, the choice depends on the survey objectives and the study population: general population surveys tend to prefer a broader definition, while topic-specific or population-specific surveys (health or effective informal care provider surveys) opt for a narrower or more detailed definition. If the care questions are included in an 'intergenerational solidarities' module, the presence of a real 'need' for care is not essential: the focus is on the relationship and the type of intergenerational exchanges. On the contrary, if the care questions are part of a 'health status module', the purpose is often to identify care resources and potential unmet needs. In this case, it is important to exclude the provided care that is not justified by health needs but rather by the usual household task division[97]. However, in surveys only including elderly living at home, the need condition should not be too restrictive to avoid working on a highly selected sample. Very dependent elderly living at home are likely to be selected on their social environment and financial means: to stay at home with severe dependency problems imply to have a strong informal care network and/or to be able to pay for intensive home care services. Furthermore, the differences in long-term care regional policies (like the development of home care targeted to dependent elderly in Flanders) could make the regional comparisons more difficult. Therefore, a definition of care without (strong) needs conditions should be preferred for the study of elderly home care and their regional differences.

As we have seen, the scope of the care definition will influence the proportion of 'declared care situations' in the study sample. The definition of the study population (specific age group, family situation, geographical area, etc.) will also have an effect. There are no two surveys (among the 13 selected) which are identical in terms of definition of care and study population. This explains why a simple question like 'What is the share of informal care providers in the population?' may lead to very different results: from 6% (among the 16+ who answer the questionnaire of the last PSBH wave, 2002) to 65% (among the Flemish aged 25-64, in the ZVE°, 2003). But, hopefully, the differences are narrowing when efforts are made to compare what is comparable.[98]

These differences do not prevent from assessing whether or not the strong tendencies identified in the systematic literature review (gender differences, age effect, etc.) were also observed in the Belgian studies. But these differences in survey design and operationalisation ask to be cautious with the interpretation of 'unexpected' results.

[96] The response will depends on the own 'care' definition of the respondent.
[97] Note that both concerns can be found in a same survey: for instance, in the SHARE, questions on care conditioned on the presence of a real need are asked in the 'physical health' module, while questions on care received by and provided to non-cohabitants, regardless of the presence of a real need, are asked in the 'social support' module.
[98] The SCV and MVE° are both restricted to the Flemish Region but the age group and the intensity of care differ. The overall difference in proportion of informal care-givers is 10% (65% in ZVE° against 55.3% in SCV). However, if the comparison is restricted to 'weekly care provided' by respondents aged 25-64, the figures are nearly the same: 19% in ZVE° against 20% in SCV.

## *SECTION 4. How those surveys contribute to answer the three main research questions?*

This section is divided into three points corresponding to the three main research questions: *Who is receiving family care? What are the characteristics of the provided family care? How does family care evolve over time?* Each point begins with a reminder of findings coming from the systematic literature review findings. Then, the published[99] Belgian[100] results based on the selected surveys are analysed to answer two questions: Are the Belgian results consistent with those of the systematic literature review? Are there regional differences in family care[101]?

## A. Preliminary remarks

For a better understanding of the results, one should bear in mind that in elderly care research, like in most of the social sciences research, (1) changing the unit of observation can lead to 'apparent' contradictory results and (2) many socio-demographic characteristics of the elderly potential care-receiver are strongly associated with gender.

These two aspects were mentioned in the interpretation of the systematic literature review results (chapter II). A further explanation is needed here because these aspects play a role in the interpretation of the observed regional differences and in the articulation between family care and home care services.

### *1. The unit of observation*

Table IV-4 shows the main 'apparent' contradictory results observed when changing the unit of observation. Note that specifications of the care situation (relationship, gender of the care-receiver) may also have a 'moderating' effect.

[99] The Belgian results of the GGPS are not published yet. As for the LFS, I did not find any publication related to the module on work and family articulation. Two surveys are, therefore, absent of this section.
[100] Only Belgian results are presented. Publications based on international surveys (EB, ECHP and SHARE) and presenting pooled or grouped countries results are not considered.
[101] The presence of regional differences in demographic, cultural and social policies aspects is highlighted in chapter III. It is therefore expected that those differences will also be visible in the family care pattern. Identifying those differences would be one of the key contributions of this Belgian surveys-based literature review.

**TABLE IV-4:** Effect of the unit of observation and moderating factors

<table>
<tr><td colspan="2">Are women more likely to be informal care provider? (+age effect)</td></tr>
<tr><td>Informal care provider (ICP)</td><td>Care-receiver (CR)</td></tr>
<tr><td>Yes, if the relationship with CR is not specified: women are more likely to provide care in general and especially for children and parents[102]. Most of the ICP will be aged 45-64[103]. Care provided to a non-cohabitant often refers to parental care.<br>No, if the focus is on spousal care: men are as likely as women to care for a disabled or sick spouse[104]. However, if the provided care is not ‘needs conditioned’, then will women be more likely to provide care because of the gendered task division. In this case, most of the ICP will be aged 65+.<br>Care provided to a cohabitant often refers to spousal care.</td><td>Not necessarily, if the CR is a woman because the first ‘preferred’ ICP would be the spouse. But, if the study sample is restricted to the oldest old, women are more likely to be widow and to receive care from their daughter (if they have any).<br>Yes, if the CR is a man because the first ‘preferred’ ICP would be the spouse. Even if the study sample is restricted to the oldest old, men are still likely to live in couple (because of the gender-gap in life expectancy) and, if even they become a widower, the ‘preferred’ CR, the daughter, is still a woman.</td></tr>
<tr><td colspan="2">Does the number of children of the CR increase the probably of children care?</td></tr>
<tr><td>Informal care provider (ICP)</td><td>Care-receiver (CR)</td></tr>
<tr><td>Apparently no: the number of siblings is negatively associated with the probability that a given child provides care. But, this does not contradict that…</td><td>…Yes, at the CR level, the number of children is positively associated with receiving care from, at least, one child.</td></tr>
<tr><td colspan="2">What is the effect of a larger definition of care (including all types of relationship)?</td></tr>
<tr><td>Informal care provider (ICP)</td><td>Care-receiver (CR)</td></tr>
<tr><td>Increases the gender gap: (see explanation above)<br>However, if only non-family care is considered, the gender gap may be smaller (strong friendship may be alike ‘partner’ relationship and overcome expected gendered roles.)</td><td>Decrease in care intensity, increase in task specialisation: non-family care-providers (friends, neighbours, professionals, etc.) tend to provide more specific and punctual care than the family).</td></tr>
</table>

The choice of the unit of observation depends on the research focus and on the information available in the used survey.

The Informal care provider’s point of view is present in the analyses based on the EB*,* the PSBH*,* the Census 2001*,* the ZVE°, the MVE°, the FRB/KBS°; The care-receiver’s point of view in the PSBH, the HIS, the SHARE, the CRIV°, the LOVO. The small number of surveys presenting the care-receiver point of view implies that some of the observations made in the systematic literature review (especially those related to the health status of the elderly or the possibility of sharing the care responsibility with another member of the nuclear family) could not always be validated for Belgium: this information being often missing when the unit of observation is the Informal care provider.

An example where the unit of observation may influence the regional differences is given by the study of Jacobs & Bartiaux (1995) where the intergenerational solidarities using wave 1 of the PBSH are analysed.

[102] EB 1992, 1999, 2002; PSBH 1994, 2002; HIS 2004; FRB/KBS° 2006.

[103] This is observed in the EB 1999, 2002; PSBH 1992; PSBH 1994, 2002: Nisen (2004); PSBH 1997: Bracke *et al.* (2008); PSBH 2002 : Declercq & Audenhove (2004); Census: Deboosere *et al.* (2006); LOVO: Vanderleyden &Vanden Boer (2006); MVE°: Jacobs & Lodewijckx (2006); FRB/KBS°: Casman (2007); SCV: Vanderleyden & Moons (2010).

[104] This may partly explain why no significant gender difference is found in the intensity of care provided (Census: Deboosere *et al.* (2006), Farfan-Portet *et al.* (2007); ZVE°: Heylen & Mortelmans (2006): by and large, men are less likely to care. But, men who care, usually care ‘intensively’ for a spouse.

They found regional differences in the 'care logic'. Children living in Flanders seem to be less likely to cohabit with their elderly parent or to care for an elderly parent living aside. The intensity of care is also lower in Flanders and the gender gap is larger than in Wallonia: daughters are more likely to care, especially if they are not married. The authors concluded to a higher 'family solidarity' in Wallonia and a more 'specialised' model of care in Flanders where informal care is mainly assumed by an un-married daughter (if any) and supplemented by professional care.

The proportions of informal care providers observed in the three regions in several surveys having the Informal care provider as unit of observation) tend to favour this interpretation:

**TABLE IV-5:** Proportion of informal care providers by region, the Census 2001 and several analyses of the PSBH (informal care providers' point of view)

| | REGION | | |
|---|---|---|---|
| **PROVIDED CARE** | **Flanders** | **Wallonia** | **Brussels** |
| PSBH 1994 (respondent having a parent aged 80+ | 26(1)<br>23(2)<br>17(3) | 40(1)<br>35(2)<br>26(3) | 39(1)<br>33(2)<br>29(3) |
| PSBH 1996 (16+) | 5 | 8 | 6 |
| PSBH 1997 (16+) | 6 | 8 | 6 |
| PSBH 1998 (16+) | 6 | 9 | 7 |
| PSBH 2001 (16+) | 6 | 8 | 5 |
| Census 2001(15+) | 9 | 10 | 10 |

*Sources:* PSBH 1994: Jacobs & Bartiaux (1995); PSBH 1996, 1997, 1998: Casman & Thomsin (2001); PSBH 2001: Vanderleyden & Moons (2010); Census 2001: Deboosere *et al.* (2006). *Notes:* (1) The care provided to a sick, disabled or elderly person (not necessarily the parent); (2) care provided to a cohabitant parent aged 80+; (3) care provided by the respondent to a non-cohabitant parent aged 80+.

Part of these results are congruent with the socio-political differences in home care policies described in chapter III: intergenerational cohabitation is more frequent in Wallonia and the development of an elderly care policy favouring community care may give more opportunities for the informal care provider to share the care responsibility with professionals. However, the idea that Walloon children should be more 'family oriented' seems to be in contradiction with the stronger catholic culture of Flanders.

Indeed, one may think that the Flemish elderly are more likely to adhere to catholic values (including family solidarity) and to have transferred these values to their children. If so, we could expect that the Flemish elderly would be more likely to receive care from his children. But, this implies that we take the elderly' point of view (potential care-receiver). Jacobs & Bartiaux choose the child's point of view (potential informal care provider). Their sample is made of respondents having an elderly parent aged 80+ in 1992. I will try to show how the decision to use the potential informal care provider as unit of observation may lead to results which are, apparently, contradictory to those expected in the dissertation research (where the potential care-receiver is the unit of observation).

First, Jacobs & Bartiaux consider the 'place of living' of the child (not of the elderly). It would have been more interesting to consider the place of living of the elderly parent because: (1) the available home care services and elderly care policy orientation (towards institutionalisation or towards community care) depend on the place of living of the care-receiver; (2) when the parents and children live in different regions, it is more likely that the child moves out and that the elderly

remains in the region where the adult child grew up. Therefore, to evaluate the effect of policy or cultural differences between regions, the elderly region of living should be preferred. The information on the place of living of the respondent parent was not available at wave 1. Nevertheless, using the region of the child may affect the results related to the care provided to a non-cohabitant parent.

Second, using the child as unit of observation provides a partial view of the informal care network. There is no information on other potential or effective informal care provider. From the systematic literature review (chapter II), we have learnt that a given child is less likely to provide (intensive) parental care if the other parent is still alive or if brothers and sisters may share the care responsibility. The deterrent effect is stronger for sons. But, we have also learnt that, the more children the elderly has the more likely he receives care from at least one child. Chapter III showed that the Flemish study cohorts (1900-1929) had a higher fertility than the Walloons. Therefore, if the Flemish elderly have more children, they should be more likely to receive care from at least one child. But, each child considered separately (and especially the sons) is less likely to provide care. This is because the child's risk to give (intensive) care depends on the presence of alternatives. But this does not mean that the Flemish elderly receive less often care from their children and that the 'family solidarity' is weaker in this region.

Finally, the gender effect observed in Flanders and not in Wallonia goes in this direction: stronger gendered role division reflects a more traditional and bourgeois culture. Also, if the Flemish elderly have more children, they are more likely to have a daughter (or, in other words, sons are more likely to delegate the care responsibility). In Wallonia, the sharing or delegating possibilities are smaller. Sons are more likely to care than in Flanders because either the gendered roles division is weaker or it is less often possible to rely on a sister for assuming the care.

### *2. Socio-demographic characteristics and gender of the care-receiver*

The dissertation research on elderly care concerns the care provided to the cohorts born before 1930. The context of these cohorts (life events, demographic behaviour, etc. was depicted in chapter III. Important characteristics to remember here are:

1. Women have a higher life expectancy and they are therefore expected to be over-represented in older age groups. If the sample is not stratified by **age**, the health status of women will probably be worse compared to men. There is an age effect: women are older on average and thus more likely to have age related **health problems**. The age effect can even be stronger it the 'subjective health status' is used as indicator: studies, like that of Spiers *et al.* (2003), have shown that women are more likely to declare themselves as having a 'bad health' than men do.
2. Women tend to marry older men (the average age at first marriage is higher for men), thus they are more likely to experience a longer period of **widowhood** and have children as first informal care providers. They are also more likely to use home care services or to go in institution when their informal care providers are no longer able to assume the (entire) care responsibility. *On the contrary*, men are more likely to live in couple until the end of their life[105] and to have their spouse as first informal care provider.
3. Women of these birth cohorts are less educated than men and, most of them (the women) were not active in the labour force. When entering widowhood, they are more likely to experience **financial difficulties** and to be entitled to means-tested care policies.
4. Finally, the traditional gendered division of tasks is still very strong in these cohorts. Women are still in charge of most of the housework (except for heavy tasks, gardening and odd jobs) and

[105] It is also well known that widowed men are more likely to remarry than widowed women do (De jong Gierveld & Dykstra 2002)).

responsible for the health care. They tend to provide 'care' for their husband even if there are no specific 'health needs'. In case of increasing needs, they will try to assume alone the care responsibility as long as possible because they consider it as 'natural'. *On the opposite*, men start caring only when it is needed. As it evolves in assuming 'new' tasks, they are more likely to declare providing intensive care (because of the large difference compared to the previous situation). They are also more likely to be assisted (by children or home care services) especially for activities which are 'women-related'. Therefore, women are more likely to receive **children care** and **home care services** even if they live in couple.

To sum up: being poor, old, in worse health status, spouseless and to receive care from children and home care services are more frequently observed for women. *Hopefully,* the societal and demographic changes (higher women labour participation rate, lower gendered task division, changing union forms and timing, etc.) should reduce this gendered inequality in old age for the next cohorts of elderly (the baby-boomers). This will be further discussed in the dissertation conclusion.

## B. Who is receiving family care?

According to the systematic literature review, the nuclear family is ready to provide care if the elderly relative needs it. The Belgian results are in line with this 'family solidarity' hypothesis (1) but also shows evidence that the nuclear family is the first informal care provider (2). This primacy of the nuclear family is even stronger in Flanders (3). Finally, the Belgian surveys which did not put a 'need condition' on the declaration of received care show that the cohabitant (mainly spousal care) often provides care even in the absence of a specific care need (4).

1. **If needed, the nuclear family cares.** In their study of wave 8 of the PSBH, Casman & Thomsin (2001) show that the proportion of upward care (from adult children to parents) increases with the age of the parent(s), while the proportion of reciprocal and downward care decreases: **received care increases with age**. If most of the elderly have only one informal care provider (as shown in the LOVO for Flanders and in the CRIV° for Brussels), intensive registered informal care providers usually (82%) share the care responsibility (MVE°): **if needs are important, more informal care providers are mobilised.**
2. **The nuclear family is the first source of care.** Studies based on the PSBH shows that, whatever the point of view, the nuclear family is the main provider of elderly care. Bracke *et al.* (2008) analysed the 'perceived' support in wave 6 of the PSBH (*care-receiver point of view*): they show that relatives are more often 'perceived' as potential informal care providers than non-relatives. Also, respondents having a son or a daughter are less likely to declare non-relatives as potential informal care providers. *From an informal care provider point of view*, Casman & Mortelmans (2005) work on wave 11 and show that 82.4% of the respondents providing care, give care to a relative (among those, nearly half (45.0%) care for a parent and 16.7% for a spouse). Declercq & Audenhove (2004) found similar results for wave 10.
3. **The primacy of the nuclear family as informal care provider is stronger in Flanders.** Results of the MVE° (Flanders only) show that the care provided to a family member occurs more often and is more intensive than the care provided to non-family members. Results from the FRB/KBS° (Wallonia-Brussels) and from the CRIV° (Brussels only) show that most of the informal care providers care for family member(s). However, the proportion of respondents receiving care from non-family members is relatively high in the last survey (16.6%). This regional difference is also found in the PSBH 1992 (national sample) and is even more visible through the results of the Census 2001 (table IV-6)

**TABLE IV-6:** Informal care providers by type of care-receiver by region, Belgium (Census 2001)

| | RELATIONSHIP WITH THE CARE-RECEIVER | | | | |
|---|---|---|---|---|---|
| **REGION** | **Cohabitant** | **Non-cohabitant family member** | **Neighbour** | **Friend** | **n = total of informal care providers** |
| **Flanders** | 41.6 | 49.4 | 4.2 | 9.3 | 376,683 |
| **Wallonia** | 35.6 | 48.5 | 9.1 | 16.5 | 245,902 |
| **Brussels** | 31.9 | 45.8 | 10.6 | 23.5 | 61,084 |
| **Belgium** | 38.6 | 48.8 | 6.5 | 13.2 | |

*Source:* Deboosere *et al.* (2006). *Note:* the total of % is higher than 100 because multiple answers are possible.

The Flemish are more likely to provide care to cohabitants or other family members (=more family oriented) than Walloons and inhabitants of Brussels. But the Flemish are less likely to provide care to friends or neighbours. Inhabitants of Brussels are more likely to provide care to friends and neighbours than inhabitants of other regions (as there are more isolated and family-less people, the non-relatives network are more important). Walloons are middle positioned for all kinds of care-receivers; this fits their 'universal solidarity' culture. In total, they are more likely to provide care. This is consistent with the regional differences in care intensity (table IV-7): higher in Flanders (mainly family care) and lower in Brussels (often non-family care).

**TABLE IV-7:** Intensity of the provided informal care by region, Belgium (Census 2001)

| | FREQUENCY OF PROVIDED CARE | | | | | |
|---|---|---|---|---|---|---|
| **REGION** | **not daily** | **<30 minutes a day** | **30 min-2 hours a day** | **2 to 4 hours a day** | **>4 hours a day** | **n total of informal care providers** |
| **Flanders** | 47.2 | 11.3 | 18.8 | 7.6 | 15.0 | 379,048 |
| **Wallonia** | 54.4 | 13.6 | 15.7 | 5.4 | 10.9 | 245,415 |
| **Brussels** | 60.7 | 10.4 | 12.7 | 5.4 | 10.7 | 59,906 |

*Source*: Deboosere *et al.* (2006)

This is also in line with the gender difference in care observed in the three regions (table IV-8): the gender gap is smaller in Brussels (non-family care is less 'gender-specific').

**TABLE IV-8:** Respondents aged 16+ providing informal care by gender and region, Belgium (PSBH 1996-1998)

| | REGION | | | | | |
|---|---|---|---|---|---|---|
| | **Flanders** | | **Wallonia** | | **Brussels** | |
| **WAVE** | Men | Women | Men | Women | Men | Women |
| **Wave 5 (1996)** | 3.1 | 6.8 | 4.5 | 9.9 | 5.6 | 6.3 |
| **Wave 6 (1997)** | 3.8 | 7.1 | 5.0 | 10.5 | 4.9 | 6.6 |
| **Wave 7 (1998)** | 4.6 | 6.9 | 6.0 | 12.0 | 6.4 | 6.9 |

*Source:* Casman & Thomsin (2001).

In the HIS 2004: Respondents aged 65+, living in the community and having limitations in their daily activities are asked whether they receive care and, if so, who cares for them? Findings show

that the Flemish are more likely to receive care from non-cohabitant only[106] (35.9% of the respondents): this may be explained by a higher fertility for these births cohorts and thus a larger probability to receive care from non-cohabitant children. Walloons and Brussels inhabitants are slightly more likely to rely only on care from cohabitants (respectively 38.4% and 31.6% against 29.2% for Flanders).

4. **Cohabitants (especially women) are likely to provide care even if there are no care needs.** The LOVO asks the respondent about who is usually in charge of each of the ADL and the IADL (himself or somebody else). The results show that most of the 55+ are doing the ADL on their own (about 95%). For the IADL, the **gendered** task division is observed (**women** are more likely than men to prepare the meal, doing light housework, washing up, ironing alone and to prepare medicine alone; men are more likely to put the garbage outside and do the gardening). The proportion of elderly doing the ADL and the IADL alone is higher for the elderly **living alone** compared to couples and decreases with **age,** especially for women and especially for heavy housework and the ADL. Thirty-three percent of women do not receive any care (against 10% of the men). The most frequent situation for men is receiving spousal care only (62% of the men in the sample). But, overall, 67% of the 55+ receive care for at least one of the activities.

## C. What are the characteristics of family care?

### *1. The spouse as first and preferred informal care provider, children arrive in second place*

The results of the systematic literature review highlight the primacy of spousal care: the spouse is the first person to be called upon to care, it is also the one who provides the most intensive care, the most stable element (less likely to stop caring) and the most likely to care alone. However, if the care' load becomes too heavy or if the health status of the spouse declines, the children, especially daughters, are the first to be called to supplement the spousal care. In most cases, the spouse remain the main informal care provider (in charge of the ADL), children will (partly) assume the IADL. These observations are consistent with the **hierarchical compensation** mechanism (spouse first, daughter, son etc.) and the **supplementation** mechanism (when the care needs increase, the informal care provider may try to **share** the care responsibility. Evidence of the primacy of spouse caring is also found in Belgian surveys: the spouse provides more intensive care (1), is more likely to care alone (2), and, interestingly, there are no significant gender differences (3)[107].

1. **Spouses provide more intensive care:** according to the findings of the MVE° (Flanders), 70% of the spousal care-givers care for more than 38 hours a week and nearly half of them cares more than 12 hours a day. Their figures are respectively 65% and 30% for those who care for a parent. The results of the FRB/KBS° survey go in the same direction**:** there is a positive association between the age of the informal care provider and the intensity of the provided care. This relationship is also found in the Census 2001: the proportion of informal care providers spend more than 4 hours in caring per day is the highest in the age groups 65-74 and 75+ (respectively 20.08% and 26.56%).

[106] It includes formal services. Note that in the report (Demarest *et al.* 2006b), the modalities are labelled 'informal care', 'formal care', 'both', 'none'. But, when looking at the variable construction (IL_9) in the user's guide report (Demarest *et al.* 2006c), it turns out that 'informal' includes only care provided to a cohabitant, while care from non-cohabitant informal care-giver is included in 'formal'. The labels of the variables in the dataset are consistent with the user-guide definition. Furthermore, the results are more 'understandable' and consistent with other findings if the user's-guide definition is chosen. I rely therefore on this definition when interpreting the report results.

[107] Unfortunately, the presence or not of additional care provided by children could not be observed: most of the surveys including questions on the care provided ask for the relationship with the care-receiver and the intensity of care but not for the living arrangement of the care-receiver nor for the presence of other care-givers. It is therefore not possible to see if children provide less intensive care to a parent living in couple than to a parent living alone.

2. **Spouses are more likely to be the sole informal care provider:** the MVE°, which only includes intensive informal care providers, shows that most of those who care for a cohabitant share the care responsibility with others (especially if the care-receiver is a parent or for a child[108]). Spouses are the most likely (30%) to assume the care responsibility alone[109].
3. **There is no gender difference in the probability of providing spousal care:** all the results are unanimous (PSBH 1997, Census 2001, LOVO, ZVE°, SCV), if the analyses are restricted to informal care providers aged 65+ and/or providing care to a cohabitant, the gender difference becomes insignificant. This age group and the cohabitation status refer mainly to spousal care. The two tables below, based on the Census 2001 (table IV-9) and the LOVO (table IV-10) illustrate this phenomenon: the gender difference is higher in younger age groups (at this period of life, the care-receiver is usually a child or a parent and women are likely to provide this type of care). The gender difference decreases in older age groups (corresponding to the life period when care is more often provided to a spouse). Interestingly, a small gender difference is observed but in the opposite direction (older men seem to be more likely to be an informal care provider than older women). Similar results were observed in the UK Census 2001 by Del Bono et al. (2009). This may be explained by the gender difference in life expectancy and the age difference between spouses: women are more likely to be a widow, and to become a widow at an earlier age than men. Old women are therefore less likely to have a spouse to care for, while old men are more likely to still live in couple even at a very old age. They have therefore more opportunities to provide (spousal) care at old ages. Another possible explanation is that women under-declare spousal care: they are more likely to consider that the provided care is part of the tasks division.

**TABLE IV-9:** Informal care providers by age group and gender, Belgium (Census 2001)

| | GENDER | | | | |
|---|---|---|---|---|---|
| | Men | | Women | | Women-Men |
| AGE GROUP | % | N total | % | N total | Diff of % |
| **15-24** | 3.7 | 867,126 | 4.7 | 848,977 | 1.0 |
| **25-44** | 5.6 | 1,078,164 | 8.7 | 1,056,944 | 3.0 |
| **45-64** | 10.3 | 1,118,748 | 16.4 | 1,110,099 | 6.0 |
| **65-74** | 10.6 | 375,103 | 11.9 | 435,695 | 1.3 |
| **75+** | 10.6 | 220,305 | 6.8 | 382,871 | -3.8 |

*Source:* Deboosere *et al.* (2006)

**TABLE IV-10:** Informal care providers by age groups and gender, Flanders (LOVO 2001/02)

| | GENDER | | | | |
|---|---|---|---|---|---|
| | Men | | Women | | Women-Men |
| AGE GROUP | % | N total | % | N total | Diff of % |
| **55-64** | 29 | 471 | 43 | 485 | 14 |
| **65-74** | 27 | 401 | 23 | 467 | -4 |
| **75-90** | 19 | 218 | 14 | 333 | -5 |

*Source:* Vanderleyden (2006)

[108] The respondents of MVE° can be care-giving for a spouse, parent, child or any other relatives or non-relatives.

[109] Among the remaining 70%, 60% receive professional support, 30% are helped by other informal care-givers and less than a tenth is supported by volunteers. The larger proportion of formal care services compared to informal care-giver seems to contradict the hierarchical compensation model. But this can also be explained by a lack of control for the presence of a spouse and/or children. The proportion of 'informal care-givers' would be probably higher if included in the sub-sample of those having a spouse and/or children.

### *2. Children, especially sons, are more likely to care for IADL*

The presence of a **gender difference** in children care was highlighted in the systematic literature review: daughters tend to provide more intensive care (including more often the ADL) and are less influenced by the care decision of the other (potential) informal care providers. They are likely to provide care even if the spouse or siblings are available to care. On the contrary, sons are less likely to provide care if other members of the nuclear family are available. Whenever sons have to provide care, they will try to limit their implication to IADL care only. This is consistent with the **hierarchical compensation** mechanism. Evidence of gender differences are also found in the Belgian data: daughters are more likely to provide parental care (1), are more likely to assume care for the ADL and the gendered IADL (such as cleaning, ironing etc.)(2), to provide more intensive care (3).

1. **Daughters are more likely to care for a parent.** To observe the gender difference in surveys based on (potential) informal care providers sample, one should compare the proportion of men and women aged 45-64 providing care to a non-cohabitant (because most of the parental care situations occur in this context). This children care gender difference is visible in the Census 2001 which shows that gender difference in informal care provider is stronger for respondents aged 45-64 and living in couple with children, where 17.56% of women are informal care providers against 9.93 of men[110]. The study of wave 1 of the PSBH by Jacobs & Bartiaux (1995) shows that a quarter of women having a parent aged 80+ declares parental care against a tenth of the men. The findings of the MVE° go in the same direction: if we consider informal care providers delivering inside or outside care (but not both), three quarters of the women informal care providers care for a non-cohabitant against 52% of the men informal care providers.
2. **Daughters are more likely to assume care for the ADL or the gendered IADL than sons:** The analyses of wave 3 of the PSBH on the care provided to parents highlight the gender gap: daughters informal care provider are four times more likely to do the washing-up and the other housework and twice as likely to prepare the meals and to provide ADL care. The absence of a gender gap for medicine preparation can be explained by the fact that it is a less time constraining activity (it can be done in advance, once for the whole week)[111]. Jacobs & Bartiaux (1995) found similar results for the care provided to a parent aged 80+ at wave 1 of the PSBH. Evidence of this gender gap is also found in Flemish surveys: in the ZVE°, it appears that, when controlling for the intensity, women informal care providers aged 25-64 assume care for a broader range of activities and that the ADL are more often included in their 'care package'. According to the LOVO, daughters assist more often most of the domestic tasks and personal care, while sons more often help with gardening. However, there is no clear gender difference concerning help with administrative tasks (e.g. to fill in forms, to manage money).
3. **Daughters provide more intensive care:** the SCV results show that, women are more likely to provide daily or weekly care (21.2% against 14.7%) in Flanders and men more likely to provide non-intensive care (38.2% for men against 32.4% for women). The FRB/KBS° found similar results for Brussels and Wallonia: Men informal care providers are less likely to assume the totality of IADL care (housework) (33.0% against 46.1% of women informal care providers). Women are more likely to be the main informal care provider (67.3% against 51.3% of the men informal care providers).

[110] The gender difference is also apparent in case of intergenerational cohabitation (respondent living with a sole parent): 35.59% of women aged 45-64 in this case provide care against 26.31 for the men). The figures are available in Deboosere *et al.* (2006: 96).

[111] For the IADL: 53.7% of the daughters care-givers (sons: 11.71%) do the washing-up, 44.83% (sons: 18.18%) do the housework, 43.1% (sons: 21.21%) prepare meals, (no big difference for medicine preparation 34.91 against 30.36%. For the ADL: 40% of daughters provide care (21.52%). No big difference for 'eating help' (33.13% against 31.84%).(Casman 2005)

### *3. Children having competing roles care less often and less intensively*

Unlike the spouse informal care provider, who usually lives with the care-receiver and does not have competing roles to manage (such as care for dependent children, work, etc.), the children informal care providers often have to articulate their elderly care responsibility with multiple competing roles. The systematic literature review highlights the fact that competing roles (being employed, in couple, having dependent children, etc.) do not influence much the care decision (to care or not), but the care intensity. The level of education of the adult child (used as a proxy of its social status[112]) is found to be negatively associated to the intensity of provided care. The results of the analyses carried out on the Belgian surveys are globally consistent with the results of the systematic literature review but also show gender difference in the effect of employment on care: being employed has no impact on the daughter care decision but has a negative effect on the care decision of sons (1) and on the care intensity (for both genders) (2). Similarly, the level of education does not affect the probably of caring (3) but affect negatively the intensity of provided care (4). Unfortunately, the publications based on the Belgian surveys only allow presenting results on the effect of employment status and education level (not on being in couple[113], having children, etc.).

1. **Being employed does not deter children (especially daughters) from parental care.** Jacobs & Bartiaux (1995) found that the employment has a negative effect on the care provided to parents only for respondents working more than 40 hours a week. The SCV shows that active respondents were even more likely to provide care: part-time workers are the most likely to care (68.6%), just after come the full-time workers (65.2%)[114]. Those who do not work (whatever the reason for inactivity) are less likely to provide care. Finally, the Census 2001 found no impact on care involvement for women, but active men were less likely to care than inactive men.
2. **Employed children provide less intensive care.** As it is not possible to assume care and work at the same time, full-time work is hardly compatible with intensive care: The SCV showed that full-time workers are less likely to provide intensive care (12.8% against 28.1% of the part-time workers and for housewife and 20.4% of the retired). But they are as likely to provide non-intensive care (42.4%) than part-time workers (40.5%). But the negative relationship is not restricted to full-time workers: according to the ZVE°, inactive women provide more intensive care than part-time and full-time working women. Finally, the Census 2001 shows that employed informal care providers are less likely to provide 2hours of care (or more) each day (11.37%

[112] Higher educated children are more likely to have higher income and to have a job involving many responsibilities. The opportunity cost of parental care is higher for them than it is for lower educated children. Their higher income allows them to buy 'high quality' home care services for they parents. In this case, the 'financial transfer' substitutes the 'time transfer'. However, in most cases, high educated children are also involved (but less intensively) in parental care (e.g. as care coordinator, for administrative tasks, etc.). It seems also that high educated children provide more often an 'affective' support to their parents (Heyden & Mortelmans 2006). But this kind of support is out of the scope of this dissertation.

[113] Most of the surveys only give the distribution of the whole sample of care-givers (whatever the relationship with the care-receiver) according to marital status or living arrangement. The heterogeneity of the sample does not allow any conclusion concerning the relationship between being in couple or having family responsibilities and parental care. The only study which goes further (Jacobs & Bartiaux 1995), focused on children of elderly aged 80+: the authors found that unmarried children were more likely to provide care. However, most of the children were married (especially in Flanders). Therefore, the married represent a larger proportion than the unmarried among the effective care-givers. This is a 'structure' effect. The effect of 'living with a child' did not significantly influence the probability of the respondent to care for the parent. But, the age of the 'child' was not specified (most of the respondents are aged 45-64 and are more likely to cohabit with an adult child than having young and dependent children). A more restricted definition of 'dependent children' should have been used to tackle the potential effect of the family care responsibilities on parental care.

[114] The relationship between work and care is complex (Pavalko & Artis 1997; Dentinger & Clarkberg 2002; Masuy 2009): it can be negative (because of time allocation constraints or individual selectivity: some people are more 'work' oriented and other 'family' oriented) or positive (because the care-giver needs to work for financial -to be able to pay for health care- and/or psychological reasons – his work allowing to have a 'break' in his caring responsibilities).

compared to 20.11% of the informal care providers looking for a job, 26.41% of the inactive informal care providers).

3. **The level of education of the adult child does not influence his care decision.** Jacobs & Bartiaux (1995) did not find significant relationship between the level of education of the respondent and the probability to care for a non-cohabitant parent aged 80+ at wave 1 of the PSBH. In the Census 2001, no linear relationship is found between education level and the probability to provide care except for women aged 45+ years old. In this group, the higher educated are more likely to provide care[115].
4. **Children having a higher social status tend to provide less intensive care.** The Census 2001 shows that the proportion of respondents providing daily care decreases with the education level. The difference is the largest for very intensive care (more than 4 hours a day): only 6.64% of informal care providers having a university degree provide such intensive care against 22.71% of those having a primary school diploma or no diploma at all. The SCV findings show that higher educated are slightly less likely to provide intensive care but more likely to provide non-intensive care (45.8% against 37.5 for middle educated and 23.2% for the lower educated). The negative relationship between the education level and the care intensity (measured in number of hours) is also visible in the FRB/KBS°. This survey includes information on the financial situation of the respondent (ability to make ends meet). This can be considered as a proxy of social status (just as education). And, as expected, informal care providers having difficulties to make the two ends meet (low social status) are more likely to assume totally the ADL care. The effect of education is unclear in the MVE°: descriptive analyses lead to conclude that the higher educated provide more intensive care. This result is quite unexpected and is probably due to a selection effect: first, the sample only includes intensive informal care provider thus the care intensity variation is lower than in surveys based on the general population (like the Census 2001, the ZVE° and the SCV). Second, the higher educated are under-represented in the MVE° (see table IV-3) and might be more selected. Descriptive analyses of the informal care providers characteristics of the MVE° suggests that these 'higher educated' intensive informal care providers are mainly older men caring for a spouse. Therefore, the positive relationship observed between education and care intensity in the MVE° does not contradict the negative relationship observed in the other surveys concerning the care provided by children.

### *4. Articulation between family care and home care services*

The various theories on formal-informal care (e.g. hierarchical compensation, substitution, etc.) were presented at the end of chapter II. This theoretical section complements the systematic 'empirical' literature review on family care aspects and its evolution. It was decided not to include the use of care services in the systematic review because the articulation formal-informal is too country-specific.

This articulation is very much influenced by the elderly care policies applied in the country (or the region): is the **institutionalisation** frequent? Or reserved to specific population (highly dependent, poor, rich – multiple choices possible). What are the characteristics of the community formal care: quality, geographical availability, well known of the population, means or needs tested). In chapter III, regional differences in elderly care policies were highlighted: institutionalisation more frequent in Wallonia and Brussels and community formal care more developed in Flanders (especially as a complement of informal care). The four main articulation theories are used to structure the Belgian results. In chapter II, these theories were presented as various mechanisms which may be more or

[115] This may be explained by the lower opportunity cost of care: compared to younger and higher educated women, they do not longer have to build their career. Compared to lower educated women of 45+, they can more easily arrange their working time. They are more likely to have a high educated and well paid spouse. Therefore, if they decide to work fewer hours to save time for caring, the relative income loss would be less important than for lower educated women.

less able to explain the articulation between family care and home care services in a given context. Here, the purpose is to see if three[116] of these mechanisms – substitution (1), compensation (2), tasks specific (3) - are observed in the Belgian contexts. Questions on home care services used by the care-receiver are usually absent from the surveys based on (potential) informal care providers (e.g. the MVE°, the FRB/KBS°, the SCV°, the Census 2001).

1. **The substitution mechanism.** The theoretical model of substitution was proposed in the early 80s to explain substitution 'over time': formal care services replacing pre-existing informal care. At this moment, the formal care services were not much developed and the cohorts of elderly care-receivers were probably more 'traditional'/'family oriented'. With the development of services and the increase of individualist values, there is an increasing (but still minor) proportion of elderly who want to avoid or delay family care by using home care services first. In this case, the hierarchical compensation order is changed (professionals becoming the preferred care providers, before the spouse).

   A comparison between the LOVO (2001/02) and two previous surveys carried out in 1974 and in 1985 highlights this **cohort** effect: the proportion of autonomous elderly is higher in 2001 than in 1985, spousal care does not change, care provided by children decreases, the involvement of informal care providers stays marginal, home care services use increases both for the ADL and the IADL. These trends were already observed between 1974 and 1985. Questions asked about care preferences in the LOVO show that the 55+ prefer to receive home care services in case of long-term needs or the ADL short-term needs. Informal care is only preferred for the short-term IADL care. This highlights the willingness to not depend on the family among younger cohorts of elderly. This is also visible in the PSBH: at wave 10, a module related to ageing representations is added to the main questionnaire. There is a list of elderly care settings. Respondents have to select two care settings which they consider to be the best solutions if they would have to receive care. Neither 'Informal care only' nor 'intergenerational cohabitation' is in the top 3: the respondents prefer 'staying at home with a mix of formal and informal care (34.6% first choice, 16.5% second choice), 'staying at home with formal care only' (respectively 32.7% and 16.6%), or 'going to an institution' (respectively 15.8% and 37.7%).

2. **The supplementation mechanism.** In most cases, the elderly have only one informal care provider (LOVO, CRIV°). However, in case of intense care needs, the number and the sources of care tend to increase. In the MVE° sample (restricted to intensive informal care providers), only 18% assume the care responsibility alone. But the most frequent situation is to combine informal and formal care services (73%). The question about care preference asked in the LOVO shows that the combination of formal and informal care is the preferred solution in case of the long-term IADL care (49%) and long-term ADL care (37%). For the short-term ADL care, 'spousal care only' is preferred (55%); for the short-term IADL, 'spousal care only' or 'combination of spousal care and formal care' reach similar scores, respectively 42% and 43%.

3. **Task specific mechanism.** In line with this theory, the LOVO shows that ADL care is more likely assumed by home care services (varying from 44 to 57%, increasing with age of the care-receiver), the spouse is also often mentioned as ADL informal care provider but especially by men. The analyses of ADL care in the LOVO are restricted to 'feet care'. This activity is not included in the standard list but can be considered as an ADL as it concerns body care. Like nursing care, feet care is quite technical and is usually done by a professional. The other ADL could not be analysed because the number of respondents aged 55+ receiving care was too small. In the CRIV° sample (75+), the number of respondents receiving ADL care is larger and

[116] The specificity of the 'hierarchical compensation' mechanism is to explain the preference or timing order between informal care-givers. For the dissertation, this mechanism is mainly used to explain the hierarchical order within the nuclear family: when does the spouse, the daughter, the son start to care? In this restricted use, evidence of the hierarchical compensation mechanism does not refer to the home care service and family care articulation (treated in this point) but rather refers to the evolution of informal care (treated in the next point).

allows more detailed analyses. The findings show that informal care is more often used for dressing and eating, getting up and down, eating but professional care is more often used for the personal washing.

For the IADL, the LOVO shows that family care is the most frequent source of care: the spouse arrives in the first place for all the activities but the proportion of declared spousal care decreases with age (the spouse becomes less/no longer available). The children (daughter, daughter-in-law and, to a lesser extent, sons) arrive in second position or in the first position when the parent lives alone. Similar results are found in the CRIV°, informal care and especially nuclear family is the first to be called but also to be concerned by a variety of tasks: the nuclear family represents 72.5% of the care providers for meals preparation, 84.4% for shopping, 88.3% for money management, 88.9% for administration). Professionals are mainly involved in heavy housework (43.9%) and reparations works (48.2%).

Interestingly, the type of home care services used is influenced by the education level of the elderly (potential care-receiver). According to the HIS 2004 (65+) higher educated are less likely to use home care services (3.6% of the respondents having a higher education diploma use them against 14.1% of those having only a primary school diploma or less) and to use nurse at home services (respectively 12.4% and 29.9%). Similar trends are observed with the household income level. This socio-economic effect is also observed for nurse at home services and the CPAS/OCMW in the HIS 2008.

The analyses do not control for the health status. This lower level of use can be simply explained by the fact that higher educated tend to be in better health and autonomous longer. This does not mean that, in case of needs, higher educated will be less likely to use professional services. It is maybe only a question of timing. Differential uses of home care services are also visible in the CRIV°*:* respondents having a higher income are more likely to use a housemaid (33.2% against 17.4% of the lower incomes). On the opposite, family assistants are less frequent among the high socio-economic statuses. Both professionals offer the same services (housework), the difference is that housemaids are usually private and can be hired independently of real needs, family assistants belong to a public service, and their access is needs-tested.

## *5. Regional differences in family care characteristics*

There are no apparent regional differences in family care: the preference for the spouse, then daughters and finally sons, the fact that children more often care for the IADL, the higher involvement of daughters and the negative effect of competing roles are observed in the three regions. However, clear regional differences are observed in the articulation of family care and home care services, reflecting differences in elderly care policies. In Flanders, the home care services are better developed and aim at delaying institutionalisation of the elderly. For this reason, public home care services target very old or dependent elderly who need long-term care, while less dependent or younger elderly should turn to private services or only rely on family care. In Wallonia, the home care services are less developed and less targeted (the mean age of users is lower than in Flanders). They are mainly used for a middle-term period (around one month) and for a temporary health problem (e.g. post-hospitalisation care). In Brussels, the home care services are generally used for a short-term period (less than one month) and the beneficiaries are younger than in the two other regions (Pacolet *et al.* 2005a). These trends coming from the HIS 2001 suggest that home care services can really serve as a substitute or a long-term supplement for informal care in Flanders only. In the two other regions, dependent elderly in need of long-term care should mainly rely on informal care and, if this is not possible or sufficient, the institutionalisation seems to be the sole 'long-term' solution.

**The regional differences are likely to influence the structure of the elderly sample in community-based surveys**: the elderly still living in the community in Wallonia and in Brussels are likely to be selected (in better health and/or less socially isolated than the general population of elderly living in the region). Therefore, it is expected that the proportion of very old, severely disabled or isolated

elderly would be higher in Flanders. This structure effect would be kept in mind when interpreting the results of such surveys.

The 'targeted' aspect of the Flemish policies are visible in the HIS 2004: if the age effect (the 75+ are more likely to need home care services than the 65-74) is observed in the three regions, it is stronger in Flanders. Furthermore, the Flemish aged 75+ are more likely to use home services: 18.2% against 12.5% for Wallonia and 12.9% Brussels. On the opposite, the proportion of users among the 65-74 is slightly higher for Wallonia and Brussels. Nurse at home services are more often used by Walloons (for all the 65+). This might be explained by the fact that the question on nurse at home services are also answered by institutionalised elderly. In the HIS 2008, Brussels inhabitants are less likely to use nurse at home services (10%) against 17% in Flanders and 15% in Wallonia while the Flemish are more likely to use home care service in general (30%) against 13% in Brussels and 24% in Wallonia. In the SHARE 2004, respondents aged 65+ are more likely to receive informal ADL care from cohabitants or non-cohabitants in Wallonia (respectively 17.4% and 17.6%) than in Flanders (12.7% and 10.8%). This may be explained by a better development of ADL long-term professional care in Flanders (remember that elderly tend to prefer professional care for the ADL). In the same survey, the use of a nurse at home services, a housemaid and meals-on-wheels is also studied. The proportion of home care services does not vary very much between the two regions but the proportion of users of nurse at home services is higher in Wallonia (15.5% against 12.7% for Flanders) while the intensity (number of hours) is higher in Flanders .This correspond to a 'middle term' use (linked to temporary health problems) in Wallonia and a 'long-term' and targeted use in Flanders. Finally, the use of professional services for the housework is slightly more frequent in Flanders than in Wallonia (17.9% against 15.6%). However, interpretation is difficult to make because the definition is very broad and can include 'needs-related' public services such as family or cleaning helpers as well as private housemaids.

## D. How do the characteristics of provided family care evolve over time?

Although some of the selected Belgian surveys allow longitudinal analyses (PSBH, ECHP, SHARE), only cross-sectional, transitional (comparison between two waves) or longitudinal analyses on pooled countries have been published. There are no longitudinal results on care evolution in Belgium. However, some piece of information at the national level can be gathered from the cross-sectional surveys which include questions on the care duration or the long-term care preferences. The relationship between age and specific care aspects can also give some insights on the evolution of family care over the lifetime. However, these three sources of information are not biased-free:

1. **Questions on preferences** asked in the LOVO do not account for the real situation (childless elderly may declare that they would prefer receiving care from a daughter). However, the preferences are not completely independent of the reality: if the respondent had a bad relationship with his son or if the respondent is very old and has most of his friends and acquaintances living in institution, this would probably influence his preferences. In any case, the answers to preferences questions cannot be interpreted as an effective care situation.
2. **Questions on care duration** are retrospectively asked to effective informal care providers ("When did you start caring for X"?). Like any retrospective question, there is a survival bias (short-term informal care providers or informal care providers who have stopped caring before the survey are not included), and a memory bias (the starting of informal care, especially family care, is often unclear and the 'declared duration' will depend on how the informal care provider has reconstructed the care history at the time of the interview).
3. **Relationship between age and care aspects** is also an imperfect indicator of 'over time' evolution for two reasons: first, the age effect in cross-sectional surveys cannot be distinguished from the cohort effect. Second, the survey only includes elderly still alive and living in the community. Any observation made on the very old should be interpreted with caution. Because

the elderly still living in the community at a very old age are likely to be selected and not representative of their birth cohort.

Keeping these limitations in mind, the next results can be presented. Note that only a part of the points developed in the systematic literature review regarding to the care evolution (chapter II) are treated below. This is due to the absence of longitudinal Belgian results, but also to the fact that most of the published results concern the provided care and do not provide information on the sharing of the care responsibility between the nuclear family members.

- **The spouse is the most stable element**. The MVE° shows that 28% of spouse care-givers care for more than 10 years and 24% provide care for 6 to 10 years. Shorter care durations are observed for parental care: 59% provide care for less than 5 years.
- **Children are more likely to care for a spouseless parent.** According the study of Bracke *et al.* (2008) on wave 6 of the PSBH*,* women are more likely to perceive their children as potential informal care providers while men are more likely to perceive their spouse as first care provider (remember that older women are more often spouseless than older men). The study of Nisen (2004) on waves 3 and 11, shows that children are more likely to provide care to a parent who lives not in couple.
- **Children are more likely to share the care responsibility.** The MVE° shows that those providing care to parent are more likely seconded: 36% share the care responsibility with other informal care-givers, 32% use professional care services and 12% use volunteering services. Sharing care reduces the individual care load: for the same level of need of the care-receiver. Two main care configurations are observed: either a sole intensive informal care provider or multiple non-intensive informal care providers. This shows that the multiplication of care-givers is not only influenced by the level of care needed but also by the care intensity that each individual informal care provider is able and willing to deliver. The intensity threshold for the children is usually lower than it is for the spouse.
- **If the spouse is no longer available to assume the ADL care, children are likely to use formal care services for the ADL.** The HIS 2004 shows that isolated elderly are more likely to use formal care than couples are (13.8% again 5.6% for home care; 23.3% against 13.4% for nurse at home services). Women (more often spouseless) are more likely to use nurse at home services (23.1%) than men (14.5%) and home care services (11.0% against 5.8%).
- **But (family) care-givers are usually able to assume the entire IADL care load, at least for a short-time.** The LOVO shows that, family care is usually preferred for short-term IADL care: the spouse is the first choice for couples, and daughters for the respondents living alone. For long-term IADL care, professionals or a combination of professional and family care is often preferred.
- **Children can also share the care responsibility with siblings.** According the study of Bracke *et al.* (2008) on wave 6 of the PSBH; the probability of a son providing care (any type) to his parent is negatively associated with the number of sisters (more likely to provide care than sons) but positively associated with the number of brothers (more likely to share the care responsibility); for daughters, only the number of sisters has a negative effect, but the number of brothers does not have a significant effect. Daughters are more likely to care alone, while sons are more likely to share the care responsibility.
- **In any case, long-term intensive individual care tend to be avoided** because it will increase the frailty of the informal care provider but also the care-receiver does not want to be a burden to his relatives. The ZVE° and the LOVO° show that a Combination of formal and informal care is the preferred care setting in case of long-term IADL care (49%) and long-term ADL care (37%).

## *CONCLUSION*

The first objective of this chapter was to present the recent Belgian surveys providing information on elderly care. We saw that they are quite numerous (13 surveys met the selection criteria) for such a small country but that most of them only include one or two questions on care. Sub-national surveys are more frequent in Flanders and usually favour the care provider point of view (section 1). The variety between surveys is not limited to the geographical study area or to the chosen viewpoint, but also visible through the operationalisation of care (section 2). This makes comparisons even more difficult but these variations do not prevent from assessing whether or not the general trends observed in the systematic literature review are also valid for Belgium. In addition, the published analyses of the Belgian surveys highlight **regional differences** in informal care and in **use of home care services** (more targeted to older dependent elderly in Flanders and less developed and less targeted in the two other regions).

The second and the third objectives of this chapter were to compare the operationalisation and the results of the analysis made on the Belgian surveys and to complement the systematic literature review presented in chapter II. The Belgian results were analysed in details and, hypotheses were made for some unexpected or unclear result. It gives the opportunity to make explicit some of the strong associations (e.g. between gender, marital status, age, socio-economic status) and the potential selectivity (e.g. when using effective care providers as unit) often present in surveys based on elderly living in the community.

The analyses of the results were limited by three main factors:

1. The fact that most of the published results concern the provided care (**care provider point of view**) prevents from comparing the characteristics of care provided by spouse and by children to a same elderly care-receiver. We also saw that comparing results of analyses made on different units of observation (care-receiver or care provider) can lead to apparent contradictory findings. **The care-receiver point of view seems to be the best choice for a global understanding of the care configuration**.
2. The presence of regional differences could not always be observed because the published results from national surveys do not always compare the regions and, in most cases, Brussels is even excluded from the comparison.
3. Very few results concerning the evolution of care over time. To date, longitudinal data are available through three surveys: the PSBH, the ECHP and the SHARE.

Another important purpose of this chapter (already mentioned in the first objective) is to justify the choice of the PSBH for the analysis of family care evolution. The rest of the conclusion focuses on this point: how all the information provided in this chapter (comparative tables, questions presentation, and available findings) suggest that the PSBH is the 'best' choice?

According to the third 'results limitation' above-mentioned, three surveys (the PSBH, the ECHP and the SHARE) allow studying the evolution of family care over time. Why preferring the PSBH?

The ECHP does not include many questions on care and the published results focus on the relationship between care and work. Most of them worked on a pooled sample (Casado-Marìn *et al.* 2008, Masuy 2009) or on grouped countries (Spiess & Schneider 2003). Only two studies (Sarasa 2005, Viitanen 2005) carried out analyses for each country separately. The first study focused on the effect of Welfare state benefit on work and care and the second tested an econometric model. None of them provide useful information to answer the dissertation research questions. Most of the analyses of care in the ECHP look at the transition between two waves (Spiess & Schneider 2003, Viitanen 2005). As far as I know, the sole longitudinal study of care including the nine waves was

done by Masuy (2009) but the results are not interpreted here because the analyses were done on pooled countries.

The SHARE data includes many more questions on provided and received care but only the two first waves are available now. To date, the sole transitional analysis published on elderly care-receivers (Attias-Donfut *et al.* 2008) included only pooled-countries results. This paper analyses the combination of formal and informal care changes between the two waves: no many 'care' changes are observed: in most cases, the respondent either do not receive care at all or receive care only at one of the two waves. Substitution (from formal only to informal only - or the opposite - is very scarce) and complementation (from formal only or informal only to formal and informal is not very frequent). The small proportion of 'care' changes (also observed in the Belgian sample[117]) may be partly explained by the rather large inter-waves period (two years): all the changes occurring between waves are not observed. This suggests that the SHARE data are probably not the best data to study changes in care over time.

All the other published results are cross-sectional (mostly on the SHARE 2004[118]). Among those including the Belgian sample[119] (Callegaro & Pasini 2007; Knoef *et al.* 2007; Nizalova 2007; Fokkema *et al.* 2008; Hank & Stuck 2008; Bonsang 2009; Brandt *et al.* 2009; Geerts 2009; Haberkern & Szydlik 2010), only two studies present results for each country separately (Fokkema *et al.* 2008; Geerts 2009). Most of the analyses on informal care based on the SHARE data test econometric models and focus on selected sub-sample of elderly (those having no cohabitant children, those having no more than four children, family respondent only[120], etc.), or try to measure intergenerational transfers and to see whether ascendant transfers (from children to parents) or descendant ones (from parents to children) are the most frequent.

Initially, I planned to analyse and compare the SHARE and the PSBH data. This would have allowed comparing the care provided in 1994 and in 2004 in Belgium. I did all the methodological preparation (selection of the study sample, creation of the carelines file and the variables building) described in chapters V, VI and VII for the SHARE data (waves 1 and 2). However, the first analyses of the SHARE data showed two main limitations (the small proportion of care changes and too small effective in Brussels: n=55 for the Belgian respondents aged 65+ in 2004.) which led me to reorient the dissertation research on the sole analysis of the PSBH.

Indeed, the PSBH seems to be the best data to study the evolution of family care over time, because:

- It includes multiple questions on family provided and received care and some questions on home care services. Therefore the characteristics of family care and its articulation with home care services can be studied.

[117] Own analyses: 9.3% among the Flemish aged 65+, having the Belgian nationality and participating in the two waves (n=725) and 8.8% for the Walloons (n=351). The percentages refer to any changes between 'care services only' (S), 'family care only'(F) or 'both'(M): M>S,M>F,F>M,F>S,S>M,S>F.

[118] As the data of the second wave are available only since November 2008, related analyses only start to be published in working paper and journals two years later (e.g. Gannon & Davin 2010; Hank & Jürges 2010).

[119] The Belgian and the Israeli data were collected in 2005, while the data of the other countries were collected in 2004. For this reason, the Belgian and Israeli samples could not be included in the data release 1. Therefore, published analyses on elderly care based on this first release (e.g. Attias-Donfut *et al.* 2005, Crespo 2006, Kalmijn & Saraceno 2008, Albertini *et al.* 2007, Fontaine *et al.* 2007, Wolff & Attias-Donfut 2007, Bolin *et al.* 2008a,b) do not include Belgium.

[120] These selections are partly due to the design of the questionnaire: detailed questions on children are asked only for four children (therefore, the data are incomplete for elderly having more than four); the 'social support' modules (including questions on care provided by and to non-cohabitants are only answered by one of the spouse, the one who is designed as 'family respondent'. These 'convenience' based selection does not allow inferring the results of the analyses to the all elderly population.

- The 11 yearly waves allow following the elderly over a quite long period of time during which they are likely to experience caring spells.
- The survey design ensures a representative sample of the private households for the three regions. Therefore, regional comparison would be possible.

Most of the published analyses on elderly care based on the PSBH are cross-sectional[121] - mainly wave 2 (Bawin & Stassen 2002; Bawin *et al.* 2005) when a module on intergenerational relationships is added to the questionnaire and wave 6 (Bracke *et al.* 2008) when a module on care services is added. The earliest published study on care using the PSBH data (Jacobs & Bartiaux 1995) analyses the first wave (1992) and explains how the information collected in the module of the second wave could allow them to go further on their analysis. But, at the time of the publication, the data of the second wave were not available. Nisen (2004) studies the intergenerational relationships at waves 3 and 11. However, this is not a longitudinal analysis (where the same individuals are compared at two different times) but a comparison of the sample at two different times[122].

As this survey is representative at the national and regional level, the PSBH data have often been used in order to validate other surveys - Census 2001 (Deboosere *et al.* 2006), Zorg in Vlaanderen (Jacobs & Lodewijckx 2004) – to provide figures for national reports and conferences (Casman & Thomsin 2001, Casman & Mortelmans 2005) or international comparative studies (Declecq & Van Audenhove 2004; Bonvalet & Ogg 2007; Casman 2005). In these cases, the analyses are mainly descriptive and often remain superficial: the objective is not to answer a research question with the PSBH, but rather to provide (and compare) figures.
All in all, the PSBH data has been used many times to study elderly care in Belgium but often in a very descriptive way and never in longitudinal analyses. The panel aspect of the survey has been underused in family care research[123].

[121] Note that carrying out cross-sectional analyses on the follow-up waves may lead to work on a sample which is no longer representative. This will occur if there is a selective attrition.
[122] In this type of comparison, the population can change between the two waves, not only because of attrition (like in longitudinal analyses), but also because of new person enter in the sample-household (new born, people coming back from abroad, new spouse, etc).
[123] Longitudinal analyses of the PSBH data have been carried out on other themes, such as the professional trajectories, transition to adulthood etc. (see Doutrelepont *et al.* 2004a).

# *INTER-PART I*

## THEORETICAL SCHEME

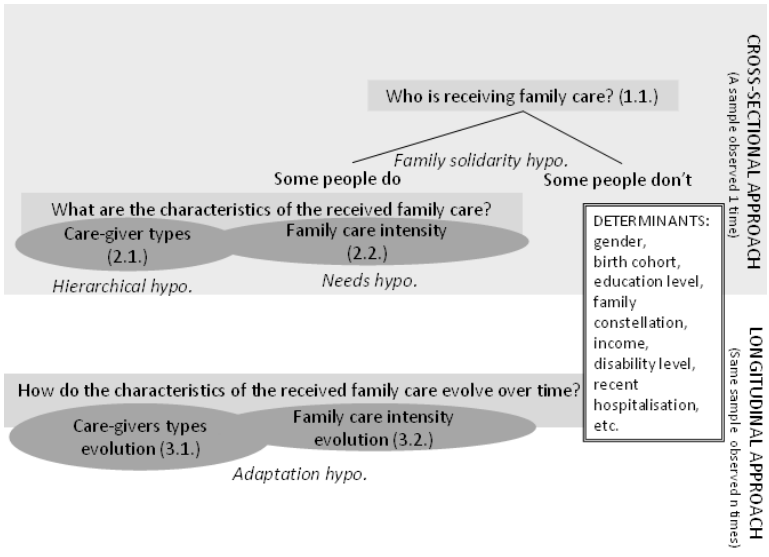
At the end of this contextual part, it is possible to draw the theoretical scheme which articulates the hypotheses to test in the analyses. To make it more readable, it will be built step by step, integrating progressively what was learned from the context of family care in Belgium.

One has to remember that the decision was taken to study care from the perspective of the elderly potential care receiver and to focus on IADL and ADL care provided by the nuclear family (see chapters I and II).

### *STEP 1. Drawing the theoretical scheme coming from the systematic literature review*

The theoretical scheme 1 is structured by the three main research questions presented in the introduction and displayed in the rectangular figures: **Who is receiving family care? What are the characteristics of the family care received? How do the characteristics of the received family care evolve over time?** The frame is divided into two parts: the 'cross-sectional approach' part includes the two first questions which should be answered considering the care provided at a given time; the 'longitudinal approach' part includes the third question which should be answered considering the evolution of the care provided over a period of time.

**THEORETICAL SCHEME 1:** The literature review




A **number between brackets** is attributed to each 'operationalisable' (sub)-question. The first number refers to the research questions (1: *'Who is receiving family care?'*; 2: *'What are the characteristics of the received family care?'*; 3: *'How do the characteristics of the received family care evolve over time?'*). A second number is used to distinguish operationalisable sub-questions referring to a same research question (e.g. distinguishing the care intensity and the care-giver types which are

two family care characteristics).[1] The question 'Who is receiving family care' is operationalisable because it can be answered by looking if and why some elderly received family care and other do not in the data. The two other research questions are not directly operationalisable. The researcher should specify which family care characteristics that he wants to study. The systematic literature review (chapter II) showed that the types of care-giver (e.g. spouse) and the care intensity are the most frequent study characteristics.

The same determinants, identified in the systematic literature review, will be used for all the 'operationalisable' questions. Note that the elderly who do not receive family care (1.1) will not be included for the study of the next questions (about care characteristics and their evolution).

The systematic literature review allowed formulating the first hypotheses.

- **Family solidarity hypothesis:** The values of 'autonomy', 'individualism' and self-accomplishment' are promoted in the today 'post-modern' society, this suggests that family solidarities are weaker than they were earlier. However, the literature on elderly care is unanimous: the nuclear family remains the first and the main source of elderly care. One may therefore hypothesise that there is *a positive relationship between the elderly care needs and the presence of family care*. The null hypothesis (absence of family solidarity) could be rejected if no association is found between family care and the needs and/or if there is only a positive association between care services use and needs. This hypothesis refers to the question **(1.1)**: Who is receiving family care?
- **The needs hypothesis:** The literature has also shown that the nuclear family is more 'flexible' in the number of caring hours and activities than other care-providers. In extreme cases, the devotion to care may lead to the care-giver burnout. Therefore, one may expect that the family care will adapt to the care needs and that, there is *a positive association between the needs intensity and the intensity of the provided family care.* **(2.2)**
- **The hierarchical hypothesis (A: between care-givers):** The relationship with the care-giver(s) (spouse and/or daughters and/or sons) depends on the elderly **resources** (to receive spousal care, it is necessary to have a spouse). **(2.1).** When several configurations are possible, the hierarchical compensation theory says that;
    - *(1) The spouse tries to assume the whole care load alone as long as possible.*
    - *(2) Children are called upon to care when the spouse also needs care or when the spouse is no longer there to care (institutionalisation, dead).*
    - *(3) Children tend to share the care responsibility.*
    - *(4) Daughters provide more intensive care.*
- **The adaptation hypothesis[2] (3.1,3.2)**
    - *(1) The changes in the provided family care can be due to a change in the elderly needs (increase in needs leads to increase in care) or in a change in the care-giver ability to assume the care responsibility (the spouse may be no longer able to assume alone the care and asks a child to help her).*

[1] The number and the articulation of the questions will be slightly modified between the first and the final step. The purpose is to build progressively the structure used for the analyses.

[2] Few of the reviewed studies work on evolution of informal care over time and most of them concern its global evolution (is informal care continuing or ceasing? If it is continuing, is there any change? However, because they often work on specific samples, it was possible to extract information on care aspect changes (e.g. studies of care changes based on an adult children sample controlling for the gender of the care-giver give information on changes in the care provided by daughter and sons).

(2) *The increase or the stability in the family care are more likely than the decrease or the end of the provided care because caring becomes part of the relationship.*

(3) *The spouse is the most stable element of the care-givers' constellation, children are more likely to change their implication in care over time.*

(4) *Having more children is associated with a longer duration of family care because simultaneous or sequentially care sharing are possible.*

## *STEP 2. Integrating the behavioural model*

The behavioural model, initially developed by Andersen (1968), allowed classifying the family care determinants into 'predisposing', 'needs' and 'enabling' factors: socio-demographic characteristics such as birth cohort, gender, education level, socio-economic status and religiosity belong to the first group; the subjective health status, the disability level and other health related characteristics to the second group; the family constellation and the income are included in the third group.

The term of 'predisposing factor' highlights the fact that some 'time-invarying'[3] individual characteristics may lead some elderly to be more likely to 'ever' receive family care. To study the determinants of 'ever' receiving family care over the given period of time, the first main research question ('who is receiving care') should be treated according to the 'ever' approach[4]: 'who has ever received care?'**(1.1.).** It should also be treated according to the cross-sectional approach as it was already mentioned in the first scheme. The operationalisable question remains the following: 'who is receiving care?' but the ordered number becomes **(1.2.)** because it is the second operationalisable question to be treated to answer the first main research question.

The hypothesis made on the determinants of 'ever' received family care, named **the predisposing hypothesis**, is that *there are some time-invarying characteristics which make some individuals more likely than others to receive care without considering the other characteristics which change over time*[5]

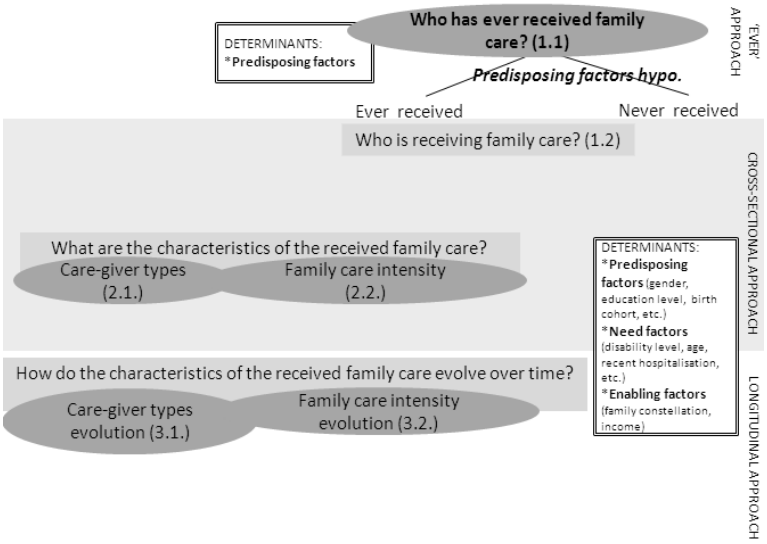
Note that the elderly who had never received family care are no more considered for the next questions (theoretical scheme 2).

[3]Refers to the characteristics which are (usually) stable over time (e.g. gender, birth cohort, etc.), in opposition to time-varying characteristics (partnership status, health status, etc.) which are likely to change over time. This distinction will be further discussed in chapter VII when the care determinants will be translated into variables.

[4]This approach implies that the information on the provided care is available over a period of time (like in panel data or cross-sectional data with retrospective questions). However it cannot be considered as a 'longitudinal approach' because the focus is not on the evolution of care but on the presence or not of care during the period. For this reason, I decided to name it the 'ever' approach.

[5] If it is true, it is important to identify those predisposing factors in order to define target groups for social policies. On the contrary, if predisposing factors are not too much influential (in other words, if the people receiving care do not differ from the people receiving no care in general, but differ from the non care receivers only at the moment when they receive care, then it is important to identify the time-varying characteristics associated with receiving care. As far as I know, this has not been studied yet because most of the studies are cross-sectional (and thus consider the situation at a given time) and the few longitudinal studies focus on changes (at the best, they control for time-invarying characteristics but do not estimate their effect.

**THEORETICAL SCHEME 2:** Integrating the behavioural model




## *STEP 3. Integrating the articulation between family care and care services*

In the systematic literature review, the bidirectional effect of elderly income on family care could be explained by the characteristic of the available care services: if the care services are expensive and of high quality, the elderly having a higher income are more likely to use care services and less likely to receive (intensive) family care. On the contrary, if care services are means-tested and of low quality, the elderly having a higher income are likely to prefer relying on family care.

This interpretation led to study the possible articulation between family care and care services, at first from a theoretical point of view. The four main theoretical articulation models were presented: **the hierarchical compensation model**, **the substitution model**, **the task-specific model** and **the supplementation model**. The first one does not only concern the articulation between family and care services, but also the articulation or preference order within the family care-givers. For this reasons, hypotheses coming from this model are divided into 'hierarchical hypothesis A' on family care-givers articulation (see step 1) and 'hierarchical hypothesis B' on family-care services articulation.

As seen in chapter II, these models are not incompatible. They are like mechanisms that the elderly can use sequentially. Therefore, the four models (or mechanisms) can be considered and hypotheses made on the situation where each of them is more likely to be used:

- The '**substitution hypothesis**': according to the literature, the complete substitution of care services to family care is very rare and occurs mainly when there are no longer potential family care-givers (e.g. when the spouse die and there are no children). From a social policy point of view, two situations of complete substitution are interesting:

  *(1) If the care services are well developed and available to everybody,* one may assume that, controlling for the needs level, family-less elderly is more likely to use care services than elderly having a family.

  *(2) If the care services are well developed and available to everybody,* one may assume that the elderly who receive care from a spouse but has no children are more likely

to use care services than to stop receiving any care or to move to an institution, when the spouse is no longer able to provide care.

*(3) The use of care services may lead to a diminution in the number of care-givers.*

- The **'supplementation hypothesis'**:

  *(1)* As mentioned earlier, if the entire care responsibility is considered, *care services are more likely to be used to supplement than to substitute for family care.*

  *(2)* This observation is mainly based either on cross-sectional research studying a sample of care services users and asking questions on the presence of family care before the use of services and since the use of the services, or on 'pure' cross-sectional studies looking at the care situation at the moment of the interview and observing that a combination of care services and family care is more frequent among those having a family than the use of care services only (supplementation is more frequent than substitution). Applied to longitudinal data, the supplementation hypothesis may also be used to test the hypothesis that: *using care services to supplement family care allows the family to assume part of the care responsibility longer and to be more stable.*

- The **'task-specific hypothesis'**:

  *(1)* As seen in the Belgian literature, the spouse is the 'preferred' provider, especially for ADL care which is more constraining and usually requires a more intimate relationship between the elderly and the care provider (like for bathing or dressing). But, if medical or technical acts are needed, a nurse will usually be called upon to assume alone a part of the ADL. The hypothesis made is that *this 'technical' specialisation mainly occurs for heavily dependent elderly or elderly having a chronic disease.*

  *(2)* The IADL may also be subjected to specialisation too, but, in this case, it is not a 'technical' but a gendered specialisation: women being more likely than men to assume the 'inside tasks' (ironing, cleaning the house, doing the washing-up, etc.), and men being more likely than women to assume the 'outside tasks' (odds jobs, gardening, shopping). Applied to the articulation between family and care services, one may hypothesises that, *elderly receiving IADL care from women (men) only are more likely to use care services for the 'outside tasks' ('inside tasks') than the elderly having IADL care-givers of both genders*.

- **The hierarchical hypothesis (B: with care services):** Care services are usually used when the spouse and the children are no longer able to assume the care responsibility alone. One of the main critics addressed to the hierarchical compensation model is the 'universal' character of the hierarchy. For instance, some elderly prefer to use care services rather than 'depending' on their children. We may say that they are 'formal care-oriented'[6] (the elderly care is a responsibility that should be assumed and organised by the society), while those who prefer to receive family care are more 'family-oriented' (the elderly care should be assumed firstly by the family). These first two orientations focus on the relationship with the care provider. The third, 'community-orientation', is based on the place where the care is provided: for some people, the most important is to stay at home whatever the identity of the care provider (family, friends, professionals, volunteers, etc.). The first orientation is usually more frequent among people living in an urban area, being younger, better educated, and less religious. While the second orientation is usually more frequent among people living

[6] Preferences and orientations could be used as 'attitudinal variables'. This is not the case here. They are only used as a guide for the interpretation of the results.

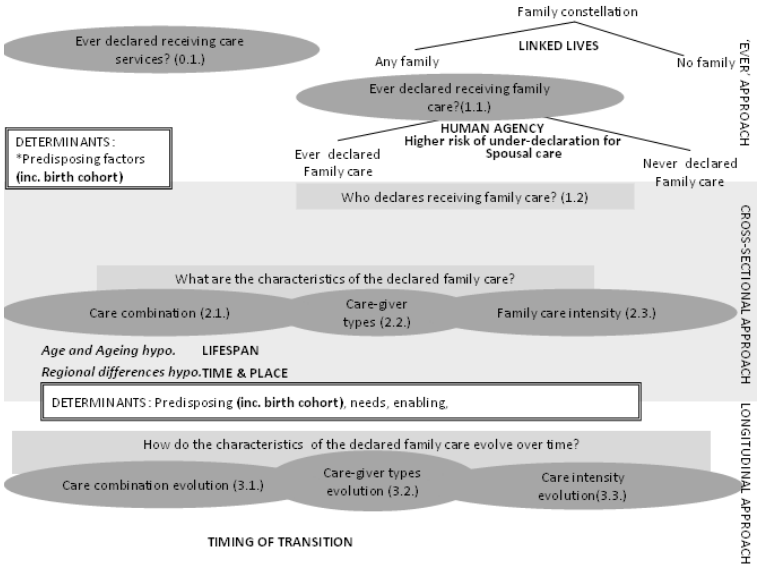
in the countryside, being older, less educated and more religious. The third is frequent in areas where community care services are well developed.

- Therefore, the following hypotheses can be made:
  - *(1) Elderly living in couple are less likely to use care services than the elderly not living in couple as they can help each other in the daily life.*
  - *(2) Elderly living in couple are more likely to use care services if their spouse has also health problems.*
  - *(3) Elderly living in couple and having no children are more likely to use care services than elderly couple having children because they cannot count on children to provide care.*
  - *(4) Elderly having many children are less likely to use care services because the children share the care responsibility.*
  - *(5) Elderly having all their children living far away are more likely to use care services because the children are less likely to be available to care or may not be able to provide intensive care.*

The previous hypotheses were made following the hierarchical compensation theory. It is expected that being religious, older and having a low income are positively associated with receiving family care only, controlling for the needs level.

To test the first substitution hypothesis, an additional 'operationalisable' question must be added to the theoretical scheme 3 'ever received care services'. This question does not derived from one of the three main research questions, therefore, it is numbered 0.1. A second difference between this scheme and the previous one is the addition of the combination care-givers/care services. It is considered as a family care aspect and thus treated in a cross-sectional approach (2.1) and in a longitudinal approach (3.1). As the care combination is a broader aspect of care - not only concerning family care but also the use of care services - it will be treated before the two other care aspects (intensity and care-giver types) in the analysis. This is why the number of the sub-questions changed: to have the care combination in the first place (2.1 and 3.1), then the care-giver types (2.2 and 3.2) and finally the family care intensity (2.3 and 3.3).

**THEORETICAL SCHEME 3:** Integrating family-care services articulation models



## *STEP 4. Accounting for the specificity of family care*

In the first chapter, the concept of family care was presented and discussed. It was shown how difficult it is to make a clear, universal and unambiguous definition. The chapter ended which a Venn diagram which highlights the possible gap between perceived, provided and declared family care. In quantitative research, the only available information is the 'declared' care. Unfortunately, it is not possible to operationalise and test the under/over-declaration of care provided. However, it is possible to make hypothesis about the type of care which is more likely to be over or under-estimated and to refer to these hypothesis for the interpretation of the results.

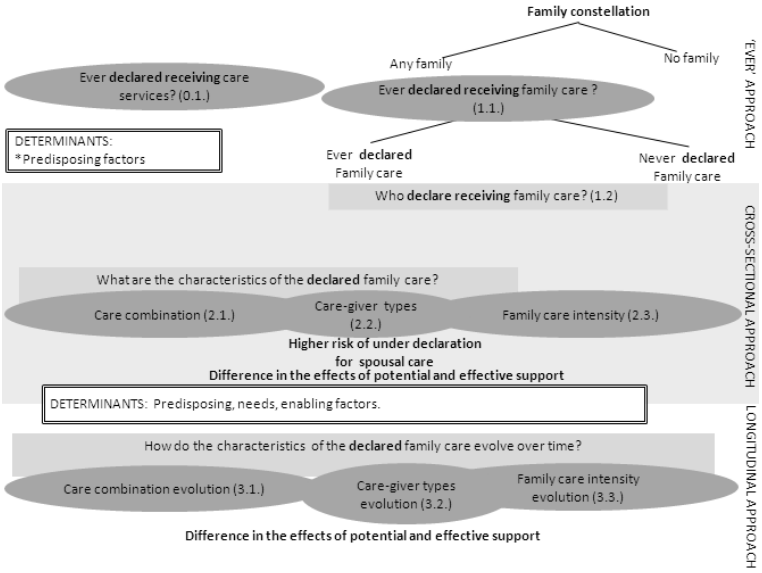
Following the literature, one may hypothesise that the care provided by the spouse (especially the wife) or other cohabitants is more likely to be under-declared (presence of care) or under-estimated (intensity of care), because care may be considered as 'natural' or 'part of the household tasks division'. On the contrary, the care provided by non-cohabitant children may be over-declared or over-estimated if the respondent wants to give the impression that there are good intergenerational relationships and solidarities. However, the declaration is also influenced by the culture and the values of the respondent: if he considers intergenerational solidarities as 'natural', he may under-declare or under-estimate the provided care because he does not perceive the tasks as care activities. If the respondent is ashamed to be dependent on his children, under-declaration or under-estimation are possible too: he perceives the care but does not declare it. By and large, the under-declaration and under-estimation are more likely to occur.

The underlying idea is that, if there is a family, it is likely that care will be provided if needed, but this care may remain undeclared. Actually, it is those who are the most likely to care and to provide intensive care, the spouse and cohabitant children, who are the most subjected to under-declaration. Studying the effect of being in couple rather than the effect of receiving spousal care gives information on potential care. Of course, we cannot assume that all the elderly who have a spouse receives spousal care (it would largely over-estimate spousal care) but we may think that this 'perceived potential support' may have a protective effect on the elderly: family-less elderly who do not perceive any potential support may decide to move to an institution earlier, even if they do not have severe health problems). Evidence of the 'perceived potential effect' was found by Ikkins *et al.* (1999) and Antonucci (2001). Analysing the determinants of family care aspects controlling once for the family constellation and once for the declared care can give an idea of the under-declaration. For instance, if 'spousal care' and 'in couple' has an effect in the same direction but only the second has a large and significant effect, one may think that being 'in couple' captures part of the effect of 'spousal care' which is under-declared.

Theoretical scheme 4 changes the care 'provided' into 'declared'[7] care and integrates the hypotheses. Note that they are not italicised to indicate that they are hypotheses to use in the interpretation but will not be tested.

[7] In the next chapters of the dissertation, the terms 'received care' or 'provided care' or 'declared care' are used interchangeably to refer to the declaration of the care received by or provided to the elderly.

**THEORETICAL SCHEME 4:** Accounting for the specificity of family care




## *STEP 5. Integrating the Life Course principles*

The Life Course approach was presented as a framework for the analysis of the family care evolution in chapter I. The particularity of this approach is to study the social phenomenon considering its timing and its multidimensional contexts (social, economic, demographic, etc.). These two main ideas are declined into five 'Life Course principles' which should help the researcher to understand the phenomenon in its complexity. These principles, 'Lifespan', 'Time and Place', 'Timing of Transition', 'Linked Lives' and 'Human Agency' were explained in chapter I. Here, we will see how they can be used to enrich the theoretical scheme by linking some questions, determinants or hypotheses to the Life Course approach and by bringing some new hypotheses to test or to use for the interpretation.

For instance, the 'family constellation' (one of the enabling factors) can be easily associated with the **'Linked Lives'**: the provided care implies the existence of a relationship between the care-receiver and the care provider. In the case of family care, the modalities of the care relationship are not only influenced by the characteristics, the motivations and the past history of the relationship between the elderly and his care-giver(s) but also by those of the other family members, the relationships between them and the evolution of the family constellation (e.g. the death of the elderly spouse is likely to affect the family dynamics and the care configuration). To a certain extent, the geographical proximity between children and their elderly parent is also an indicator of how the lives of the family members are linked: living close to (one of) his parents is often associated with strong affective bonds but may also be motivated by practical reasons: the elderly parents may look after their grandchildren and facilitate the family-work articulation of their adult children.

The '**Timing of Transition**' principle is represented in the third research question: studying the determinants of care evolution, looking at the effect of the current health status or at the effect of the evolution of health on family care transitions is a way to study the timing of the transitions.

The importance of accounting for the **'Time and Place'** principle was highlighted in chapter III:

- The **'Time'** refers here to the historic events experienced simultaneously by a birth cohort[8] (group) which will contribute to create a common generational culture. The study of the birth cohorts 1900-1929 showed a large heterogeneity of life experience between cohorts: the oldest were in their adulthood during the two World Wars and the economic crisis and this influenced their nuptiality and fertility behaviour. The younger birth cohorts experienced as adults only World War II, but they lived their childhood in a context of crisis. This influenced their life condition and maybe their development (poor nutrition, etc.). They may have lost their father or other family members during World War I. According to the Life Course theory, the life event and their timing will influence the rest of the life. It would therefore be useful to divide the birth cohort 1900-1929 into smaller cohort groups with a more 'homogeneous' culture and life-experience (e.g. those having experienced World War II in their childhood).
- The '**Place'** is used to focus the attention on the fact that a same historic event may be experienced differently according to the place of living of the individuals. The local context, the lifestyle and the cultural characteristics of the place or living influence the life experiences and the values. In Belgium, important regional differences were observed in the elderly policies options (home care being more developed in Flanders and institutional care favoured in Wallonia and Brussels) and underlying values (the 'community' and the 'family' orientations seemed to be strong in Flanders: the community and, especially the family should be involved in the elderly care; on the opposite, the 'formal care-orientation' seemed to prevail in Wallonia and Brussels: the elderly care should be assumed by the society and in specialised institutions). If the regional differences are read regarding the previous hypotheses, some added hypotheses can be formulated:
    - During the survey period (the 90s), informal care-givers supports started to be organised in Flanders. Therefore, we may think that the official recognition of this reality of 'informal care-givers' may reduce the under-declarations (compared to the two others regions).
    - The Flemish study cohorts had more numerous families. Therefore, the *Flemish had higher chances of receiving family care*. On the other hand, Belgians inhabitants of Brussels tended to have fewer children and are more likely to be spouseless (end of life migration: elderly living alone did move to urban areas which are better equipped with proximity and health care services). Therefore, *the Brussels inhabitants are less likely to receive family care*. This is the '**regional difference**' hypothesis to test.
- The '**Lifespan'** principle urges to consider the entire life as a process where the earlier events or choices are likely to influence the events occurring later in one's life. Applied to the study of elderly care, we may consider the level of education, the occupational status, the number of children, etc., all results from the past experiences, decisions and lifestyle which are also likely to influence the needs and the available care resources of the elderly. The study of the influence of these predisposing factors on the probability to 'ever' receiving family care is a way of accounting for the Lifespan principle.
    - Considering the life as a process can also lead to study the **effect of ageing** on family care. The study cohorts include people aged from 65 to 98. Some are freshly retired and others are very old, however, they are all ageing over the panel study, everybody is one year older at each wave. Therefore, a way of studying the ageing effect is to compare received family care between birth cohorts at different moments in time.

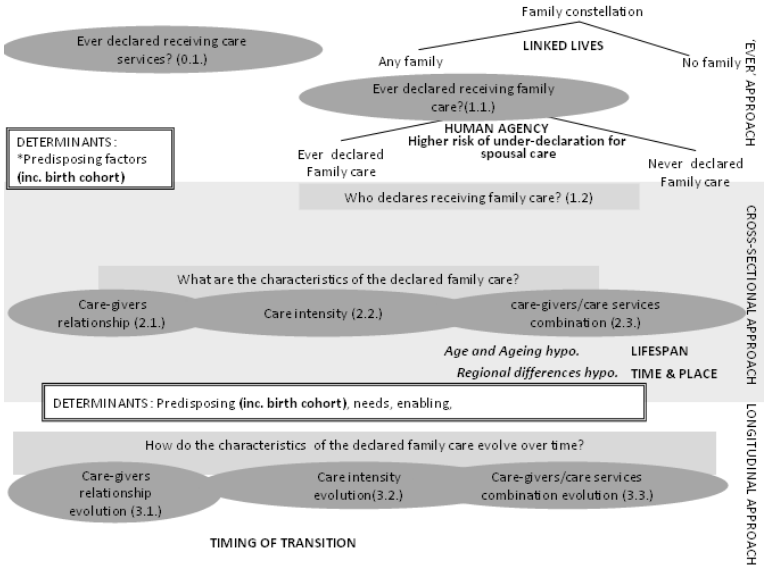
[8] Demographers usually distinguish three types of time effects: the cohort, the age and the period effects. The definition of them and the choice to focus on the cohort effect in the dissertation research are discussed in chapter I.

- The '**age and ageing' hypothesis** sets that *the initial proportion of elderly receiving (mixed) care is higher for the older birth cohorts (age effect) but is increasing over time for all the birth cohorts (ageing effect).*

- The **'Human Agency'** principle is probably the most difficult to study, especially in quantitative research based on answers to closed questions. This principle captures all the individual aspects which have not been considered yet by the four other principles: once having accounted for the effect of the 'Lifespan', 'Time and Place', 'Linked Lives' and 'Timing of Transition', the 'Human Agency' principle is what explains why two individuals, similar on the aspects considered by the other principles, will react differently. In statistical terms, the Human Agency can be considered as the 'unobserved heterogeneity' (these unobserved individual characteristics which influence the study phenomenon but cannot be clearly identified). In the study of family care, the reasons which lead an elderly to declare the received care and another elderly, being exactly in the same situation (care provided, region, birth cohort, etc.) to not declare the received care, can be considered as differences in Human Agency. It is impossible to completely control and account for Human Agency in quantitative research. But, it is possible to identify some of the aspects on which this 'human agency' is more likely to play a role (e.g. under-declaration tends to be more frequent in spousal care) and to refer to these hypotheses when interpreting the results.

Scheme 5 integrates the Life Course hypotheses and displays the Life Course principles next to the question to which they are related. The structure of this final theoretical scheme will serve later to structure the analyses part.

**THEORETICAL SCHEME 5:** Integrating the Life Course principles



# CHAPTER V

## THE 1,123 ELDERLY OF THE PSBH

One of the conclusions of the systematic literature review (chapter II) was that the elderly potential care receiver should be chosen as unit of observation if we want to have a broad view of the provided family care and of its evolution. It seemed also preferable to work on a general sample of elderly (not selected on their health status or care situation) to avoid or reduce selectivity. In chapter III, the socio-demographic and historical contexts of the Belgian birth cohorts 1900-1929 were presented because it is these cohorts, becoming older and being potential care-receivers, who will be studied. In chapter IV, the available data providing information on the elderly informal care in Belgium were presented. The PSBH appeared to be the only survey data which allows studying the evolution of family care and its regional differences. It was therefore chosen as study data.

Chapter V presents the PSBH initial sample (not restricted to the elderly population) and explains how a sub-sample of Belgian respondents born between 1900 and 1929 is extracted to form the study sample of elderly potential care-receivers.

The objectives of this chapter are: (1) To present the PSBH sample: how is the baseline sample selected at the first wave and followed up over waves? Which kinds of questionnaire did the participants answer? Is this sample representative of the population of interest? (2) To discuss the use of the PSBH for studying family care evolution: What are the characteristics of the PSBH data which may influence or limit the study of this topic? (3) To present the study sample of elderly answering the same questions than the PSBH baseline sample: how are the elderly respondents selected? And are followed up? Which questionnaires are used for the study? Is the study sample representative of the socio-demographic characteristics of the population of interest?

This chapter works like a funnel: from the broader view to a more specific approach and from the existing information to the study data.
Section 1 is broad: it presents the whole PSBH baseline sample and the various topics treated in the questionnaires. The Information comes mainly comes the PSBH methodological reports.
Section 2 is already more focused: it discusses the limitations of the PSBH data for the dissertation topic. The information comes from the general and ageing methodological literature.
Section 3 is quite specific: it presents the sub-sample of the PSBH baseline sample which will be used as study sample for the dissertation research on family care evolution. The information is completely original and tailored for the dissertation.

# *SECTION 1. The* PSBH *(household) sample*

The objectives and the design of the PSBH were described in chapter IV. This section further presents the baseline sample. The presented results are extracted from the analyses published in the PSBH monograph (Doutrelepont *et al.* 2004a) and on the methodological reports of waves 1 (Jacobs & Marynissen 1993) and 3 (De Bruyn *et al.* 1994).

## A. Selection & participation at the baseline (1992)

The PSBH is a representative survey of the Belgian private households. It means that **(1)** the sampled unit at the baseline (the first wave of the survey) is the **household**[1]; **(2)** The population of interest is restricted to Belgian private households: '**Belgian'** refers to the territory (Belgium) not to the nationality[2], '**private'** implies that collective households (like institutions, prisons) are excluded; **(3)** The sampling design is defined in such a way to obtain a **representative** sample of the Belgian private households. At the first stage, a 'probability proportional to size' sample of municipalities is drawn[3] and gives 275 clusters[4]. At the second stage, 100 addresses of 'registered heads of household' are drawn from the National Register for each cluster (27,500 addresses in total). Of each cluster of 100 addresses, 20 are starting addresses (list A) and 80 are replacement addresses (list B). The purpose (target sample) was to interview 2,000 households in Flanders, 2,000 in Wallonia and 1,000 in Brussels. To secure the representativity of the various household types, a code (1-9) is assigned to each of the 100 addresses according to the age of the head of household (<30, 30-65,>65) and the number of household members (1, 2-4, 5+). When a household of the list A cannot be interviewed, it is replaced by the first household of the list B having the same code. More information on the sampling design can be found in Casman & Lenoir (2004) and in Winfried (2004a).

**TABLE V-1:** Participation rate and coverage of the households at the baseline wave (1992), by region

| | | REGION | | |
|---|---|---|---|---|
| | **Belgium** | **Flanders** | **Wallonia** | **Brussels** |
| **0.** Total number of addresses | 27,500 | 10,000 | 10,000 | 7,500 |
| **1.** Target number | 5,000 | 2,000 | 2,000 | 1,000 |
| **2.** Contacted addresses | 10,941 | 3,813 | 4,540 | 2,588 |
| **3.** Valid addresses (=**4+5+6**) | 10,811 | 3,755 | 4,505 | 2,551 |
| **4.** Not reached | 1,874 | 384 | 655 | 835 |
| **5.** Refusal | 4,498 | 1,471 | 1,995 | 1,032 |
| **6.** Interviewed | 4,439 | 1,900 | 1,855 | 684 |
| Participation rate **=6/3** (%) | 41.06 | 50.6 | 41.2 | 26.8 |
| Coverage **=6/1** (%) | 88.78 | 95.0 | 92.7 | 68.4 |

*Source*: Winfried 2004b:86

[1] According to the PSBH definition (Casman & Lenoir 2004:26), "The household is composed of all the persons who lives permanently in the same housing or who are only temporarily absent".
[2] The nationality of the household members is not a selection criterion. The proportion of foreigners among the 8,741 baseline respondents aged 16+ (12.62%) is close to the proportion observed in the general population (13.74% among the 15+ in the Census 1991, see Eggerickx *et al.* 2002). No specific design measures were taken to insure the representativity of the Belgian households whose members have a foreign nationality in the survey. However, the language of the questionnaire (French or Dutch) and the fact that the foreigners are usually less likely to participate to surveys (Casman 2006) may lead to selectivity among foreigners.
[3] The Brussels and Walloon regions are oversampled which allows regional analyses.
[4] Multiple clusters may be drawn in case of large municipalities (e.g. *Antwerpen, Gent, Liège, Namur*, etc.).

Table V-1 shows that among the 10,811 valid addresses in Belgium, 4,439 households agree to participate in the baseline survey (1992)[5]. This represents a household participation rate of 41% (interviewed households divided by the number of contacted valid addresses) and a 89% coverage rate (number of interviewed households divided by the target number) for the whole country. The participation rate is the highest in Flanders (50.6%) and the lowest in Brussels (26.8%). Refusal is the main cause of non-participation, 'not reached' is less frequent. The main reason for not reaching the household members is that they are 'never at home' (see appendix table V-1). Added information on the type of housing was gathered by the interviewer for all the contacted addresses (Jacobs & Marynissen 1993). The analyses show that urban type housing (flats, attached houses) are under-represented in Flanders and that households living in a (very) good state housing[6] are more likely to participate in Flanders and in Wallonia.

All the household members of the 4,439 participating in the baseline wave are considered as 'sample-persons' and should be followed up over the next waves according to the 'follow-up rules' explained in point 4. This procedure is common in panel surveys. The particularity of the PSBH is that all the members of the household participating in wave 3 are also considered as 'sample-persons' even if they did not participate in the baseline questionnaire. This is because wave 3 of the PSBH (1994) corresponds to the first wave of ECHP.

> *For instance,* when a participant in the baseline sample enters in union between the two first interviews, his partner is interviewed in wave 2 but is not considered as a 'sample-person'. If the partner is still in the sample-household in wave 3, he will be considered as a 'sample-person' for the following waves (and thus included in the Belgian baseline sample of ECHP).

The collaboration to the ECHP project influences the PSBH in various ways (frame V-1).

**FRAME V-1:** The impact of the ECHP project on the PSBH

The PSBH has joined the ECHP project in 1994[7]. The first wave of the ECHP corresponds therefore to wave 3 of the PSBH. In order to meet to ECHP guidelines, the definition of 'sample-person' was revised (see above) and some additional changes were brought to the questionnaires since 1994.
Compared to the questionnaires of 1992 and 1993,

- Some questions were added (e.g. subjective health status);
- Some questions were modified to allow international comparison (standardisation of question wording, routing, modalities, code);
- Some questions were suppressed at all the waves (since 1994) or only at specific waves.

The aim was to have a questionnaire which (1) includes all the 'core' ECHP questions, (2) keeps most of the PSBH specific questions and focuses, (3) is not too long to answer[8].

Note that the over waves standardisation concerns only the ECHP questions. Changes in PSBH specific questions are observed over all the panel period.

In the initial *PSBH* project (before ECHP), three kinds of questions are distinguished (Casman & Lenoir 2004:29): 'permanent' questions which are asked each year because the answer can change quite quickly (e.g. health, income, work); 'intermittent' questions (e.g. values, opinions, place of living) which are asked every two or three years because the evolution is slower; 'occasional' questions (on specific topics) asked only once in a module. This distinction is still applied from wave 3 onwards. Note that some 'permanent' questions are added during the panel (e.g. the question *"Does your chronic health problem or handicap causes an extra effort or concern to the other members of the household"* which will be used for the imputation of care in chapter VII, is only asked from wave 6 onwards).

[5] The proportion of single-person households is slightly lower than in the National Register of 1992 (1.1% difference). Note that the difference is only observed in cases where the registered head of household is aged 30-64. It does not concern isolated elderly (when the head of household is necessarily aged 65+).

[6] The state of the housing is often used as a proxy for the economic status. The results can be interpreted as an over-representation of the wealthier households in Flanders and Wallonia.

[7] See chapter IV for a description of the ECHP.

[8] This explains why more PSBH questions were suppressed at the waves including a specific module (especially waves 7 and 9).

## B. The questionnaires

Five different (sub-)[9]questionnaires can be answered. The first three should, in principle, be filled-in at each wave for all the participating households. The fourth questionnaire (concerning children) is only answered if the household includes child(ren) aged less than 16. A 'module' questionnaire on a specific theme can be added to the household or the adult questionnaire at a particular wave.

### *1. Contact sheet*

The contact sheet is filled in by the interviewer. It includes observations concerning the housing (type, state and environment), the reasons for (individual or collective) non-response, gender and birthday of all the members of the household and the relationships between them[10].

*In the contact sheet of wave 1*, the relationship of each household member with the self-defined head of household is registered. In addition, the presence of a cohabitant spouse, mother and/or father is mentioned for each household member. *In the contact sheet of wave 2,* the same principles of relationships registration are applied. However, since that wave, the dynamic aspect of the panel should also be registered: some members may enter the household (new born, new partner etc.) and others may have left the household (deceased, moved out, institutionalisation, etc.). Also, a difference is made between panel person and non panel person. *The contact sheet of wave 3* is quite similar in content with the one of wave 2. Most of the changes are related to the layout or the coding. *Since wave 4,* the relationship between each pair of household members is registered (relationship matrix), the other items of the contact sheet did not change.[11]

### *2. Household questionnaire*

This face-to-face questionnaire is answered by the self-defined head of household. It includes question on the housing (localisation, size, etc.), the equipments, the objective and the subjective economic situation. **It also includes the questions related to the use of at-home care services.**

### *3. Adult questionnaire*

All the household members aged 16+ are invited to answer an adult questionnaire. It can be filled in 'face-to-face' with the interviewer or, since wave 2, 'self-completed' by the respondent himself. No proxy respondent can be used. It includes many questions on training and education, employment, personal income, health, family relationship, leisure, values and religiosity, etc. **Questions on the family care provided and received are comprised in this questionnaire.**

[9] In fact, there are only 2 documents to be filled in by the respondent: the 'household' questionnaire which includes the children questionnaire and sometimes a household module, and the 'adult' questionnaire which sometimes includes an adult module. The contact sheet is filled in by the interviewer.

[10] In some cases, none of the household members participated (e.g. not reached). Therefore, no questionnaire is filled in and the only pieces of information available are the observations of the interviewer on the housing, the age of the registered head and the size of the household (coming from the National Register). In other cases, only a part of the members of the household aged 16+ complete an adult questionnaire. Basic information on the 'individual' non-respondent can be obtained from the contact sheet (gender, birthday, relationship with the other members of the household and reason for non-response). To make it clear, the term 'respondent' is used in the dissertation to refer to people who effectively answered the adult questionnaire, 'participant' is used to refer to all the members (respondent or non-respondent) of a 'participating' household (in which at least one member answered the adult questionnaire). In the best cases, all the household members aged 16+ agree to answer an adult questionnaire. Therefore, the number of respondents is equal to the number of participants aged 16+.

[11] I describe the evolution of the contact because it had an impact of the building of the 'carelines' (explained in chapter VI).

### *4. Children questionnaire*

If the household includes child(ren) aged less than 16, a unique 'children' questionnaire should be answered, face-to-face, by the self-defined head of the household for all the children aged less than 16. The questionnaire should be filled in at each wave providing that there is still a child aged less than 16. When a child reaches 16 years, he can complete an adult questionnaire and is no longer concerned by the 'children' questionnaire. The 'children' questionnaire includes questions on children custody, childcare, schooling, extra-curriculum activities, use of time (time spent in watching TV, sleeping, etc.)

### *5. Added modules*

Specific modules were added at almost each wave:

- Wave 2: "intergenerational relationships" module,
- Wave 3: "security" module (in the French questionnaire only),
- Wave 5: "representation of exclusion and insecurity" module (in the French questionnaire only),
- Wave 6: "security" module (in the French questionnaire only), "care"[12] module,
- Wave 7: "partnership" and "environment" modules,
- Wave 9: "relational culture and relationship satisfaction"[13] module,
- Wave 10: "schooling" (in the Dutch questionnaire only), "representation of ageing" and "mobility" modules,
- Wave 11: "work trajectory" and "intimacy" modules.

## C. External validity

The purpose of the external validity is to verify if a sample is representative of the socio-demographic characteristics of its population of interest. In the case of the PSBH, the population of interest is the Belgian private households.

Different tests were done by the PSBH research team to verify the external validity of the initial sample of 1992 (see Winfried 2004a). The published statistics on the general population of 1992 were used for the external validation the gender, age and civil status distributions. The results shows that the PSBH initial sample of 1992 was well representative for gender (the distribution is nearly identical, $Chi^2$=0.936)[14] and quite well representative for age, except for the extreme age groups (less than 10 or more then 80) which are over-represented (see table V-3). The regional analysis of the age distribution highlighted that the representativity is the best in Flanders (where the participation rate was the highest) and the worst in Brussels (where the participation rate was the lowest). Concerning the marital status, it turned out that married people were over-represented while single men and separated women were under-represented (but the differences are not significant: $Chi^2$= 0.914 for the men and 0.548 for the women).

The household composition of the PSBH initial sample was compared to a sample of 10% of the Census of 1991 using the LIPRO[15] typology (Boulanger *et al.* 1997). The results showed that the PSBH

[12] Translation from the French: "*aide aux personnes*".
[13] Translation from the French: "cultures relationnelles et satisfaction relationnelle".
[14] The $Chi^2$ test is computed to test the null hypothesis of independence of gender distribution in the two samples (figures of the PSBH 1992 is considered as the observed frequencies and those of the population statistics 1991/1992 as the expected frequencies). The same test is applied for age (among the 65+ only, see table V-3), for marital status and the household composition.
[15] LIPRO (LIfestype PROjections) is a household typology created in the Netherlands (van Imhoof & Keilman 1991) and applied for the first time on Belgian data by Boulanger *et al.* (1994). Seven household types are distinguished: single, single-parent family, married couple without children, married couple with children, unmarried couple without children, unmarried couple with children, other types.

was globally representative for the various types of households ($Chi^2$ =0.9961 for men and 0.9997 for women) but for single-persons households are slightly under-represented[16] (7% of men and 11% of women against 9% and 13% in the Census).

## D. Follow-up and attrition

### *1. Follow-up rules*

The sampled unit of the PSBH is the household but the unit to follow is the individual. It means that all the 'sample-persons' (members of the households participating in wave 1 and/or wave 3) should be followed up the next waves even if they have left the 'sampled' household[17]. In case of strong or repeated refusal[18], the participant losses the 'sample-person' status. 'Non sample-persons' moving into the household of a sample-person are interviewed but will not be followed up if they stop living with the 'sample-person'.

> *For instance,* when a young man lives with his parents in 1992 and this household is selected for the interview. They are all 'sample-persons'. In 1993, he leaves his parents to live with his girlfriend. Both of them are interviewed at this wave. In 1994, he has a new girlfriend. The ex-girlfriend is no more interviewed (she left the 'sample-person' household), the young man and his new girlfriend are interviewed (she is a 'sample-person' for ECHP). In 1995, they split up, but both are followed up. The girl strongly refuses to be interviewed again and loses her 'sample-person' status.

Variations in number of household members over waves are due to newcomers (birth, adoption, union, re-cohabitation, coming back from a long stay abroad or in institution) and out-comers (death, moving abroad, institutionalisation, refusal, people not found).

### *2. Attrition*

Most of the baseline households (85.25%) accepted to be followed up in 1993. The number of participating households (and thus, the number of respondents) decreases over waves for many reasons (refusal, death, moving abroad, etc.)[19]. Table V-2 shows the attrition over waves at the individual level for the adult sample-persons: among the 8,741 respondents who live in one of the 4,439 baseline households and have answered an adult questionnaire in 1992, only a third (2,840) continued answering the questionnaire at all the follow-up waves until the end of the panel.

As in most panel surveys (Blossfeld *et al.* 2007), the individual attrition in the PSBH is higher (17.70%) at the first follow-up wave (wave 2). People who accept to be interviewed a second time show their interest for the study and will usually agree to be followed up over the next waves. On the opposite, people who do not want to be re-interviewed tend to show their lack of concern since the first follow-up.

[16] This might be a problem for the selectivity of the study sample of elderly because many elderly live alone. However, if the two previous results are considered (over-representation of the aged 80+ and under-representation of single men and separated women), one may think that the under-representation of single-person-households mainly concerns these two types of situations (not frequent among elderly cohorts).

[17] Sample-persons who move out of the sample-household but still live in a private household in Belgium are interviewed, Sample-persons who move abroad or in a collective household (e.g. rest home) are not interviewed at that time but will be eligible for interview if they live again in a private household in Belgium.

[18] To limit the number of refusals, a short questionnaire is proposed to adults who do not agree to answer the complete questionnaire.

[19] An additional sample was drawn in Flanders in 1997 to compensate for attrition. It was not possible to do that in the two other regions due to budget constraints. More information on the sampling design and the response rate can be found in Winfried (2004).

**TABLE V-2:** Life table of the adult sample-persons

| | PANEL PERSONS [1] | | | |
|---|---|---|---|---|
| **WAVE** | **Sample size** | **# Lost[2]** | **%Lost** | **Survival function** |
| Wave 1 (1992) | 8,741 | | | 100.00 |
| Wave 2 (1993) | 7,194 | 1,547 | 17.70 | 82.30 |
| Wave 3 (1994) | 6,190 | 1,004 | 13.96 | 70.82 |
| Wave 4 (1995) | 5,613 | 577 | 9.32 | 64.21 |
| Wave 5 (1996) | 5,134 | 479 | 8.53 | 58.73 |
| Wave 6 (1997) | 4,626 | 508 | 9.89 | 52.92 |
| Wave 7 (1998) | 4,140 | 486 | 10.51 | 47.36 |
| Wave 8 (1999) | 3,738 | 402 | 9.71 | 42.76 |
| Wave 9 (2000) | 3,435 | 303 | 8.11 | 39.30 |
| Wave 10 (2001) | 3,059 | 376 | 10.95 | 35.00 |
| Wave 11 (2002) | 2,840 | 219 | 7.16 | 32.49 |

*Source:* PSBH 1992-2002 (own computation). *Note:* (1) Attrition is computed on the basis of people who answered the adult questionnaire at wave 1. (2) Respondents are considered as 'lost' at the first wave they do not answer the adult questionnaire, even if there re-answer an adult questionnaire later (= no difference between **temporary** and **permanent attrition**). In other words, there are 2,840 respondents who completed the questionnaires during the 11 years of the survey: this amount 32.49% of those who answered the questionnaire at wave 1.

Attrition is a common and unavoidable phenomenon in panel surveys. It becomes an issue when the attrition is too important and the remaining sample too small or when the attritors differ from the non-attritors, especially on characteristics which are relevant for the analyses:

> *For instance*, if the attritors are lower educated than the non-attritors, this would be a problem for the longitudinal study of health problems because the lower educated have usually more health problems. A decrease in the proportion of health problems in the sample over waves can only be due to the fact that the remaining 'selected' sample is less likely to have health problems than the initial sample.

The 'longitudinal' response rate included in the yearly methodological PSBH reports (De Bruyn *et al.* 1996) is computed on the total sample-persons[20] who answered at $wave_{n-1}$ (and not on the initial sample). Casman & Lenoir (2004) made an analysis of the non-responses over all the waves but, as their computations are not based on the baseline sample, it is not exactly an analysis of the attrition. I did not find any published analysis of the general attrition of the PSBH baseline sample over the 11 waves. It would be possible to carry out such analyses but they are time consuming and not really useful for the dissertation purpose. A specific analysis of the attritors and non-attritors of the study sample (see section 2) would be more useful.

[20] In waves 2 and 3, the 'sample-person' refers to the baseline *PSBH* sample (1992). Since wave 4, the 'sample-person' refers to the baseline ECHP sample (1994).

## *SECTION 2. Limitations of the* PSBH *characteristics on the study of family care evolution*

It was showed (chapter IV) that, among the available recent Belgian surveys, the PSBH seems to be the best choice for the study of family care evolution, even though, it was not specifically designed to do so. The purpose of this section is to identify the characteristics of the PSBH which may influence or limit the analysis of family care evolution. Three types of characteristics are discussed: the definition of the PSBH sample **(1)**, the panel specific features **(2)**, the differences between the population of interest and the PSBH effective sample **(3)**.

## A. Due to the sample definition

Three characteristics of the PSBH baseline sample definition are likely to influence the use of the data for studying family care: the sample unit, the restriction to private households and the 'general' aspect of the survey.

### *1. The 'household' as sample unit*

The PSBH is a household survey (like GGPS or ECHP). As most of the surveys of this kind, it includes a contact sheet (which specifies the relationships between the household members), a household questionnaire (for the aspects which are likely to concern all the members of the household) and individual questionnaires (for more personal aspects).

When compared to individual based surveys (like LOVO, CRIV°, etc.), one advantage for the study of family care is that the contact sheet permits to identify who is providing 'cohabitant' care to whom.

> *For instance,* if a respondent declares to provide care to his cohabitant mother, the contact sheet allows identifying the individual number of the mother. This number gives access to her adult questionnaire which provides information on her age, health status, etc.

A disadvantage is that some pieces of information are only available at the household level. For instance, questions on the use of home care services are included in the household (and not in the adult) questionnaire because all the household members benefit (even indirectly) from those services. When the household includes more than one member, it is not possible to know who benefits directly[21] from the service.

> *For instance,* if an elderly person lives with her daughter, even if meals-on-wheels are provided to the elderly parent only (direct beneficiary), the daughter also benefits indirectly from the service because without this service she would have to leave her work at lunch time to come back home and prepare the meal for her parent.

Another issue is that the individual responses of the household members are likely to be correlated.

> *For instance,* if one of the elderly spouses declares to receive IADL care from a non-cohabitant child, the other spouse is likely to also declare receiving IADL care because this type of care (e.g. help with the housework) is often provided at the household level. This problem can be partially solved by controlling for the presence of a spouse in the household. Indeed, in most cases, there is only one elderly potential care-receiver in the household or a couple of elderly. In the few other cases of cohabitant elderly (e.g. siblings), the problem of non-independence of the response on family care provided is less important: they have not the same potential family care-givers (children and spouse).

[21] Who is the person who decides to use the service or whom health status makes him eligible to some kind of care services?

## *2. A sample restricted to 'private' households*

The fact that institutionalised elderly persons are excluded from the sample is not a problem per se as the dissertation focuses on care provided to elderly living at home. However, it is important to remember that the elderly living at home are selected, especially the oldest old: they are more likely to have a social or family network, to be in better health condition (Black *et al.* 1999, Egleston *et al.* 1999, Sales *et al.* 2005, Thygesen *et al.* 2008).

## *3. A 'general' survey*

The PSBH is a general and multidisciplinary survey. It is neither specific to the elderly population nor to the care topic. However, elderly living in the community and potential care-receivers are included in the sample.

The main advantage of 'general' surveys for the study of family care evolution is that it allows starting the analyses on a representative sample of elderly, to compare those who have a family (and thus are 'eligible' to receive family care) and those who do not have a family. It also allows studying the effect of ageing on the use of care: the proportion of care-receivers will be probably lower at the first wave (especially for the younger cohorts) than it is in specific surveys on disabled elderly, but the proportion is likely to increase over time because of the ageing process.

Two disadvantages of 'general' surveys are:

1. The number and the precision of the questions on care are limited (e.g. no information on the use of nursing care services; the identification of the specific ADL or IADL for which care is received is unknown, etc.);
2. The means used for collecting individual data (face-to-face with no possibility to use a proxy respondent) are not necessarily adapted to the most disabled, old or sick elderly living at home. Even though they may be included in the initial sample, they are more likely to refuse answering the complete questionnaire because of tiredness or health reasons. It is therefore, possible that the respondent elderly are, on average, healthier than the total elderly population living at home (health selection) and thus also less likely to move to institution shortly after the time of the interview. However, health selection may occur in the other direction too: the healthiest elderly have more 'outside activities' and thus are less likely to be available to answer the survey than the moderately disabled elderly - those with a fair health status and who are used to spend most of their time home- who will enjoy the visit of the interviewer. All in all, it is expected that the elderly having minor health problems or light dependency tend to be over-represented in the survey. This sub-population of elderly represents a particular interest for the development of at-home care policies because they are on the boundary between home and institution (they start having health problems and need care but their needs are not too important to justify an institutionalisation). The availability of family and/or at-home care providers will play a key role in the decision and the timing of institutionalisation. The development of at-home care will have a greater impact on this sub-population. It is therefore interesting to study their characteristics and their evolution.

## B. Effect of panel specific features

### *1. Advantages of the panel data[22]*

The 'panel' aspect of the PSBH offers many advantages:

1. It allows distinguishing **individual changes** and changes in the structure of the sample (or the population).

   *For instance,* the proportion of the sample who declare receiving at-home care services can increase over waves because of a structural change (e.g. the development of at-home care services) or a sample structural change (e.g. the population is ageing and more likely to need these services). But the individual care trajectories may be very heterogeneous: some respondents may use services during the whole survey, while others may use them occasionally, etc. Only panel data allow studying individual trajectories.

2. It allows measuring **lagged, long-term** and **short-term** effects of some care determinants.

   *For instance,* to measure the effect of the health status on the number of care-givers at a given $wave_n$, one can measure the **short-term** effect by taking the health status at this $wave_n$, the **lagged effect** by taking the health status at $wave_{n-1}$ and the **long-term** effect by combining the health status at $wave_{n-1}$ at $wave_n$ (stable good/bad health status, improving or worsening health status).

3. Unlike retrospective data, there are no memory problems because the questions refer to the current (at the time of the interview) or recent situation (over the last months).

### *2. Specific issues and problems of panel data*

If panel surveys are not frequent, it is because the organisation and the data management of this type of survey is very **expensive** and **time consuming**. Panel data are also more complex to analyse because they require using specific statistical techniques accounting for the non-independence of observations over waves in the explanatory analyses (see analyses part). In this point, the focus is on specific features of panel surveys which may influence the study of family care evolution. A detailed list of the panel surveys features is presented in Blossfeld *et al.* (2007:13-21) or in Tuma (2004:309-303) and a discussion on survey design effect in ageing research can be found in Ingram (1999).

1. **Panel conditioning (or panel bias)**: respondents may be tired to answer again and again to the same questions each year. They may find it easier to repeat the same answers over waves (even if it does no longer reflect the current situation) or to let a missing answer. Between-waves imputation can partially solve the problem. The interviewer characteristics and the fact of having the same interviewer over waves or not may also influence the answers of the respondents (Billiet & Loosveldt 1988).

2. **Selective attrition:** the selective attrition issue was already treated in general terms in section 1. In elderly population surveys, the main problem is the 'health' or 'ageing' selective attrition. The older old and the sick elderly are not only less likely to participate in surveys but also more likely to exit the panel before its end because of death, institutionalisation, important health problems, etc. This is a specific characteristic of this population which should be accounted for in the interpretation of the results.

3. **Window of observation:** the duration of the panel survey is limited in time. Some of the elderly respondents may have already received care before the beginning of the panel (left censored observations) or may receive care after the end of the panel (right censored

[22] Note that only advantages related to the study of family care evolution are presented. Other advantages such as the possibility to carry out causal analysis or to control for unobserved heterogeneity are not considered here.

observations). It is therefore not possible to observe the full care trajectory. However, the panel is quite long (11 years) and the age criteria of the study sample are such that the observed waves correspond to the life-stage when the respondent is more likely to experience changes in his care configuration (start of care for the younger cohorts, changes in the existing care for the older). It is therefore possible to study the care configuration 'sequences' (the successive care configurations the elderly experience during the panel period).

4. **Yearly data collection:** Some short-time care configuration may be overlooked (if they start and end between two annual interviews) (Peek *et al.* 1997). The exact timing and duration of a given care configuration is unknown. But, it is possible to compare the current care configuration with that of the previous year. Therefore, the results should be interpreted in terms of 'pattern' evolution.

## C. Differences between the general population and the PSBH effective sample

The main differences between the population of interest and the PSBH effective sample were mentioned in section 1. Some of them could influence the study of family care evolution.

1. The lower participation rate in Brussels is a common phenomenon: people are more likely to move from one place to another (difficult to track), more likely to live alone (and maybe more suspicious and less likely to let an unknown person enter their home for interview), less often at home (difficult to reach). **This may affect the feasibility of some regional comparisons and imply that the results concerning the effect of living in Brussels on care characteristics should be interpreted cautiously.**

2. People living in an 'urban' type of housing (e.g. flat, attached-house) and single-person households are also less likely to participate in the baseline survey. These two characteristics are mainly found in Brussels. However, they also refer to a more independent lifestyle: people may be less likely to receive family care because they do not want to depend on their family. **Their under-representation in the baseline sample may lead to an over-estimation of family care.**

3. The higher economic statuses are more likely to participate. This is also a well-know phenomenon, (also observed in the FRB/KBS° survey in Casman (2007)). This sub-population is usually healthier and more likely to pay quality at-home care services to substitute or to complete family care. **Their relative over-representation may imply an over-estimation of at-home care services.**

Note that the preview comments (A-C) are based on analyses of non-participation in the total population at the baseline. It is not certain that these problems of over- or under-representativity are observed in the 65+ age group. Indeed, the 65+ are well represented (as age-group) in the baseline sample: their proportion is quite similar to the proportion observed at census 1991 in the general population (Table V-3) especially in Flanders and in Brussels. The 65+ are slightly under-represented in Wallonia and the 80+ are under-represented in Brussels. The 'good' representativity of the dissertation population of interest (65+) means that there are probably no specific age group selectivity biases, but it does not mean that the 65+ participants are representative of this age group. To assess the representativity within the 65+ age group, comparisons of the 65+ in the PSBH and in the general population are needed. This will be done in section 3 (for the 65+ included in the study sample).

**TABLE V-3:** Proportion of 65+ by region: PSBH 1992 compared to Census 1991
(100% = population aged 0-85+)

| | **REGION** (p value of the $Chi^2$ test) | | | | | |
|---|---|---|---|---|---|---|
| | **Flanders** | | **Wallonia** | | **Brussels** | |
| | **PSBH 1992** | **INS/NIS 1991** | **PSBH 1992** | **INS/NIS 1991** | **PSBH 1992** | **INS/NIS 1991** |
| **AGE GROUPS** | (p value $Chi^2$=0.484) | | (p value $Chi^2$=0.378) | | (p value $Chi^2$=0.037) | |
| **65-69** | 5.0 | 5.0 | 4.8 | 5.4 | 5.8 | 5.3 |
| **70-74** | 3.5 | 3.3 | 4.0 | 3.7 | 3.1 | 4.0 |
| **75-79** | 2.8 | 2.8 | 2.5 | 2.8 | 3.0 | 3.4 |
| **80-84** | 1.1 | 2.0 | 1.1 | 2.0 | 1.8 | 2.6 |
| **85+** | 1.0 | 1.3 | 0.8 | 1.4 | 0.4 | 2.0 |
| **Total 65+** | **13.3** | **14.4** | **13.2** | **15.3** | **14.3** | **17.3** |

*Source:* Winfried (2004), own computation of the $Chi^2$.

## *SECTION 3. The study (elderly) sample*

The PSBH questionnaire allows doing analyses from both the care-giver and the care-receiver points of view (see chapter IV). The primacy of the care-receiver approach to study the care configuration was highlighted in chapter I (better knowledge of the care situation) and chapters II and IV (studies using care-receivers as unit of observation allow accounting for the care provided by multiple care-givers). The systematic literature review (chapter II) also showed that it was preferable to work on a general sample of elderly (not only on the disabled or effective care-receivers) to study the evolution of care over time.

This section explains how the study sample of elderly used for the dissertation is drawn from the PSBH baseline sample and which questionnaires will be used for the analyses. The attrition and the external validation of the study sample with the data of the Census 1991 and 2001 are also treated.

### A. Selection

Table V-4 shows the steps of selection from the 10,811 valid addresses to the 1,123 elderly respondents, fulfilling the conditions of being born before 1930 (aged 65+ at wave 3), of Belgian nationality and having completed an adult questionnaire at waves 1 and 3.

**TABLE V-4:** Selection of the study sample

<table>
<tr><td colspan="6">1° Private households sampled, valid addresses at wave 1 (n=10,811)</td></tr>
<tr><td rowspan="6">Households not interviewed<br>(n=6,372)</td><td colspan="5">2° Households interviewed (n=4,439)<br>=<br>Adults (16+) interviewed (n=8,741)</td></tr>
<tr><td>Born after 1929 (n=6,837)</td><td colspan="4">3° First selection criterion:<br>Born before 1930 (n=1,904)<br>Woman: 57%<br>Couple: 60%<br>Living alone: 31%<br>Age: 65-69: 30%, 70-74: 31%, 75-79: 16%, 80-84: 15%, 85+: 9%<br>Region: Flanders: 43%,Wallonia: 42%, Brussels: 15%<br>= POPULATION OF INTEREST</td></tr>
<tr><td rowspan="4">No questionnaire wave 1 (n=55)<br>Women: 67%<br>Couple: 55%<br>Living alone: 0%(*)<br>Age:<br>65-69: 20%,<br>70-74: 15%,<br>75-79: 11%,<br>80-84: 27%,<br>85+: 27%<br>Region:<br>Flanders:38%,<br>Wallonia:53%,<br>Brussels:9%</td><td colspan="3">4° Second selection criterion:<br>Questionnaire wave 1 (n=1,849)<br>Women: 56%<br>Couple: 61%<br>Living alone: 32%<br>Age: 65-69: 30%, 70-74: 31%, 75-79: 16%, 80-84: 15%, 85+: 8%<br>Region: Flanders: 45%, Wallonia: 40%, Brussels: 14%</td></tr>
<tr><td rowspan="3">Having not the Belgian nationality (n=145)<br>Women: 59%<br>Couple: 59%<br>Living alone: 28%<br>Age:<br>65-69: 26%,<br>70-74: 43%,<br>75-79: 13%,<br>80-84: 9%,<br>85+: 9%<br>Region:<br>Flanders: 17%,<br>Wallonia: 59%,<br>Brussels: 25%</td><td colspan="2">5° Third selection criterion:<br>Belgian nationality (n=1,704)<br>Women: 56%<br>Couple: 62%<br>Living alone: 32%<br>Age: 65-69: 30%,70-74: 30%,<br>75-79: 16%, 80-84: 15%, 85+: 8%<br>Region: Flanders: 45%, Wallonia: 41%, Brussels: 13%,</td></tr>
<tr><td>No questionnaire wave 3 (n=581)<br>Women: 56%<br>Couple: 60%,<br>Living alone: 32%<br>Age:<br>65-69: 23%,<br>70-74: 29%,<br>75-79: 16%,<br>80-84: 21%,<br>85+: 12%<br>Region:<br>Flanders: 45%,<br>Wallonia: 38%,<br>Brussels: 17%<br>Attrition reason(**)<br>Refusal: 57%<br>Dead: 12%,<br>Sick: 10%,<br>Institutionalised: 6%,<br>Other reason: 15%</td><td>6° Forth selection criterion:<br>Questionnaire wave 3 (n=1,123)<br>Women: 56%<br>Couple: 62%,<br>Living alone: 32%<br>Age:<br>65-69: 34%,<br>70-74: 31%,<br>75-79: 17%,<br>80-84: 12%,<br>85+: 6%<br>Region:<br>Flanders: 45%,<br>Wallonia: 41%,<br>Brussels: 13%<br><br>= STUDY SAMPLE of elderly[23]</td></tr>
</table>

(*) To belong to this group (participant non-respondent), individuals must 1° being registered in a contact sheet at the first wave (meaning that at least one household member answer a questionnaire at this wave) and 2° have not answered a questionnaire themselves. Therefore, the household size is necessarily bigger than one.
(**) The attrition may have occurred at wave 2 or at wave 3.

[23] Since now, 'elderly respondents' is used to refer to the 1,123 elderly constituting the study sample.

The figures of the two first steps can be found in table V-1 and table V-2. The real selection process starts at *step 3*. Since that step, the distributions of key characteristics (gender, living arrangement, age group, and region) are displayed. This allows assessing what are the characteristics of the excluded sub-samples and to what extent the study sample is 'selected' compared to the participating elderly (comparison of population at steps 2 and 6). The **population of interest** is defined as '**people born before 1930'**. The year '1930' was chosen because all the people born before 1930 were aged **65+** at **wave 3** (1994), the first standardised wave. Given this complex study sample selection process, the dissertation analyses will not be weighted.

*Why 65+?*

The age of **65** was chosen because it is often used as a cutoff to define the older adults in reference to the retirement age (e.g. Denton 1997; Breuil-Genier 1998; Vollenwyder *et al.* 2002; Abramowska *et al.* 2005; Fontaine *et al.* 2007). Although most of the people in their late 60s are completely independent and do not need care, it enlarges our sample size allowing us having the different cohorts to compare and to study the ageing process over waves.

*Why 65 at 1994?*

Many changes in the adult questionnaire occur between wave 1 and wave 3. Longitudinal analyses of care can only be done since wave 3, when the questionnaires were standardised. For this reason, the risk group (aged 65+) should be defined at this wave. Another reason for not starting the analyses at the baseline wave is that questions of important determinants of care (subjective health status and disability level) are only asked from wave 3.

*Why not accepting respondent reaching 65 during the panel?*

In some longitudinal studies, 'late entry' (people entering in the risk group during the panel) is accepted (Singer & Willet 2003). Here, it would mean to accept people reaching 65 during the panel and considering only the waves when they have 65+. Late entrances are, however, not included in the dissertation research because they belong to younger birth cohorts and may have other characteristics and experiences[24] than those described in chapter III.

One thousand, nine hundred and four participants meet this criterion.

*The step 4* consists in keeping only those who have answered an adult questionnaire at wave 1.

*Why working on a sample of 'respondents' and not of 'participants'?*

Because all the questions related to family care are included in the adult questionnaire. Therefore, the selection, the rules of follow-up and the attrition analysis should be based on the response to the adult questionnaire and not only on the participation (being registered in the contact sheet of a participating household.

*Why requiring the answer to the adult questionnaire at wave 1 while the longitudinal analyses can only start at wave 3?*

Because some questions like the number of children and the socio-economic status are only asked at wave(s) 1 (and 2).

Fifty-five elderly did not survive this criterion: mainly women, very old, not in couple and living in Wallonia. This description may correspond to intergeneration cohabitation, more frequent in this

[24] The cohort culture is an important aspect of the Life Course framework. The study cohorts (1900-1929) have in common to have experience a World War as a teenager and/or an adult and to be 65+ in 1994.

region. Note that the distribution of the remaining 1,849 elderly is quite similar to the one of the participants (step 3).

*At step five*, the foreigners were excluded[25]

> *Why not to consider foreigner elderly living in Belgium?*
>
> There are four reasons:
>
> The first is that the PSBH panel was not especially designed to insure the representativity of the foreigners. This population is usually less likely to answer to surveys for language or other cultural reasons. Therefore, they are likely to be under-represented and be highly selected.
>
> The second reason it that the literature shows (Moulin *et al.* 2006) that the habits and preferences in terms of elderly care of immigrants remain very much influenced by their initial culture. For instance, North-Africans usually prefer to rely on the family only and are reluctant to use at-home care services.
>
> The third reason it that the foreigner elderly are more likely to have lived a part of their life out of Belgium and to have experienced other contexts than those of the Belgian cohorts 1900-1929 described in chapter III.
>
> The fourth reason it that elderly foreigners are not very numerous in the PSBH sample.

The 145 excluded foreigners are more likely to live in Brussels than the respondents having the Belgian nationality. No other difference is found at this stage[26].

The final step is to keep only the respondents who answered the adult questionnaire at wave 3.

> *Why requiring the answer to the adult questionnaire at wave 3?*
>
> Because it is the first 'study wave'[27].
>
> *What about respondents answering to adult questionnaire at waves 1 and 3 but not at wave 2?*
>
> They are included in the study sample because the follow-up rules (point 4) allow imputing short-term attrition.

The study sample is composed of 1,123 elderly respondents[28]. The proportion of 80+ is lower than in the population of interest. This is mainly due to the exclusion of elderly respondents who did not answer the adult questionnaire at wave 3. The relatively high proportion of health related attrition reasons (12% died, 10% are sick and 6% moved to an institution) suggests a health selection, unavoidable in elderly studies (Feng *et al.* 2006).

[25] The Belgian nationality is based on the nationality at birth which reflects better the culture of the elderly. If this variable is missing, the current nationality is used. It is assumed that the Belgian cohorts have spent most of their life in Belgium and were influenced by the general context presented in chapter III.

[26] Since now, the expression 'Belgian (birth) cohort(s)' is used as a synonymous of 'birth cohort(s) living in Belgium and having the Belgian nationality'.

[27] Since now, 'study waves' is used to refer to the 9 standardised waves (3-11) because most of the analyses will start at wave 3. The term 'PSBH waves' will be used to refer to all the 11 waves. Therefore, the first 'PSBH wave' (or the 'baseline wave') is wave 1 (1992) and the first 'study wave' is wave 3 (1994).

[28] The panel baseline households may include 0, 1, 2 or more elderly respondents. Cohabiting elderly respondents may live in couple but not necessarily. For instance, if an elderly respondent has a spouse who is too young or who is a foreigner, the spouse will not be selected. Two or more cohabiting elderly who are not in couple (e.g. siblings, cousins, older child living with a very old parent, etc.) will be all selected if they meet the selection criteria.

## B. Questions used

The variables used as determinants of care (described in chapter VI) come from the household and adult questionnaires. In all cases, they are measured at the individual level. The care dependent variables are build on the basis of the adult questionnaire and on the contact sheet (for identifying the presence of a spouse and/or cohabitant child(ren)). In addition, the contact sheet provides information on the attrition reasons which will be analysed in point D.

The children questionnaire will not be used for the dissertation because it concerns the cohorts 1977-2002 (aged less than 16 at the interview[29]) and they are more likely to be grandchildren than children of the elderly study cohorts (1900-1929). This questionnaire does not include questions on care and is thus of no use for analysing the care provided by spouse or children.

The questions included in the 'added module' questionnaire are not used for the dissertation because they are only asked at a given wave and are therefore not useful for the analyses of family evolution over time.

## C. External validation

### *1. Objective and material used for the validation*

The purpose is this point is to verify whether the study sample is representative of the population of interest (the Belgian birth cohorts 1900-1929 still alive and living at-home in 1992). The best data for the external validation seems to be the Census 1991. Its advantages are: **(1)** the data are collective on the entire registered[30] population of Belgium (there are no selection criteria); **(2)** It is possible to select the respondents having the Belgian nationality[31] for the comparisons; **(3)** the data are collected only one year before the baseline wave of the PSBH, it is therefore possible to compare the birth cohorts 1900-1929 of Census 1991 with the study sample (1992) making the hypotheses that differences in the mortality of these cohorts will not be too important between the two data collection. The main disadvantage (or limitation) of the use of the Census for the external validation is that it is not possible to select only the elderly living at-home[32]. The comparison will be carried out on the total population of Belgium having the Belgian nationality and born between 1900 and 1929. The inclusion of the institutionalised elderly in the Census data should influence the results as follows: the proportion of women, very old people, the lower educated and widowed - characteristics more frequently observed among institutionalised elderly - is expected to be lower in the study sample than in the Census. The difference is expected to be larger in Wallonia and Brussels due to the higher institutionalisation rate in these regions.

Five characteristics are used for the external validation: gender, region, birth cohort, education level and marital status. Birth cohort, education level and marital status are analysed by gender and region. This allows seeing if the potential over- or under-representativity of a characteristic is general

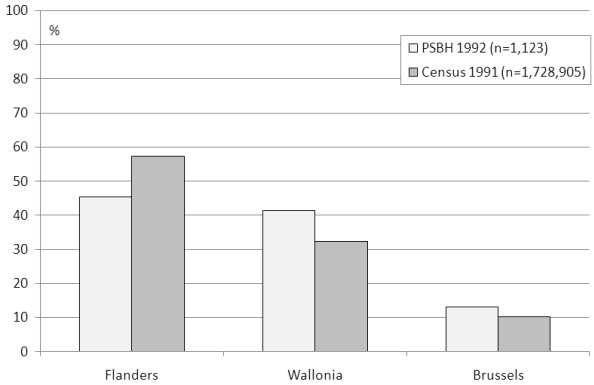
[29] The oldest are those aged 15 in 1992 (born in 1977), the youngest are those aged less than 1 in 2002 (born in 2002).
[30] A very small proportion (less than 1%) of the population is not registered: illegal, without papers people or without fixed place of living, etc. (see *Observatoire de la Santé et du Social Bruxelles*-OSSB*/Observatorium voor Genzonheid en Welzijn Brussel*-OGWB 2006).
[31] Note that in the Census, the current nationality is considered, while the study sample, privileges the nationality at birth.
[32] Part of the institutionalised elderly are still registered as living at their previous private address. It implies that the proportion of elderly living *de facto* in 'collective households' is under-estimated in the Census (Boulanger *et al.* 1997).

or limited to a specific region and/or gender. In the next point, the comment focuses on the general trends and the large differences (>5%) observed between the Census 1991 and the PSBH 1992.

## *2. Region*

Remember that the PSBH design over-represents Brussels and Wallonia to allow regional analyses (section 1). In the study sample (graph V-1), the over-representation of Wallonia is the most striking: 41.41% against 32.43% in the general population (Census). The proportion of Brussels inhabitants is slightly higher in the study sample (13.18% against 10.27%), but not so much. A larger difference would have been expected. But the low participation rate in Brussels (reducing the share of Brussels inhabitants in the PSBH) and the fact that the Census includes institutionalised elderly (increasing the share of Brussels elderly inhabitants) may contribute to reduce the gap.

**GRAPH V-1:** Belgian cohorts born before 1930 by region (Belgium=100%)

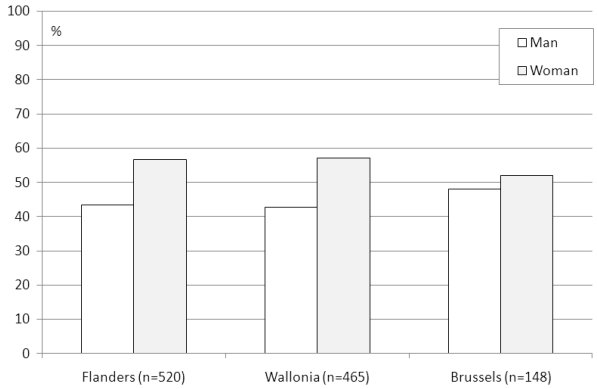



*Sources:* Census 1991 (own calculations), PSBH 1992. *Note*: p value Chi$^2$=0.557 (figures in appendix table V-2)

## *3. Gender*

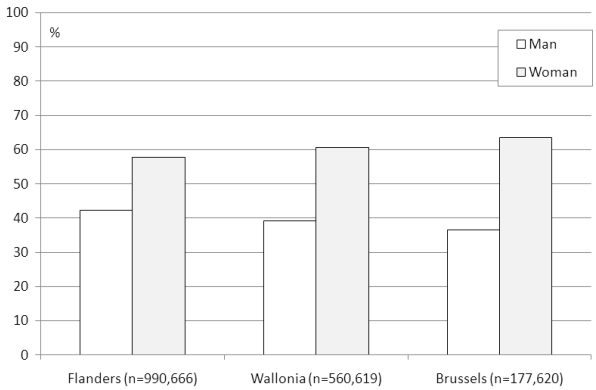
Women are in majority in the three regions in both surveys (graphs V-2). This was expected: it is the feminisation of ageing. However, the phenomenon is less marked in the study sample. Compared to the Census, men are over-represented in the study sample (especially in Brussels: 47.97% against 36.42% in the Census). These differences may be simply due to the fact that the Census includes institutionalised elderly (mainly women). The study sample might well represent the gender distribution in the elderly population living at home.

**GRAPH V-2A:** Belgian cohorts born before 1930 by gender and region (region= 100%)




*Source:* PSBH 1992

**GRAPH V-2B:** Belgian cohorts born before 1930 by gender and region (region= 100%)



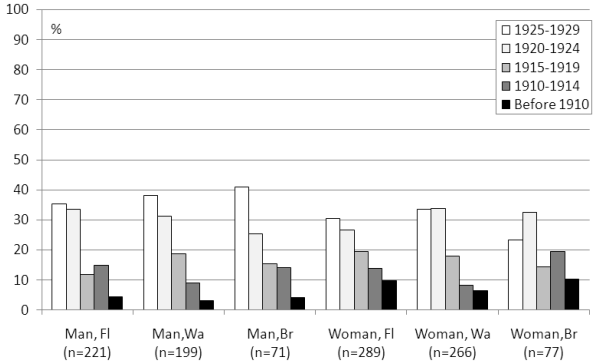

*Source:* Census 1991, own calculations

*Note*: the p value of the Chi$^2$ test comparing the gender distribution in the PSBH and in the Census is equal to 0.825 for Flanders, 0.471 for Wallonia and 0.02 for Brussels. (figures in appendix table V-2).

## *4. Birth cohort*

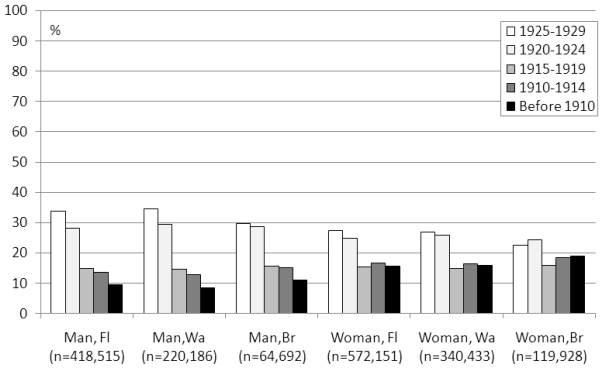
In both surveys (graphs V-3), there is a higher proportion of men among the younger cohorts 1925-1929 and 1920-1924 and a higher proportion of women among the older cohorts (1910-1915, before 1910). The inhabitants of Brussels tend to be older (larger proportion in the two oldest cohorts). In the Census 1991, the birth cohort distributions of Flanders and Wallonia are quite similar, but in the study sample, the Walloons are globally younger than the Flemish. This may be explained by a higher selectivity of older Walloon still living at-home in their old ages. The Chi$^2$ test shows that the distribution of cohort groups among Walloon women in the PSBH differs significantly from the Census.

**GRAPH V-3A:** Belgian cohorts born before 1930 by cohort, gender and region (a given gender and region= 100%)




*Source:* PSBH 1992

**GRAPH V-3B:** Belgian cohorts born before 1930 by cohort, gender and region (a given gender and region= 100%)




*Source:* Census 1991, own calculation

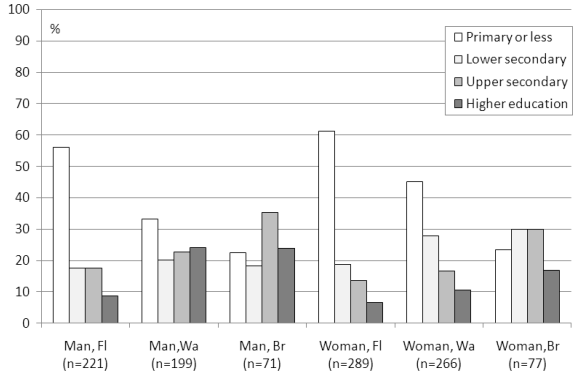
*Notes*: the p value of the Chi$^2$ test comparing the distribution of birth cohorts by region and gender in the PSBH and in the Census equals 0.346 for Flemish men, 0.184 for Walloon men and 0.064 for men living in Brussels; 0.369 for Flemish women, 0.006 for Walloon women, and 0.144 for women living in Brussels. Figures are in appendix table V-3.

## *5. Education level*

In the Census 1991 (graphs V-4), 92% of the Belgian cohorts born between 1900 and 1929 gave a valid answer to the question of the 'last obtained diploma' (the invalid responses are the most frequent in Brussels, 17.39% against 7.45% in Wallonia and 7.19% in Flanders). I tried to obtain more information from previous Censuses[33] (already used in chapter III for the cohort context). In the Census 1947 (INS/NIS 1951a), the question of education asks if the respondent is 'able to write and read' or not. The proportions of literate respondents among the 21-60 (which correspond to the study cohorts) are about 97-98% with neither large gender nor region differences. In the Census 1961, the distribution of the education level (for all population aged 14+ who are no more enrolled in school) shows a lower proportion of people 'having no more than a primary school diploma' in Brussels (INS/NIS 1966a).

In the Census 1970 (INS/NIS 1975), the results are available by age groups, gender and regions. Among the 45-64 (corresponding to the birth cohorts 1906-1925) both regional and gender differences are observed: women are less educated than men (for the three regions) and Brussels inhabitants are better educated. In the Census 1981 (INS/NIS 1986b), the published tables on education level concern not the general but the active population. This does not provide useful information, because most of the study cohorts have left the labour market at that time (the younger are aged 52+ in 1981).

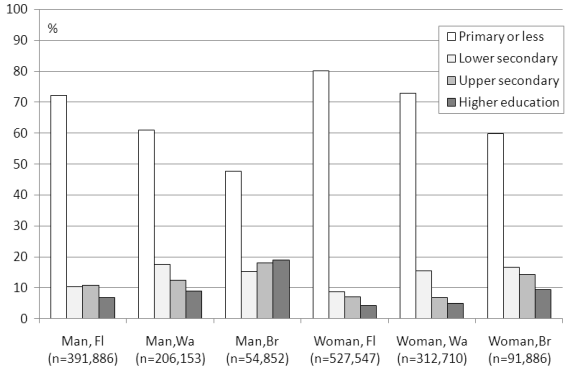
**GRAPH V-4A:** Study sample by education level, gender and region (a given gender and region= 100%)




*Source:* PSBH 1992

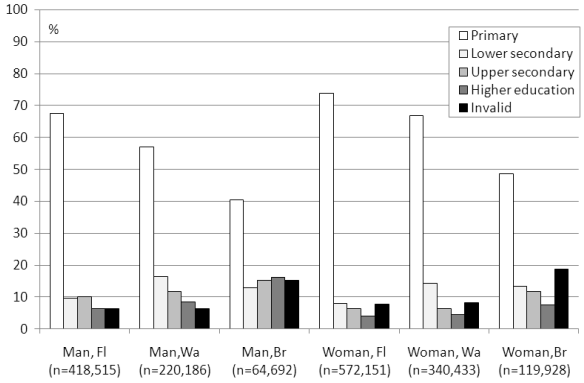
[33] Note that the age is usually grouped and that Belgians and foreigners are pooled in the published tables. It is therefore not possible to strictly compare the population of interest (Belgians born between 1900 and 1929). The tables coming from the Censuses 1947, 1961 and 1970 are displayed in appendix tables III-9 to III-11.

**GRAPH V-4B:** Study sample by education level, gender and region (a given gender and region= 100%) (valid answers only)




*Source:* Census 1991, own calculations
*Note*: The initial categories (more detailed) are grouped as follow: Primary (no diploma, primary diploma), low secondary (general, artistic, technical, professional), upper secondary (general, technical, professional), higher education (university, college of further education, teacher-training college).

**GRAPH V-4C:** Study sample by education level, gender and region (a given gender and region= 100%) (with invalid answers)




*Source:* Census 1991, own calculations
*Note*: The initial categories (more detailed) are grouped as follow: Primary (no diploma, primary diploma), low secondary (general, artistic, technical, professional), upper secondary (general, technical, professional), higher education (university, college of further education, teacher-training college).

*Note (for the three graphs)*: the p value of the $Chi^2$ test comparing the distribution of education level by region and gender in the PSBH and in the Census (computed on valid answers based on graph V-4b) equals 0.003 for Flemish men and is <0.001 for all the other sub-groups; (computed on valid answers based on graph V-4c) equals 0.002 for Flemish men and is <0.001 for all the other sub-groups. (Figures are in appendix table V-4).

In the study sample and in the two Census graphs (excluding or not the invalid answers), there is a large proportion of lower educated (primary school diploma or less) and the women tend to be lower educated than men. These are two characteristics of the study birth cohorts. However, some large differences are observed between the study sample and the Census 1991. There is an under-representation of the lower educated in the study sample (the difference tends to decrease when the invalid answers are included in the Census sample[34]). This under-representation can partly be explained by the fact that lower educated are usually less likely to answer the survey and partly by the inclusion of institutionalised elderly in the Census. This hypothesis is supported by the fact that the under-representativity is especially marked in Brussels and, to a lesser extent in Wallonia (where institutionalisation is more frequent and arrives earlier in their lifetime). The representativity is the best in Flanders (where the participation rate is the highest), there is a clear over-representation of the higher educated in Brussels and of Walloon men. For Brussels, this should be linked to the over-representation of the very old and could be explained by a selection of elderly living in the community: higher educated are more likely to be healthy and still autonomous in old age. Furthermore, if needed, they can afford buying high-quality or intensive at-home care services. I do not have hypothesis on the Walloon men.

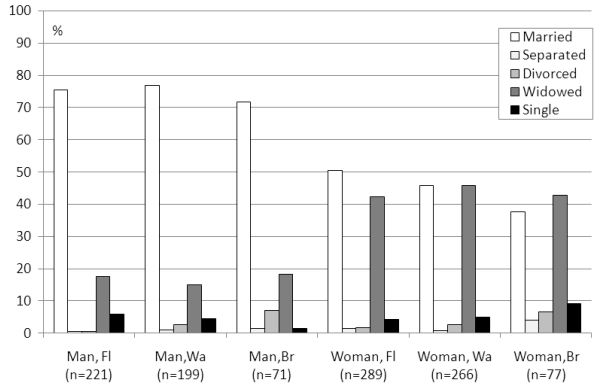
## *6. Marital status*

The same trends are observed in both surveys. The proportion of divorced and separated is very small because divorce was very unusual for the birth cohorts 1900-1929. The proportion of single is

[34] Including the invalid answers as a separate modality seems to be a more realistic solution. Distributing the education level on valid answers only implies that the actual level of education of people with invalid answers, follows the same distribution than the valid answers, which is very unlikely.

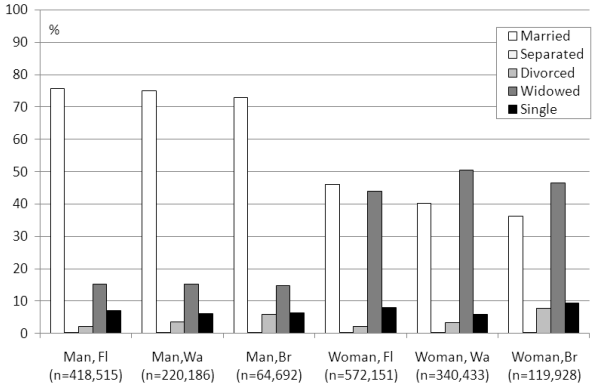
also quite low, without gender or region difference. As expected, women are more likely to be widowed than men are.

**GRAPH V-5A:** Study sample by marital status, gender and region (a given gender and region= 100%)




*Source:* PSBH 1992

**GRAPH V-5B:** Study sample by marital status, gender and region (a given gender and region=100%)




*Source:* Census 1991, own calculation

*Note*: the p value of the Chi$^2$ test comparing the distribution of marital status by region and gender in the PSBH and in the Census equals 0.106 for Flemish men, 0.152 for Walloon men and 0.002 for men living in Brussels; is <0.001 for Flemish women, 0.145 for Walloon women and <0.001 for women living in Brussels. (Figures are in appendix table V-5).

To sum up, the external validation shows that similar patterns are observed in the PSBH 1992 and in the Census 1991 (except for education). The differences in proportion are possibly due to the fact that the Census data includes institutionalised elderly. Unfortunately, there is no representative survey of the elderly population living at home contemporaneous of the PSBH. The external validation is thus limited, but allows identifying specific patterns of the study (e.g. the selectivity of Brussels inhabitants) which should be considered in the interpretation of the results. It is nevertheless important to remember here that the main purpose of the dissertation is to understand the determinants and the evolution of family care. The relative representativity or selectivity is an issue to be discussed but the strict 'representativity' of the sample is not the priority.

## D. Follow-up and attrition

### *1. Measure of the study sample attrition*

As mentioned earlier, the general follow-up rules of the PSBH baseline sample allows temporary attrition: panel persons who did not answer the adult questionnaire for one or more successive waves are not definitively excluded from the sample. They are still eligible to answer an adult questionnaire at the following waves. In the study sample, 19 respondents did not answer the adult questionnaire at wave 2, 67 respondents did not answer the questionnaire at one or more study waves (but the missing waves are not consecutive) and 6 respondents did not answer two or more consecutive waves. The first two situations can be considered as 'short-term' attrition and the last situation as 'long-term' attrition.

The decision was to impute short-term attrition: all the variables of the missing questionnaire are imputed following the same imputation rules as for the missing values[35] (see chapter VII). Long-term attrition was not imputed and considered as permanent attrition. The reason for that is twofold: only six respondents are concerned, the loss of waves is quite small; in these cases, the between-waves

[35] When the adult questionnaire is filled in but some responses are missing.

imputation should largely over-estimate stability over waves. Table V-5 compares the decrease of the study sample size over the study waves according to three ways of defining the attrition. The first two columns show the most restrictive solution: as soon as the elderly does not complete an adult questionnaire, he is 'lost' for the following waves. Columns 3 and 4 present the less restrictive solution: only elderly who will never complete an adult questionnaire again are 'lost'. Columns 5 and 6 show the 'middle-way' solution explained above and used in this dissertation. The last columns give the number of completed adult questionnaires. Note that the 'losses' do not differ much from one solution to another.

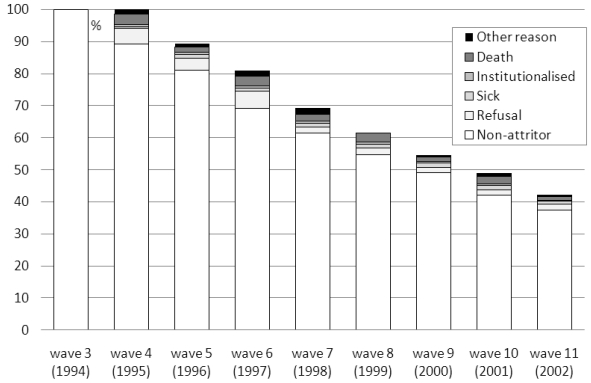
**TABLE V-5**: Over waves attrition in the study sample (restrictive, non-restrictive and middle way solutions)

| WAVE | ATTRITION DEFINITION | | | | | | |
|---|---|---|---|---|---|---|---|
| | **First attrition** (short-, long-term or permanent) | | **Permanent attrition** | | **Permanent or long-term attrition** | | **Number of adult questionnaires** |
| | Remaining Sample | Lost | Remaining Sample | Lost | Remaining sample | Lost | |
| Wave 3 | 1,123 | 135 | 1,123 | 119 | **1,123** | **120** | 1,123 |
| Wave 4 | 988 | 105 | 1,004 | 90 | **1,003** | **93** | 988 |
| Wave 5 | 883 | 135 | 914 | 133 | **910** | **133** | 898 |
| Wave 6 | 748 | 91 | 781 | 84 | **777** | **86** | 771 |
| Wave 7 | 657 | 78 | 697 | 76 | **691** | **77** | 679 |
| Wave 8 | 579 | 62 | 621 | 66 | **614** | **64** | 612 |
| Wave 9 | 517 | 78 | 555 | 77 | **550** | **77** | 544 |
| Wave 10 | 439 | 47 | 478 | 54 | **473** | **53** | 468 |
| Wave 11 | 392 | | 424 | | **420** | | 424 |

*Source:* PSBH 1994-2001. *Note:* Waves 1 and 2 are not included in the table because, by selection of the study sample, all the elderly are answering an adult questionnaire at wave 3. Wave 4 is the first where attrition can be observed.

Using the third definition of attrition, there are 420 non-attritors and 703 attritors. Graph V-6 shows how the study sample diminishes over waves and for which reason the elderly leave the panel before its end. The refusal is the more frequent attrition reason, especially at the second study waves.

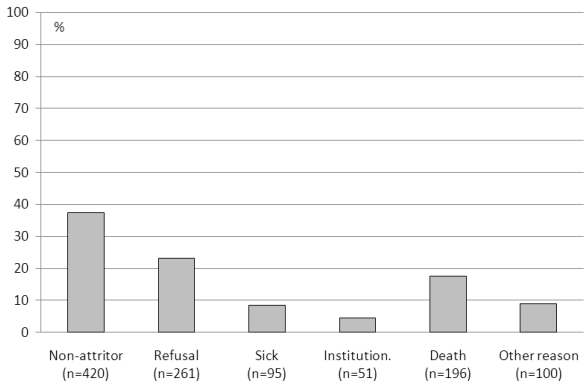
**GRAPH V-6:** Attrition of the study sample over waves by attrition reason (initial n=1,123)




*Source:* PSBH 1994-2002 (Figures are in appendix table V-6). *Note:* the attrition reason is registered at the first wave of absence (the proportion of refusal in the last bar refers to the proportion of respondents still in the panel at wave 10 and refusing to answer the 11th wave).

The next graph (V-7) shows the distribution of the attrition status (attritor/non-attritor) in the study sample and specifies the attrition reason (regardless the wave when the respondent leaves the sample). The two main attrition reasons are refusal (23.24% of the study sample) and death (17.45%)[36].

**GRAPH V-7:** Study sample by attrition status and attrition reason




*Source:* PSBH 1994-2002

Some studies (e.g. Spitze & Logan 1992, Tennstedt *et al.* 1993, Peek *et al.* 1997) prefer to carry out the analyses on the non-attritors only. This has the advantage of working on a 'balanced' sample: each individual is observed the same number of waves. However, it has two main disadvantages: the risk of working on a smaller and often (very) selected sample. The alternative is to work on an 'unbalanced' sample: each individual is observed at all the waves before attrition. Therefore, the number of waves of observations varies between individuals. The advantages of this solution are that it uses a maximum of the available information and that it allows working on a larger initial sample. The disadvantage is that the probability of change is likely to be associated with the time of observation. Therefore, it is more likely to observe changes in respondents who stay longer in the panel. Selectivity over waves can also be a problem. In both cases, if attritors and non-attritors differ on characteristics associated with the study phenomenon (here: care), this may affect the results of the analyses.

## *2. Comparison of the characteristics of attritors and non-attritors*

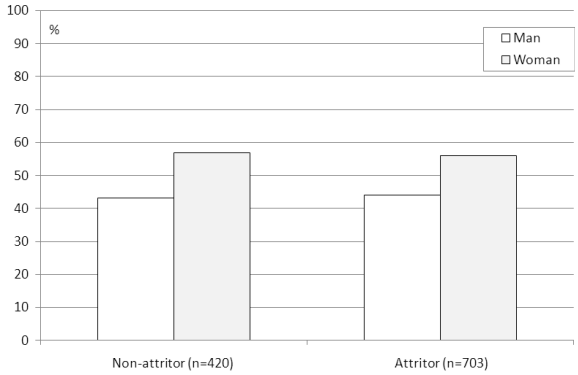
The comparison of the characteristics of attritors and non-attritors allows assessing if and how they differ. The next graphs V-8 to V-25 compare the distribution of the variables used to build the care determinants (gender, birth cohort, region, urbanisation level, education level, last profession, religiosity, ability to make ends meet, partnership, number of children, recent hospitalisation, subjective health status, disability level) [37] at the first study wave (1994) for attritors and non-

[36] As one can expect, elderly who leave the panel because of sickness, institutionalisation or death are more likely to have a bad subjective health (about a third against 20.93% in the whole study sample) than those remaining in the sample until the end or who leave for refusal or another reason (about 15-22%). The age difference is only visible for those moving to an institution or dying (respectively 39.22% and 27.04% are aged 85+ at their last study wave against 17.19% in the whole study sample). The characteristics of the study sample according to the attrition reason is not considered in the further analyses of care because (1) some modalities have small numbers (institution n=51); (2) the 'other reason' modality may blur the results as we do not know what are the real reasons (health related or not); (3) we only have information about the main reason at a given time (a respondent may 'refuse' to continue answering the panel because he is depressed, sick, etc.).

[37] The variables definition and building of indicators are later presented in chapter VII.

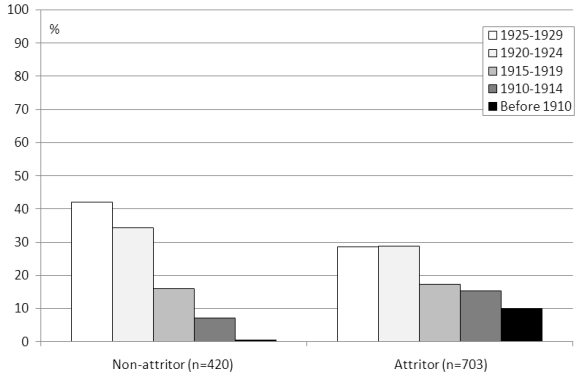
attritors. The level of signification of the Chi² test is also given[38]. As mentioned earlier, health selection is likely to occur in elderly samples. To identify it, the distribution of the three health variables is compared at the first study wave and at the last study wave[39] (to see if the health status is linked to attrition[40]). Finally, the care combination (family care/care service) is distributed at the first and at the last study wave[41]. The exact proportions in the two sub-samples and in the whole study sample are displayed in tables V-6 and V-7.

**GRAPH V-8:** Attrition status by gender in the study sample at wave 3 (ns)



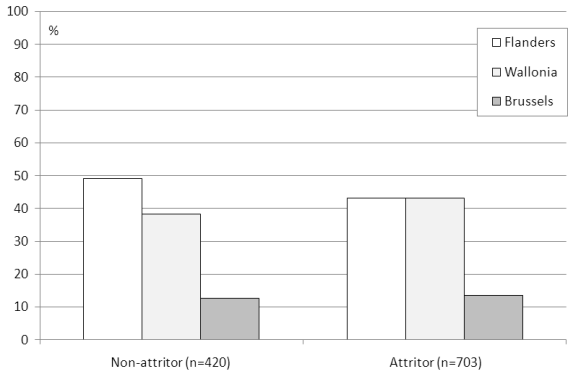

*Source:* PSBH 1994.

**GRAPH V-9:** Attrition status by birth cohort in the study sample at wave 3 (***)



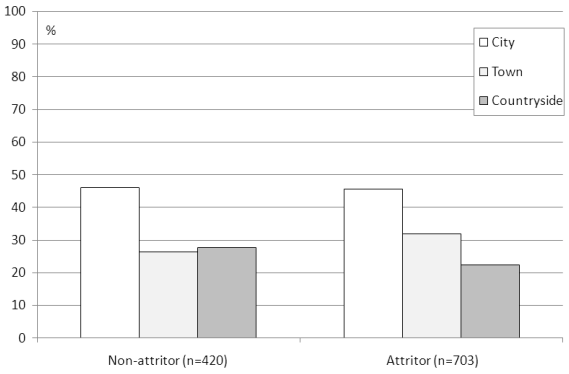

*Source:* PSBH 1994.

**GRAPH V-10:** Attrition status by region in the study sample at wave 3 (ns)




*Source:* PSBH 1994.

**GRAPH V-11:** Attrition status by urbanisation level in the study sample at wave 3 (*)




*Source:* PSBH 1994.

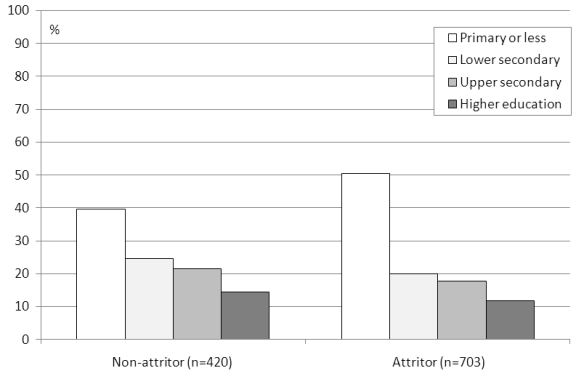
[38] For parsimony and legibility reason, in the rest of the dissertation, the p value of the Chi² test will be indicated as follows: ns: not significant at 10%; *: [0.05 < p value < 0.1]; **: [0.01< p value < 0.05]; ***: [p value <0.01]. These conventions are used for all the further analyses.

[39] Note that the 'last study wave' differs from one individual to another. For the non-attritors, it is necessary wave 11. For the attritors, it can be equal to the first study wave (if the have left the panel at wave 4) or any other wave except wave 11. In the rest of the text, the expression 'last (study) wave' is always used in this sense. When referring in particular to wave 11, I will write 'wave 11'. The term '(study) waves of presence' is used to refer to all the (study) waves of a given elderly after imputation of temporary attrition.

[40] Note that the declared attrition reason already gives some information: elderly leaving the sample because of sickness, going to an institution or because they died were probably less healthy. However, elderly having left the panel for another reason (e.g. refusal, 'other reason') may also have health problems.

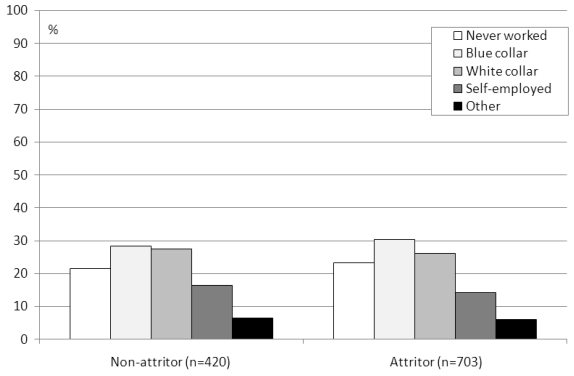
[41] Note that the care combination variable is only distributed on the sub-sample of those having a spouse and/or children at the given wave because family-less respondents cannot be 'eligible' for all the modalities of the care combination variable (they can be in the 'no care' and in the 'care services' modalities but neither in the 'family care' nor in the 'mixed care' modalities).

**GRAPH V-12:** Attrition status by education level in the study sample wave 3 (***)



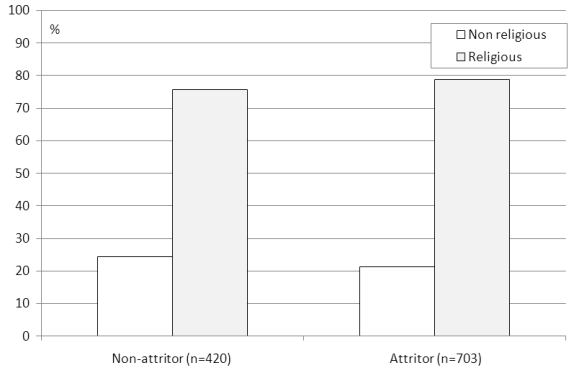

*Source:* PSBH 1994.

**GRAPH V-13:** Attrition status by last occupation in the study sample wave 3 (ns)



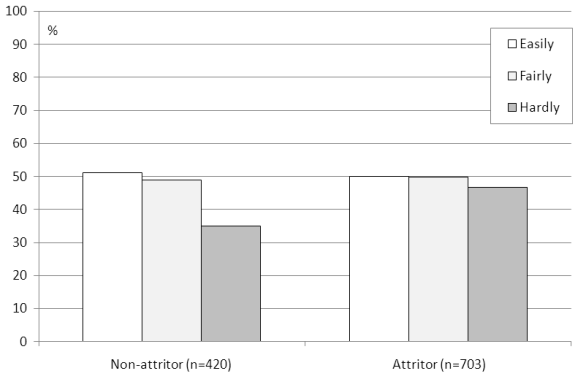

*Source:* PSBH 1994.

**GRAPH V-14:** Attrition status by religiosity ('being catholic or of other denomination') in the study sample at wave 3 (ns)



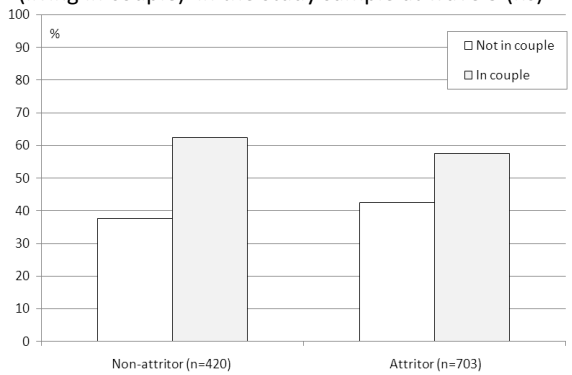

*Source:* PSBH 1994.

**GRAPH V-15:** Attrition status by ability to make ends meet in the study sample at wave 3 (***)



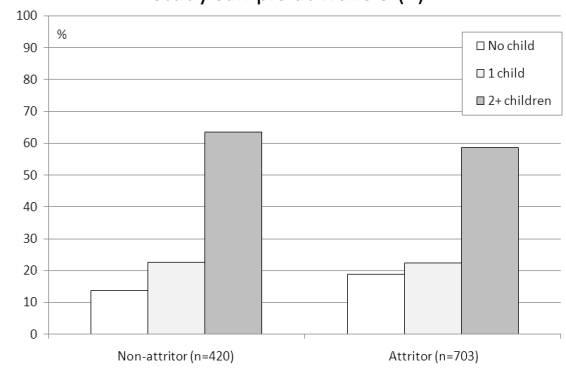

*Source:* PSBH 1994.

**GRAPH V-16:** Attrition status by partnership status (living in couple) in the study sample at wave 3 (ns)




*Source:* PSBH 1994.

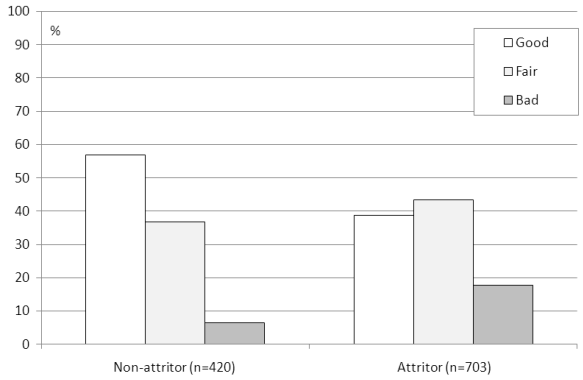
**GRAPH V-17:** Attrition status by number of children the study sample at wave 3 (*)




*Source:* PSBH 1994.

WAVE 3

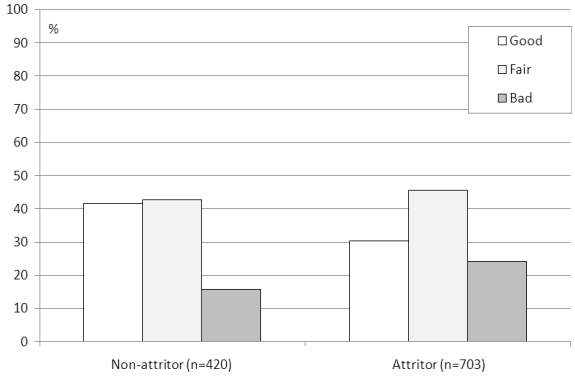
**GRAPH V-18:** Attrition status by subjective health in the study sample at wave 3 (***)




*Source:* PSBH 1994.

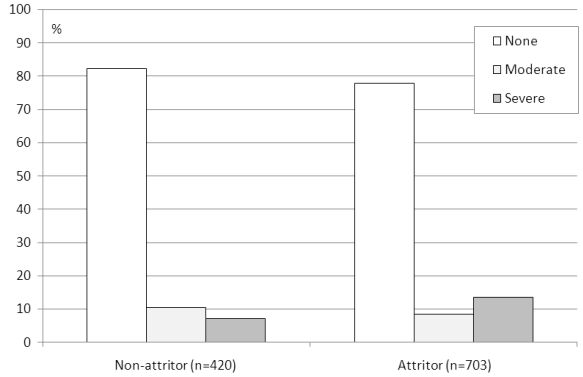
LAST WAVE

**GRAPH V-19:** Attrition status by subjective health in the study sample at their last study wave (***)



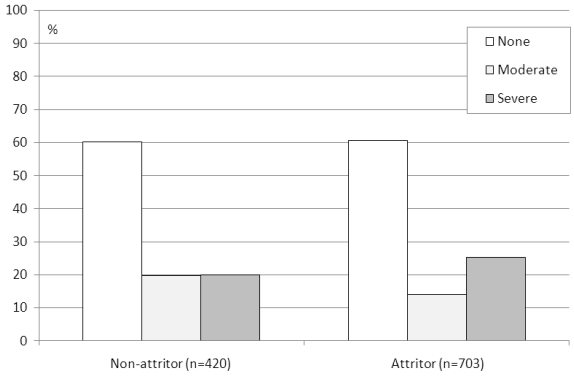

*Source:* PSBH 1994-2002.

**GRAPH V- 20:** Attrition status by disability in the study sample at wave 3 (***)



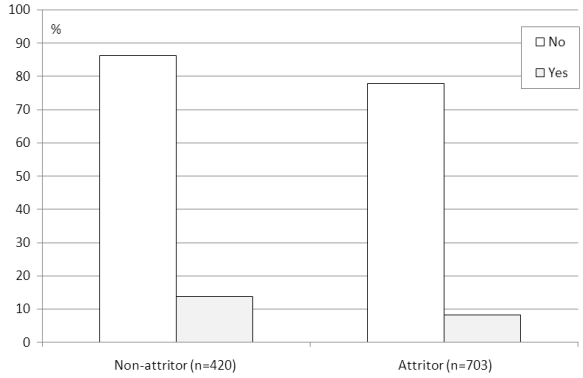

*Source*: PSBH 1994.

**GRAPH V- 21:** Attrition status by disability in the study sample at their last study wave (*)



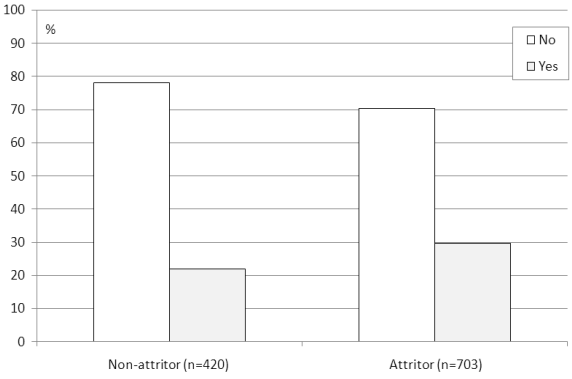

*Source:* PSBH 1994-2002.

**GRAPH V-22:** Attrition status by recent hospitalisation (ever hospitalised over the 12 past months) in the study sample at wave 3 (***)



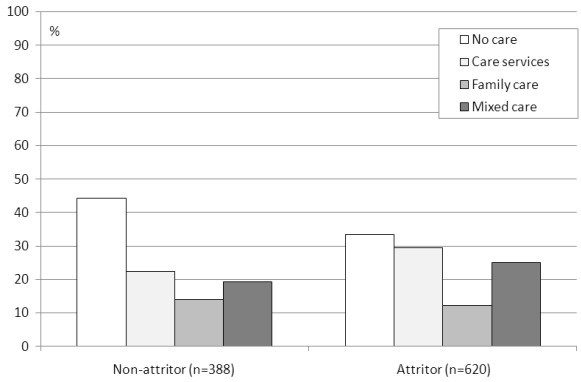

*Source:* PSBH 1994.

**GRAPH V-23:** Attrition status by recent hospitalisation (ever hospitalised over the 12 past months) in the study sample at their last study wave (**)



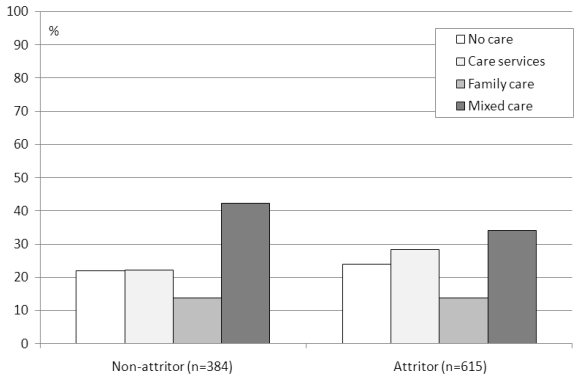

*Source:* PSBH 1994-2002.

**GRAPH V-24:** Attrition status by care combination in the study sample (only respondents having a spouse and/or children at wave 3)(***)




*Source:* PSBH 1994.

**GRAPH V-25:** Attrition status by care combination in the study sample (only respondents having a spouse and/or children at their last wave)(*)




*Source:* PSBH 1994-2002.

As expected, the main differences between attritors and non-attritors are related to the ageing process: older cohorts and respondents having a bad health condition at the first study wave are more likely to leave the sample before its end. The health difference is also visible at the last study wave but the proportion of elderly having (severe) health problems at the last wave is higher than at the first study wave in both sub-samples. As noticed by Mendes de Leon (2007) the health selection effect tends to attenuate over time because all the respondents are ageing during the panel and more likely to have problem with their health. Non-attritors are less likely to receive care at the first study wave but more likely to receive mixed care (from family and at-home care services) at the last wave. Other significant differences are: non-attritors are more likely to live in the countryside and to be high or middle educated and to have children.

**TABLE V-6**: Distribution of health variables and care combination at wave 3 (W3) and at the last study wave (LSW), by attrition status (PSBH 1994-2002)

| | | WAVE 3 | | | LAST STUDY WAVE | | |
|---|---|---|---|---|---|---|---|
| **VARIABLES** | **MODALITIES** | **Non-attritor** (n=420) | **Attritor** (n=703) | **All** (n=1,123) | **Non-attritor** (n=420) | **Attritor** (n=703) | **All** (n=1,123) |
| **Disability** | None | 82.38 | 77.95 | 79.61 | 60.24 | 60.74 | 60.55 |
| | Moderate | 10.48 | 8.53 | 9.26 | 19.76 | 14.08 | 16.21 |
| | Severe | 7.14 | 13.51 | 11.13 | 20.00 | 25.18 | 23.24 |
| W3 ***, LSW* | | | | | | | |
| **Subjective health** | Good | 56.90 | 38.83 | 45.59 | 41.67 | 30.44 | 34.64 |
| | Fair | 36.67 | 43.39 | 40.87 | 42.62 | 45.52 | 44.43 |
| | Bad | 6.43 | 17.78 | 13.54 | 15.71 | 24.04 | 20.93 |
| W3***, LSW*** | | | | | | | |
| **Hospitalisation** | No | 86.19 | 77.81 | 80.94 | 78.10 | 70.41 | 73.29 |
| | Yes | 13.81 | 8.25 | 13.89 | 21.90 | 13.09 | 18.52 |
| W3***, LSW** | | | | | | | |
| **Care combination**(1) | No care | 44.33 | 33.39 | 37.60 | 21.88 | 23.90 | 23.12 |
| | Care services | 22.42 | 29.52 | 26.79 | 22.14 | 28.29 | 25.93 |
| | Family care | 13.92 | 12.10 | 12.80 | 13.80 | 13.66 | 13.71 |
| | Mixed care | 19.33 | 25.00 | 22.82 | 42.19 | 34.15 | 37.24 |
| W3***, LSW** | | | | | | | |

*Note :* (1) On respondents having a spouse and/or children at the given wave; ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**TABLE V-7**: Distribution of the variables used to build care determinants (except health), at wave 3, by attrition status (PSBH 1994)

| | | WAVE 3 | | |
|---|---|---|---|---|
| | | **Non-attritor** | **Attritor** | **All** |
| **VARIABLES** | **MODALITIES** | (n=420) | (n=703) | (n=1,123) |
| **Gender** | Man | 43.10 | 44.10 | 43.72 |
| Ns | Woman | 56.90 | 55.90 | 56.28 |
| **Birth cohort** | 1925-1929 | 42.14 | 28.59 | 33.66 |
| *** | 1920-1924 | 34.29 | 28.73 | 30.81 |
| | 1915-1919 | 15.95 | 17.35 | 16.83 |
| | 1910-1914 | 7.14 | 15.36 | 12.29 |
| | Before 1910 | 0.48 | 9.96 | 6.41 |
| **Religiosity** | Non religious | 24.29 | 21.19 | 22.35 |
| Ns | Religious | 75.71 | 78.81 | 77.65 |
| **Region** | Flanders | 49.05 | 43.24 | 45.41 |
| Ns | Wallonia | 38.33 | 43.24 | 41.41 |
| | Brussels | 12.62 | 13.51 | 13.18 |
| **Urbanisation level** | City | 45.95 | 45.66 | 45.77 |
| * | Town | 26.43 | 31.86 | 29.83 |
| | Countryside | 27.62 | 22.48 | 24.40 |
| **Education level** | Higher education | 14.52 | 11.81 | 12.82 |
| *** | Upper secondary | 21.43 | 17.78 | 19.15 |
| | Lower secondary | 24.52 | 19.91 | 21.64 |
| | Primary or less | 39.52 | 50.50 | 46.39 |
| **Last occupational status** | Never worked | 21.43 | 23.33 | 22.62 |
| Ns | Blue collar | 28.33 | 30.30 | 29.56 |
| | White collar | 27.38 | 26.17 | 26.63 |
| | Self-employed | 16.43 | 14.22 | 15.05 |
| | Other | 6.43 | 5.97 | 6.14 |
| **Number of children** | No child | 13.81 | 18.92 | 17.01 |
| * | 1 child | 22.62 | 22.33 | 22.44 |
| | 2+ children | 63.57 | 58.75 | 60.55 |
| **Partnership status** | Not in couple | 37.62 | 42.39 | 40.61 |
| Ns | In couple | 62.38 | 57.61 | 59.39 |
| **Ability to make ends meet** | Easily | 37.86 | 34.14 | 33.79 |
| Ns | Fairly | 36.19 | 34.00 | 37.51 |
| | Hardly | 25.95 | 31.86 | 28.70 |

*Note:* ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## *3. Controlling for attrition status*

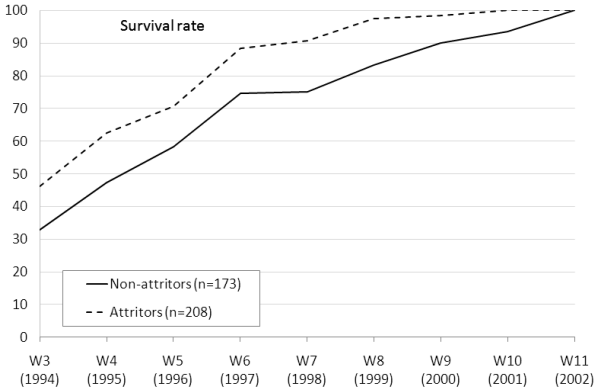
The comparison of the attritors and the non-attritors sub-samples highlights the presence of significant differences. Working only on the non-attritors sub-sample would imply excluding nearly two-third of the study sample and analysing a selected sub-sample (younger, in better health and less likely to use care). Therefore, the 'balanced' sample option is rejected. The decision taken is to work on the all study sample (unbalanced) and to include the attrition status as independent variable in the multivariate analyses.

The fact that attritors are observed for a shorter period implies that changes in care would probably be less frequent than for non-attritors. However, as attritors are older and in worse health condition since the beginning (at wave 3) make them more likely to receive care (earlier in the panel). If non-

attritors start receiving care later, than changes in care will be observed later (and the number of waves where changes can be observed is maybe not larger than for the attritors). To sum up: the difference is more likely to be in the timing of change then in the probability of change. Graph V-26 shows that, among the respondents who receive family care for the 'first time[42]' during the study wave, attritors are quicker to receive family care (the cumulative percentage of respondents who have already received family care for the first time is higher at each wave).

Controlling for the attrition status (attritor/non-attritor) is based on the assumption that the main difference is between those who stay until the end of the panel and those who left earlier (whatever the time spent in the panel). An alternative to the control of the attrition status is to control for the number of waves of presence of the elderly respondent either as a continuous variable (but the imputation of temporary attrition make this measure unusable[43]) or as a categorical variable (this implies to add eight dummies variables in all the analyses: wave 3… wave 11). More sophisticated methods, (model-based adjustment, use of weights) are also possible, but these methods should only be used if the sample losses are random (Tuma 2004).

**GRAPH V-26:** First wave of family care, by attrition status (on those who ever received family care at one of the study waves and who have not received family care in wave 2, total n= 381, PSBH 1993-2002)




*Note:* Figures are in appendix table V-7.

[42] This means that they did not receive family care at wave 2. It is not possible to know if the have ever received family care before 1993 because the question on care received is not asked at wave 1 and there are no retrospective questions on ever received care before the panel. This is the 'observation window' limitation of panel data.

[43] Indeed, the number of waves after imputation of short-term attrition may be higher than the initial number of waves.

## *CONCLUSION*

The purpose of this chapter was to present and make the external validation of the baseline PSBH sample and the specific study sample used in the dissertation and to identify important aspects linked to the survey or the sample which should be accounted for in the analyses.

Section 1 showed that the PSBH baseline sample was well representative of the population of interest but that the participation was lower in Brussels. The follow-up rules based on the individual (not the household) and the presence of individual questionnaires and of a contact sheet are well suited for the study of care evolution over time: it is possible to get individual data and to have information on the household of the elderly. Furthermore, the standardisation of the questions, due to the participation in the ECHP project, facilitates longitudinal analyses. Finally, the over-representation of Wallonia and Brussels allow having enough elderly respondents in Brussels to include the 'region' as independent variable and measure its effect on the study care aspects.

Section 2 mentioned some aspects of the survey which may limit the analyses of the family care evolution with the PSBH data. The main limitation is that the panel data does not allow identifying the real beginning of family care (limited observation window), short-term care spells and the exact timing of a given care spell. However, the PSBH data allow studying 'care sequences' and identifying 'patterns' of care evolution. Another limitation is that the very dependent elderly are less likely to participate in face-to-face interview. Healthy younger elderly may also be less likely to be at home and available for interviews. Therefore, the elderly having moderate health problems are likely to be over-represented among the 65+ in this face-to-face survey. This should not prevent from analysing the family care evolution because it is precisely in this sub-group (the moderate disabled or the unhealthy) that the evolution of care would be the more visible.

The study sample was described in section 3. The purpose was to constitute a general sample of elderly which is not selected on their health or care situation but which should be quite homogeneous in terms of their past context (working on Belgian birth cohorts 1900-1929 allow using information on the Belgian context of the XX$^{th}$ century for a better understanding of the results). The selection of the study sample also accounts for the specificities of the PSBH design (presence of an adult questionnaire at the first ECHP waves, accepting short-term attrition, etc.). The conclusion of the external validation is that the study sample is well representative of the 65+ in terms of region, gender and marital status, but the Brussels sub-sample seems to be more selected (elderly are older and are better educated than in the general population of 65+). However, these differences may be (partly) due to the fact that the Census data (used for the validation) includes institutionalised elderly. The last step was to measure attrition in the study sample and to assess if it is selective. The results showed that more than a third of the study sample remains in the panel until the end. These non-attritors are younger and in better health than the attritors. This 'health selection' is unavoidable in elderly studies (Ghisletta & Spini 2004). To account for the differences between attritors and non-attritors, the 'attrition status' will be controlled for in the multivariate analyses.

All the decisions (from the selection sample to the attrition control) where taken in a same perspective: to identify the problems, to make hypothesis on their potential effect on the results and to see if there is a simple and comprehensive way to deal with the problems found (reducing the scope of the analyses: study of the pattern of care evolution rather than the timing of care changes; introducing control variables, etc.). Too sophisticated methods which may lead to results that would be difficult to interpret or non-informative in term of care determinants will be avoided. The purpose is to understand the social phenomenon by applying suitable methods.

# CHAPTER VI

## FAMILY CARE ASPECTS OPERATIONALISATION

In the previous chapter, it was shown how the study sample of 1,123 elderly respondents was drawn from the PSBH baseline sample. To study the evolution of family care, the next step is to obtain the information on the care provided (or not) by each potential care-giver at each wave for the 1,123 elderly respondents.

The objectives of this chapter are to explain (1) how the 'carelines' file was built, with the potential care-giver at a given wave of a given elderly respondent is the most detailed level of analysis; (2) how the information on care from the wave level (one value for all the potential care-givers) was disaggregated to the carelines level (one value for each potential care-giver); (3) how the operational care aspects variables based on the carelines file were built.

Section 1 justifies the creation of a carelines file for the study of the family care evolution with the PSBH data. Section 2 explains how the 1,123 elderly respondents 'produce' the 26,088 carelines (19,381 carelines if waves 3 to 11 are considered). Section 3 details the methodology used to disaggregate the care information: which variables are used and combined to identify ADL and IADL care provided by the spouse and children. It also discusses the hypotheses underlying the creation of the care variables at the carelines level. Section 4 presents and discusses the operationalisation of the family care aspects and changes which will be used as dependent variables later on in the analyses part.

## *SECTION 1. Why building a carelines file to study the evolution of family care over the PSBH waves?*

As far as I know, the PSBH data have never been used to study the evolution of family care over time. The sole published analyses on care (see chapter IV) are cross-sectional or work on two waves (comparing the proportion of elderly receiving care between waves). One could wonder why no tentative of longitudinal study of care (looking at individual care changes over waves) has not been made so far. It is well known that family care is a long-term involvement and that its characteristics and their evolution over time are key elements for allowing the elderly to live at home longer. To date, the PSBH is the only representative and longitudinal Belgian data file providing yearly information on family care (care provided to cohabitants and care provided by non-cohabiting children) and on the use of care services. But treating this information is not straightforward and requires a long time of data preparation and correction. The main difficulties I had to deal with were the following:

1. There is no one single question on the care received by the respondent with a list of care providers and a list of activities for which care is needed (like in GGPS, for instance). The information on the care provided by the nuclear family (spouse and children) is only partly available in the elderly respondent adult questionnaire (if the respondent has non-cohabiting children, he is asked: Did your children help you during the past three months by keeping house? By giving you aid in case of sickness?) and partly in the adult questionnaire of the spouse or cohabiting child (through the question: Do your daily activities include looking after, without pay, another person who needs special help because of old age, illness or disability? In case of positive answer, the respondent is asked if the care-receiver is a cohabitant or not, what is the relationship between them and which kind of help he gives). The situation is even more complex when a child cohabits with the elderly parent at some waves and not at the others[1]. In this case, the source of information on care varies from one wave to another according to the child's living arrangement situation.

2. The fact that the information on the care provided by cohabitants is indirect (available through the questionnaire of the potential care-giver and not through the questionnaire of the elderly respondent) has some implications. First, it requires a preliminary step: the identification of the relationships between the elderly respondent and all the other household members at each wave (see section 2.A.1). Once the spouse and the cohabiting children are identified, their respective adult questionnaires - where the questions on the provided care are asked - can be linked. Second, the cohabiting spouse and children have not necessarily answered the adult questionnaire. It may be necessary to impute missing values on the provided care. From wave 6 onwards, each respondent is asked whether his physical health condition requires extra effort from the other household members. This question can be used to impute missing declaration on provided care or to correct for under-declaration of care.

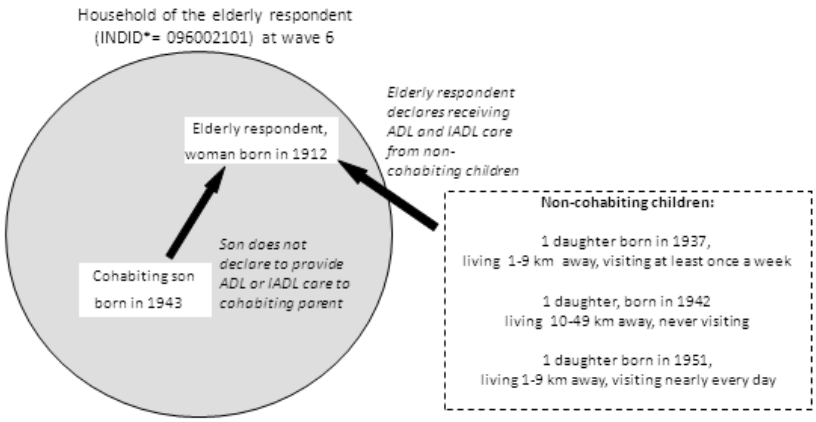
3. The question on the care provided by non-cohabiting children is not asked at waves 1 and 7. The decision was taken to proceed to 'between-waves' imputation for solving the missing values at wave 7 but to not impute the care at wave 1 (as the longitudinal analysis of care is limited to waves 3 to 11, see chapter V for justification).

4. Another difficulty with this question (non-cohabiting children) is that it does not allow to identify which child(ren) provide(s) care. It just tells whether any non-cohabiting child provides ADL and/or IALD care to the elderly respondent. But, to answer the dissertation questions on the evolution of family care over time, it is necessary to know who is providing

[1] 35 elderly respondents are in this case.

care at each wave: Is the spouse caring? How many daughters and sons are there caring? The solution was to 'disaggregate' the care responsibility at the potential care-giver level for each wave. For the cohabitant potential care-givers, the information is already individualised. But it is not the case for the non-cohabiting children. To make it clearer, frame VI-1 shows a concrete case of an elderly respondent cohabiting with a son and having three non-cohabiting daughters at wave 6.

**FRAME VI-1**: An example of family care declaration from cohabitant and non-cohabitants




(*)The *INDID* is a nine-position identification number, the first three indicate the cluster number, the three following the order of the household within the cluster, the number at the seventh position is 1 in case of a 'panel household', is larger than 1 in case of a 'split household' (a panel member leaves the panel household to build a new household). The last two positions of the *INDID* refer to the rank order of the respondent within the household. For instance, the respondent having an *INDID* = 096002101 is (reading from the right to the left) the first member (01) of a panel household (1) being the second (002) of cluster 96 (096).

**Explanation:** The son does not declare having provided care to his cohabitant parent but his elderly mother declares that her physical health status requires extra effort from the other household member(s). As there are no other cohabitants, it is likely that the cohabiting son provides care. At this stage, we do not know the kind of the given care (ADL and/or IADL?). The elderly mother also declares receiving ADL and IADL care from non cohabiting children. If there is only one non-cohabiting child, it would be easy to attribute him the care responsibility. But, in the present case, she has three non-cohabiting daughters. Based on the geographical proximity and the frequency of visits, it is possible to identify who is/are the most likely to provide care. We may hypothesise **that *children visiting the parent more often and living closer are more likely to provide care (especially ADL care which is more intensive and constraining).*** In the present case, we may think that the daughter born in 1951 is the most likely to provide care because she visits her mother nearly every day and lives nearby (1-9 Km away). The oldest daughter (born in 1937) also lives close to her mother and visits her quite often (at least once a week), she is therefore likely to provide care too. The middle daughter never visits her mother and is therefore not likely to provide care. **Another hypothesis[2] that can be made is that *cohabitants are likely to provide at least as much care as non-cohabitants but are also more likely to under-estimate the care provided.*** In this case, we may assume that the cohabitant son provides ADL and IADL care.

[2] The precise 'imputation hypotheses' are presented and numbered in the text.

The 'disaggregation' of the care responsibility is based on such hypotheses coming from the literature. All of them and the consequent imputation rules will be specified in section 3. The 'disaggregation' process implies the creation of a new data file ('carelines file[3]') in which the most detailed level of analysis is the family care-giver (spouse or child) at a given wave for a given elderly respondent. In the present case, the elderly women left the panel after wave 6. Therefore, 6 (waves of presence in the panel after imputation)*4 (potential care-givers) lines are created for this elderly respondent. Once the information on the provided care becomes available at each wave for each potential care-giver, it would be possible to re-aggregate the information at the wave level - How many care-givers? For which kind of activities does the elderly respondent receive care? (See section 4) – and thus to study the evolution of the care situation over waves.

5. A last difficulty I encountered was the counting of the number of children. Indeed, to create the carelines file, I needed to know the gender, birth year[4], the geographical proximity and visit frequency for the spouse of the elderly respondent and of all their children. For the cohabitant, the gender and the birth year are usually available (through the contact sheet or the adult questionnaire), the proximity can be set to 0 'same place' and the visit frequency to 0 'every day'. For the non-cohabiting children it was more difficult. The visit frequency and the geographical proximity can change from one wave to another (this is normal) and is sometimes missing (the respondent may find it difficult to estimate the number of kilometres or the visit frequency). But there were also inconsistencies[5] in the number, the gender and the birth year of the children mentioned by the two spouses at a given wave and by the same elderly respondent at different waves. The imputation rules for children number and characteristics will be specified in section 2.

The preparation of the carelines file, the correction and imputation of the care variables and their determinants (also see chapter VII) took a long time. It required taking many decisions (based on the literature and on the common sense), combining systematic corrections (based on programs written by a computer engineer) and manual corrections and doing many cross-validations. I estimate that the data preparation time took me about 9 months full-time, with intensive technical support. It is neither possible nor useful for the reader to give the detail of the data preparation. Only the main steps, the rationales and the major decisions are described in the rest of the chapter.

[3] In the elderly care literature, there are some examples of studies where a carelines file (also named 'care-giver record' file) has been created care-giver record (Spitze & Logan 1991b; Dwyer *et al.* 1992; Spillman & Pezzin 2000) either to do dyadic analysis (studying care provided by a given child to a given elderly parent and comparing care provided by daughter to mother and father and provided by son to mother and father) or for controlling the interdependence of potential care-givers decision.

[4] The birth year is needed to distinguish children of the same gender. In case of twins of the same gender, one of them receives one year more or one year less than mentioned. In this case, a given elderly cannot have two children with the same gender and the same birth year. This modification does not have any implication on the analyses as the potential care-giver birth year is not included in the determinants of care.

[5] The funding for the PSBH project covered the period of data collection but not the whole cleaning and file preparation phase. The research teams did a part of the data cleaning, prepared 'forward-feeding' variables to correct structural missing and created a file named 'QNFE' which summarises the changes (in coding, response modalities, question wording, etc.) for each question ever asked in the adult and household questionnaire (see chapter VII). All this work of data preparation aimed to guide the data users in cross-sectional and longitudinal analyses. However, the data made available to external researchers are not as 'cleaned' as ECHP or other paying data (the name of the variables are not standardised over waves and consistency check within and between waves are left to be done by the researcher).

## *SECTION 2. Building the carelines file*

This section explains how the information on the spouse and the children was collected and corrected to build the carelines file.

### A. Identifying the spouse and cohabiting children through the contact sheet and the non-cohabiting children through the adult questionnaire

#### *1. Standardisation of the contact sheet*

The contact sheet includes the identification number (*INDID*), the gender and the birth year of each household member and the relationship between them. It is therefore possible to identify, for each wave of presence of the elderly respondent, whether he lives with a spouse and or child(ren). However, the presence of missing values and the modification of the structure of the contact sheet over waves (see chapter V) made this initial step more difficult than expected: for waves 1 to 3, only the relationship between the self-defined head of the household and the other household members is recorded. Since wave 4, the relationship between each pair of household members is registered. Note that the designation of the head may change from one wave to another. Various situations are found:

1. The elderly respondent is the self-defined head at waves 1 to 3 and if there are no missing values on the 'relationship to head' variable, it is then possible to identify the presence of cohabiting child(ren) and spouse at all the waves of presence.
2. The elderly respondent is the self-defined head at only one or two of the three first waves while no changes in the household composition and no missing values on the 'relationship to head' variable are observed: in this situation, the values recorded at the waves where the elderly respondent is the self-defined head will be imputed to the other wave(s) (between-waves imputation). The applied principle is that **the relationship between two given household members, identified by their unique *INDID,* does not change over time** (if $X_1$ is the father of X3 at wave 2, the same relationship links the two individuals at all the other waves).
3. The elderly respondent is never the self-defined head; his relationships with the other household members are only available since wave 4. If there are no changes in the household composition and no missing values on the relationship variable, the imputation of the relationship to waves 1 to 3 is safe.
4. When the relationship between the elderly and another given household member (identified by the *INDID*) is only available at some of the waves of presence, the imputation of the missing values is considered as safe (see principle mentioned in 2°).
5. When the relationship between the elderly and another given household member (identified by the *INDID*) is always missing, I tried to extrapolate it from the other relations (e.g. if X1 is 'spouse' of X2 and X2 is 'sister/brother' of X3, the missing relationship between X1 and X3 is 'sister/brother-in-law').
6. When the relationship between the elderly and another given household member (identified by the *INDID*) is always missing and no extrapolation is possible, I imputed the 'most likely' relationship according to the age difference, the gender and the composition of the household.
    - If the age difference is large (20-45), then the 'parent/child' relationship is the most likely

- If the age difference is very large (>45), then the 'grandparent/grandchild' relationship is the most likely.
- If the gender differs and the age difference is not too large (<20), the 'spouse' relationship is the most likely (unless one of the two household members is the 'spouse' of a third person. In this situation, the 'brother/sister' relationship is the most likely).
- If the gender is similar and the age difference small (<20), then the 'brother/sister' relationship is the most likely.

Finally, information from the adult questionnaire (the fact that the respondent lives in couple or not, that his parent is still alive or not) were used to validate the imputed relationship.

### *2. Selection of the potential cohabiting care-givers*

Once the relationship between the elderly respondent and the other household members at all the waves of presence has been specified, it is possible to select the potential cohabitant care-givers (spouse and children). This was done in a two-steps procedure:

First, the *INDID* of the household member having a relationship 'spouse/partner' or 'children/step-children'[6] with the elderly respondent is kept. Second, the effective presence of these individuals in the household is checked. In case a household member aged 16+ did not answer the adult questionnaire, the reason for non-completion is given in the contact sheet (the member can be absent – travelling abroad, staying in hospital, institution, moving out etc.) or present in the household, but unwilling or unable to answer (sickness, refusal, etc.). **Are then considered as cohabitant potential care-givers, the spouse and the children who answered the adult questionnaire (or did not answer the questionnaire), but are currently living in the elderly respondent household.** Children who are not currently living in the household (absent) are considered as non-cohabiting children for the given wave[7] (see next point). An absent spouse (non-cohabiting) is not considered as a potential care-giver because the factual situation (living in couple) is preferred to the civil status (being married): if the elderly wife or husband lives in institution or moved to another household (factual separation), she/he is not likely to provide care. On the contrary, a cohabiting partner (living in a non-married couple with the elderly) is as likely to provide care as a cohabiting spouse.

Note that the completion of the adult questionnaire is not required for being a potential care-giver: spouse and currently cohabiting children may be not willing to participate in the interview and yet provide care to their elderly relatives. However, the absence of adult questionnaire have implications on the information available (health status, care provided).

One careline is created for each cohabitant potential care-giver who survives the two-steps procedure selection. The carelines file gives the gender, birth date and relationship with the elderly respondent[8].

[6] For brevity reason, the term 'children' refers to both children and step-children: remarriage (and thus having step-children) is not common for the study cohorts.

[7] When they come back to the elderly respondent household, the children are again treated as cohabiting children.

[8] The adult questionnaire was used to impute the missing value on gender or birth year of the cohabitant potential care-givers (the *INDID* of the potential care-giver is included in the adult questionnaire and in the contact sheet and allows linking the information provided in the two corresponding data files).

### *3. Count of the potential non-cohabiting care-givers*

At each wave (except at waves 1 and 7), the respondent is asked to give some basic information on each of his non-cohabiting children (birth year, gender, geographical proximity, contact frequency[9]). For each wave of presence of the elderly respondent, a careline has been created for each mentioned non-cohabiting child. It means that, for each wave of presence, the number of carelines is the sum of the spouse, the cohabiting children and the non-cohabiting children.

The first step of correction is the 'between-spouses' imputation: the adult questionnaire of the spouse (if any) has been used to complete the information of the elderly respondent (e.g. if the geographical proximity of a given child is missing on the elderly respondent questionnaire but given in the spouse questionnaire). All the children 'mentioned'[10] by at least one of the two spouses are considered and produce a careline. **The children imputation hypothesis (1) is that *it is more likely that one of the parents does not mention a child than that a parent mentions a child that does not exist.*** One of the reasons which may explain a difference in the number of children declared by the two spouses is the presence of step-children (for cohabiting children, it was not possible to distinguish between children and step-children). Children and step-children are both are considered similarly as 'children'. Therefore the same rationale should be applied to non-cohabiting children. If children and step-children are considered equally, it implies that the number of non-cohabiting children mentioned by one spouse should be the same than the number mentioned by the other spouse. This 'between-spouses' imputation (of children and related characteristics) is done for each wave when needed.

The second step is the 'between-waves' imputation. The loss of an adult child should be very rare for the elderly respondents. A child birth is also very unlikely as all the elderly respondents are aged 65+ at wave 3. Therefore, **the children imputation hypothesis (2) is that *the number of children should be constant over waves.*** If a child is only mentioned at some of the waves, it is imputed at all the other waves of presence of the elderly respondent (according to the children imputation hypothesis 1). Remaining missing values (e.g. none of the spouses provide information on the geographical proximity of a given child at wave 4, but the information is available at other wave(s)) were also imputed at this step. The between-waves imputation and correction rules for the individual characteristics of non-cohabiting children were applied in the following order:

**Gender** (considered constant over waves)[11]:

1. If the information is available and consistent at some waves but missing at other(s), between-wave imputation is done.
2. If the information is available at some waves but inconsistent, then the most frequent value is imputed at all the waves. If both values appear the same number of waves, I considered

[9] *What is the sex of the X$^{th}$ non-resident child* (question code: W1A135- W1A144)*? In what year was the X$^{th}$ non-resident child born* (W1A145- W1A154)*? What is the distance between the house of your X$^{th}$ child and your own house* (W2AM271- W2AM280)*? By what frequency do you visit your X$^{th}$ child or does your first child visit you* (W2AM281- W2AM290)*?* At wave 2, these questions are asked up to 11 children (which is the maximum number of non-cohabiting children observed at this wave in the whole PSBH sample). At the other waves, the questions are only asked up to six non-cohabiting children. It means that the information may be incomplete for respondents having more non-cohabiting children at a given wave. However, this case is very rare among the 1,123 elderly respondents. Moreover, the 'between-spouses' and 'between-waves' imputation should have corrected for that: the six children mentioned (by respondents having more children) may be different between spouses and between waves.

[10] A child is considered as 'mentioned' if the respondent gives at least a gender or a birth date. For instance, if the respondent gives a birth date and a gender for the 'first' and 'third' child but neither the gender nor the birth year of the 'second child', I considered that the respondent has only two children (except if the between-spouses or between-waves imputation gives information on the gender and/or the birth year of a third child).

[11] An example of children gender imputation can be found in Checkovich & Stern 2002.

the sibling's structure (e.g. when the number of sons is always larger than the number of daughters, the gender respecting this structure is preferred).

3. When the information is unavailable (a birth year without gender is mentioned by one of the spouses at any wave), then the imputation is made at random. But this situation is very rare.

**Birth year** (also constant over waves): the same rationale than for gender (from **1°** to **3°**) is applied. If the information is unavailable, the year birth remains missing and the child is considered as younger than siblings having a birth year[12].

**Geographical proximity** (which may change over waves):

1. If the information is available and consistent at different waves but missing at other(s), then between-waves imputation is done.
2. If the information is available at different waves but inconsistent varies over waves:
   2.1. When the values of the surrounding waves are equal (e.g. the proximity is similar at waves 2 and 5 and missing at waves 3 and 4), then the value of the surrounding waves is imputed.
   2.2. When the values of the surrounding waves are different and one of the two is more frequently observed (considering all the waves), then the most frequent value is imputed.
   2.3. When the values of the surrounding waves are different and none of the two is more frequently observed, the value of the preceding wave is imputed (implies that a real change in proximity could be delayed when using this imputation rule).
3. If the information is unavailable, the modal value[13] 'living at 50 to 99 Km' is imputed.

**Contact frequency** (which may change over waves): the same rationale than for the geographical proximity (from **1°** to **2.3°**) is applied. If the information is unavailable, the contact frequency stays missing[14].

### *4. Number of potential care-givers*

According to the available information, the potential care-givers include the spouse (or partner) and (step)-children: it was not possible to distinguish between partner and spouse or between children and step-children at each wave. This is not really a problem, because, from a substantive point of view, one can expect that partners are as likely to provide care as spouses are and that (step)-children are likely to provide care to both parents at the same time[15]. Children-in-law are not included in the potential care-givers.

[12] Contrary to the child gender, which is used as a care determinant and thus should be imputed, the birth year can remain missing. Its main function is to identify the children and to rank them from the oldest to the youngest. This order will serve to attribute a rank number to each potential care-giver.

[13] It is computed on all the geographical proximity values ever mentioned in the elderly sample (after between-spouses and between-waves imputation).

[14] Contrary to the geographical proximity, which is used as a care determinant and should be imputed, the contact frequency is only used for the attribution of the care responsibility among the non-cohabiting children. If the value is missing, the hypothesis is made that this child is less close to the elderly respondent than those for which the information is available. He is therefore less likely to provide care (according to the hypothesis that the frequency of contacts is positively associated with the probability of being a care-giver.

[15] The only problematic case occurs when the elderly respondent enters in a new-union during the panel. In this situation, it would be incorrect to impute step-children at the waves preceding the union (it is unlikely that the children of the new spouse provide care to the elderly before the union. This theoretical case was not observed among the 1,123 elderly respondents: in the very few cases of new unions (n=6) no between-spouses differences were observed).

The literature on in-law children care (Goetting 1990, Merrill 1993, Lee *et al.* 2003, Agree *et al.* 2003, Shuey & Hardy 2003) has shown that the elderly cared by a son in union, often receives care from their daughter-in-law too. Unfortunately, the PSBH data only provide longitudinal information on children-in-law if they are cohabiting. In case of non-cohabitation (the usual situation), the only available information is the marital status of the non-cohabiting children at wave 2. Furthermore, the instability of unions and the increasing proportion of non-marital unions among the children cohorts (born around 1930-1960) make it difficult to study the care provided by children-in-law over time.

After the application of the imputation rules explained at points 2 and 3, each elderly respondent has a given number of carelines for each wave of presence. The number of children is constant over waves and for the two spouses. Only the presence of the spouse may vary over waves (in case of a new union, separation, divorce or widowhood). A final verification is done before fixing the number of carelines: in the adult questionnaire of wave 1, the respondent is asked how many children he has (declared number). This question is not repeated at the following waves. Table VI-1 gives the distribution of the 1,123 elderly respondents according to the number of children declared at wave 1 and the number of children retained after imputation (cohabitants + non-cohabitants): in 90% of the cases (183+830=1013), the two values converge (either the respondent declared to have no children and the modality 'no children' is retained or the respondent declared to have a given number of children and this information is retained). Most of the cases of divergence concern the number of children (elderly declared to have a given number of children at wave 1 but the number of children observed and retained differ, n=90). There are only 20 cases where the discrepancy concerns the fact of having a child or not (8 elderly declared to have children but no child was observed and retained, 12 elderly did not declare to have children but children were observed and retained).

**TABLE VI-1**: Comparison between the number of children declared and retained for the elderly (n=1,123)

| **Any child declared at wave 1?** | **Any child retained after imputation?** No | Yes |
|---|---|---|
| No | **183** | 12 |
| Yes | 8 | 920* |

Note: * 920 = **830** (same number) + 90 (different number)

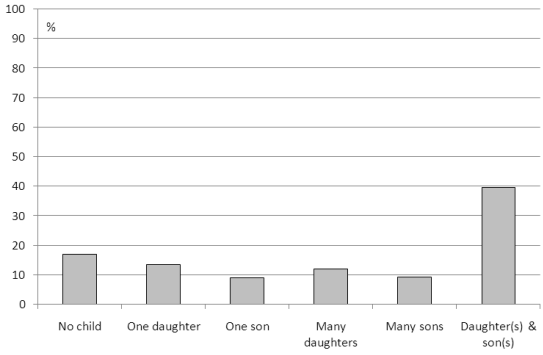
Table VI-2 details the number of children in the study sample: a fifth of the sample does not have children, 22% have only one child, 23% have two children, 16% have three children and the remaining 21% have four children or more.

**TABLE VI-2**: Number of children of the 1,123 elderly

| **NUMBER OF CHILDREN** | N | **%** |
|---|---|---|
| **0** | 191 | 17.01 |
| **1** | 252 | 22.44 |
| **2** | 259 | 23.06 |
| **3** | 184 | 16.38 |
| **4** | 117 | 10.42 |
| **5** | 40 | 3.56 |
| **6** | 39 | 3.47 |
| **7** | 11 | 0.98 |
| **8** | 16 | 1.42 |
| **9** | 6 | 0.53 |
| **10** | 8 | 0.71 |
| **Total** | 1,123 | 100 |

If one accounts for the gender of the children, different sorts of 'kinship' can be distinguished, according the number of sons and daughters. The appendix table VI-1 gives the numbers for all the combinations observed in the sample (from no child to 11). Graph VI-1 summarises this information by regrouping the combination into six main types (no child, 1 daughter, 1 son, many daughters, many sons, daughter(s) and son(s). It shows that in most cases, the elderly have both son(s) and daughter(s) and that the proportion of elderly having only daughter(s) is higher than the proportion of elderly having only sons.

**GRAPH VI-1**: Kinship combination in the study sample
(PSBH 1994-2002, n=1,123)




## B. Structure of the carelines file

Once the number of potential care-givers fixed for each wave of presence, each of them received a rank: *RANK*= 00 for the spouse, 01 for the oldest child, 02 for the second born child, etc. The total number of carelines varies from one elderly respondent to another, according to the number of potential care-givers and the number of waves of presence in the panel. There is at least one line by wave of presence[16]. In case the elderly respondent has no potential care-givers (neither spouse nor children), one careline with the rank 99 is created for each wave of presence of the elderly[17]. When the elderly respondent has no children and looses his spouse during the panel, then one line is created with *RANK*=00 for all the waves when the spouse is present and one line with *RANK*=98 is created from the wave of widowhood/separation[18].

Each careline has a **unique identification number** made of the elderly respondent identification number (*INDID*), the wave number (*WAVE*= {1-11}) and the rank of the potential care-giver (*RANK*= 00-11, 98, 99). For instance, the care provided by the spouse of the elderly respondent having *INDID*=046002101 at wave 3 will be recorded at the careline number 046002101-03-00 (*INDID-WAVE-RANK*). Family care is never recorded at wave 1 (because the question on care is not asked at that wave) or at carelines with a number ending by '98' or '99' because there are no potential care-givers at these carelines.

An elderly respondent can be the potential care-giver of another respondent (in case of multiple elderly respondents in the household) and children are then potential care-givers for both parents.

[16] The carelines are used to disaggregate the care responsibilities. The analyses will be done on a file at the wave level (in which the carelines information is re-aggregated at the wave level). The number of observations in this wave file should correspond to the total number of waves of presence for all the 1,123 elderly respondents.
[17] One hundred and twelve elderly respondents are 'family-less' since wave 1 (115 at wave 3).
[18] Twelve elderly respondents are in this case.

The frame VI-3 shows how the carelines look like in three concrete cases: frame VI-3a presents a respondent having no potential care-giver (all the carelines have *RANK*=99), frame VI-3b presents a respondent losing a spouse (*RANK* = 98 for some of the carelines), frame VI-3c presents a respondent having a spouse and children (the most frequent case). The notation convention used for the variable names in the rest of the thesis is given in frame VI-2.

**FRAME VI-2:** Variables name notation

**All the variables names are capitalised and italicised.**

There are 3 identification variables (see explanation above): *INDID, WAVE, RANK*

- The variable names referring to 'time-invarying' (must be constant over waves) elderly characteristics start with '***E***-', E for elderly (e.g. *E-GENDER*).
- The variable names referring to 'time-varying' elderly characteristics (which may change over waves) start with '***W***-', W for wave (e.g. *W-HEALTH*).
- The variables names starting with '***C***-'(C for carelines) refer to the carelines file. They are working variables created at the careline level and which will be aggregated to create a 'W-' or a 'E-' variable (e.g. *C-FAMILYCARE1* tells which kind of care the potential care-giver is providing at this wave after imputation. It will be used to create *W-FAMILYCARE1* which tells if the respondent receives any family care at a given wave and to create *E-FAMILYCARE1* which tells if the respondent ever receives family care at any wave).

**FRAME VI-3A:** Woman born in 1927 who completes an adult questionnaire until wave 11

| *INDID* | *WAVE* | *RANK* | *C-BIRTHYEAR* | *C-GENDER(1)* | *C-PROXIMITY(2)* | *C-CONTACT(3)* |
|---|---|---|---|---|---|---|
| 003006101 | 01 | 99 | . | . | . | . |
| 003006101 | 02 | 99 | . | . | . | . |
| 003006101 | 03 | 99 | . | . | . | . |
| 003006101 | 04 | 99 | . | . | . | . |
| 003006101 | 05 | 99 | . | . | . | . |
| 003006101 | 06 | 99 | . | . | . | . |
| 003006101 | 07 | 99 | . | . | . | . |
| 003006101 | 08 | 99 | . | . | . | . |
| 003006101 | 09 | 99 | . | . | . | . |
| 003006101 | 10 | 99 | . | . | . | . |
| 003006101 | 11 | 99 | . | . | . | |

**FRAME VI-3B:** Man born in 1910 who completes an adult questionnaire until wave 8

| *INDID* | *WAVE* | *RANK* | *C-BIRTHYEAR* | *C-GENDER(1)* | *C-PROXIMITY(2)* | *C-CONTACT(3)* |
|---|---|---|---|---|---|---|
| 046002101 | 01 | 00 | 1909 | 1 | 0 | 0 |
| 046002101 | 02 | 00 | 1909 | 1 | 0 | 0 |
| 046002101 | 03 | 00 | 1909 | 1 | 0 | 0 |
| 046002101 | 04 | 98 | . | . | . | . |
| 046002101 | 05 | 98 | . | . | . | . |
| 046002101 | 06 | 98 | . | . | . | . |
| 046002101 | 07 | 98 | . | . | . | . |
| 046002101 | 08 | 98 | . | . | . | . |

**FRAME VI-3C:** Woman born in 1915 who completes an adult questionnaire until wave 3

| *INDID* | *WAVE* | *RANK* | *C-BIRTHYEAR* | *C-GENDER(1)* | *C-PROXIMITY(2)* | *C-CONTACT(3)* |
|---|---|---|---|---|---|---|
| 009039102 | 01 | 00 | 1913 | 0 | 0 | 0 |
| 009039102 | 01 | 01 | 1936 | 0 | 3 | 4 |
| 009039102 | 01 | 02 | 1950 | 1 | 2 | 1 |
| 009039102 | 02 | 00 | 1913 | 0 | 0 | 0 |
| 009039102 | 02 | 01 | 1936 | 0 | 3 | 4 |
| 009039102 | 02 | 02 | 1950 | 1 | 2 | 1 |
| 009039102 | 03 | 00 | 1913 | 0 | 0 | 0 |
| 009039102 | 03 | 01 | 1936 | 0 | 3 | 3 |
| 009039102 | 03 | 02 | 1950 | 1 | 2 | 2 |

(1) Potential care-giver gender: 0 = man; 1= woman.
(2) Geographical proximity of the potential care-giver (PCG): 0= cohabiting; 1= same building; 2 = < 1 Km; 3 = 1- 9 Km; 4 = 10-49 Km; 5 = 50-99 Km; 6 = 100 Km in Belgium; 7 = 100 Km out of Belgium.
(3) Contact frequency of the potential care-giver (PCG): 0=cohabiting; 1= nearly everyday; 2 = at least once a week; 3 = twice a month; 4= once a month; 5 = once each two months; 6 = 2 or 3 times a year; 7 = less often; 8 = never.

This file gives information on the care provided at the most detailed level (the individual care-giver at a given wave). It allows computing aggregated variables at the wave level (e.g. number of care-givers at $wave_n$) or at the elderly care-receiver level (e.g. ever received care from spouse). It is therefore possible to study family care at four levels: the **carelines** level, the **wave** level (aggregating the carelines information for a given wave identified by the *INDID* and the *WAVE* variables), the **potential care-giver level** (aggregating the carelines information for a given potential care-giver, identified by the *INDID* and the *RANK* variables), and the **elderly respondent** level (aggregating the carelines information from all the waves and all the potential care-givers, identified by the *INDID* variable)

The study of changes can be done 'between waves' (comparing the care received by the elderly respondent from one wave to another, using care variables which summarise the care provided by all the potential care-givers) or can be done 'between care-giver waves' (comparing the care provided by a given potential care-giver to the elderly respondent from one wave to another). In this dissertation, only the first type of changes will be studied.

# *SECTION 3. Attributing the individual care responsibility*

This section explains which variables were used to identify the care provided by the spouse and children and which imputation and correction rules were applied. Here again, the care provided by cohabiting and non-cohabiting children should be treated separately. To begin with, the variables used for spousal care, cohabiting children and non-cohabiting children are specified and the rules for attributing the care responsibility among non-cohabiting children are given. Afterwards, differences between the questions used for cohabiting and non-cohabiting potential care-givers and their implication are discussed. Finally, the imputation and correction rules are applied.

## A. Variables used for identifying the provided care

### *1. Care provided by the spouse and cohabiting children*

As said before, the information on the care provided by cohabitants has the advantage to be **individualised** and thus available for each potential care-giver separately**.** But it has the disadvantage to be **indirect**: it is not available through the elderly respondent adult questionnaire but should be

'imported' from the potential care-giver adult questionnaire. The contact sheet, which is used to identify the household members who are a 'spouse' or a 'child' of the elderly respondent, also gives the *INDID* of the two people in the given relationship (e.g. 009039102 is spouse of 009039101. In this case, where both spouses are elderly respondents, the information on spousal care at a given wave for 009039102 is found in the adult questionnaire of 009039101 and *vice-versa*).

The working care variable *C-FAMILYCARE0* has four modalities: 0= no care, 1=IADL care, 2= ADL care, 3 = ADL and IADL. For the **spouse carelines** (*RANK*=00), the value of *C-FAMILYCARE0* at a given wave is determined as follows:

If the spouse, in his adult questionnaire, answers that:

(1) He is **providing care** (*Do your daily activities include looking after, without pay, another person who needs special help because of old age, illness or disability?* = yes)[19]

(2) …to a **household member** (*Do the person or persons you look after live in this household?* = yes)

(3) … who is his **spouse** (*Is your spouse/partner one of those people who need special help because of old age, illness or disability?* = yes)

(4.1) … and is responsible for one or more **IADL** (*Are you responsible…for the hot meals?* = yes
AND/OR *for the laundry?* = yes
AND/OR *for the cleaning of the house?* = yes
AND/OR *for following the medication?* = yes),
then **the spouse is considered as an IADL care-giver.**

(4.2) … and is responsible for one or more **ADL** (*Are you responsible…for the serving-up of food and drink?* = yes

AND/OR *for the personal hygiene?* = yes),
then **the spouse is considered as an ADL care-giver.**

The spouse can provide both IADL and ADL care at the same time then (4.1) and (4.2) are both true.

For the **cohabiting[20] children carelines** (*RANK*={01-11} and *C-PROXIMITY*=0), the value of *C-FAMILYCARE0* at a given wave is determined alike for the spouse, except at step (3) where 'spouse' is replaced by 'parent(s)' in the question wordings[21].

[19] The codes of the care questions are given in the presentation of the PSBH in chapter IV.

[20] Some studies (e.g. Bengtson & Roberts 1991; Jacobs & Bartiaux 1995) consider that intergenerational cohabitation is a form of children care (even if there is no declaration of care). The argument is that this intergenerational cohabitation is a rare phenomenon nowadays and is therefore likely to be motivated by the ADL and/or IADL care needs of the elderly parent. This is not always true**.** According to the international literature (Aquilino 1990; Ward *et al.* 1992; Choi 2003), the cohabitation can also be motivated by financial difficulties of the child, of the parents or both or by a health problem of the child. This is often the case when the child has never moved out. The intergenerational cohabitation is rare today. Rosenmayr (1983) uses the expression 'intimacy at distance' to refer to the fact that different generations prefer to live independently but to maintain frequent contacts. The study of Jacobs & Bartiaux (1995) on the first wave of the PSBH showed that only a twelfth of the respondents having a parent aged 80+ cohabit with him. Looking at the characteristics of cohabiting children, it seems that intergenerational cohabitation is more frequent among poorer children and is thus likely to be motivated by economic reasons more than by care reasons. This is especially true when the child is a son. For this reason, the cohabitation will not be considered as a form of care.

[21] It would have been possible to study the care provided by the other household members (using the same series of questions and modifying the relationship considered at step 3. However, I did not do it for two reasons: the first is that cohabitation with others is rather rare. The second is that spouse and children are the main care-givers and are also the focus of this dissertation.

If the cohabiting child, in his adult questionnaire, answers that:

(1) He is **providing care** (*Do your daily activities include looking after, without pay, another person who needs special help because of old age, illness or disability?* = yes)

(2) …to a **household member** (*Do the person or persons you look after live in this household?* = yes)

(3) … who is his **parents** (*Are your parents one of those people who need special help because of old age, illness or disability?* = yes)

(4.1) … and is responsible for one or more **IADL** (*Are you responsible…for the hot meals?* = yes
AND/OR *for the laundry?* = yes
AND/OR *for the cleaning of the house?* = yes
AND/OR *for following the medication?* = yes),
**then the cohabiting child is considered as an IADL care-giver.**

(4.2) … and is responsible for one or more **ADL** (*Are you responsible…for the serving-up of food and drink?*[22] = yes
AND/OR *for the personal hygiene?* = yes),
**then the cohabiting child is considered as an ADL care-giver.**

Cohabiting children can provide both IADL and ADL care at the same time then (4.1) and (4.2) are both true.

In the few cases where the child cohabits with his two parents, the health status of the parents and the presence of other source of care (from spouse and/or non-cohabiting children) were used to identify which parent was the most likely to be the care-receiver (e.g. when the father has a poorer health status than the mother and receives spousal care, it is more likely that the cohabiting child provides care to his father than to his mother).

**For each spouse or cohabiting child, the variable *C-FAMILYCARE0* will take a value between 0 and 3. If the value is higher than 0, the *C-IMPUTCODE* variable (care imputation code) = A. This variable allows distinguishing the various ways used to identify the care responsibility. The value 'A' is used for the 'care declared by cohabitant'. The value of the variable *C-FAMILYCARE1* (care after imputation) is equal to the value of the variable *C-FAMILYCARE0.***

### *2. Care provided by the non-cohabiting children*

The information on the care provided by non-cohabiting children has the advantage to be **direct** (available through the elderly respondent questionnaire). But it has the disadvantage to be **aggregated**: one value is available for all the non-cohabiting children. The determination of the care responsibility should be done in two steps.

First, the *C-FAMILYCARE0* value has to be defined for the **non-cohabiting children carelines** (*RANK*= {01-11} and *C-PROXIMITY*>0). The value at a given wave is the same for all the children and determined as follows:

[22] Means "helping for eating and drinking" and not "preparing the meals", which is also present in the list but as an IADL.

When the elderly respondent declares, in his adult questionnaire:

(1) to receive IADL care from non-cohabiting children (*Did your [non-cohabiting] children help you during the past three months by keeping house?* = yes),
then **non cohabiting children are considered as IADL care-givers.** IADL,

(2) to receive ADL care from non-cohabiting children (*Did your [non-cohabiting] children help you during the past three months by giving you aid in case of sickness?*=yes ),
then **non cohabiting children are considered as ADL care-givers.**

Non-cohabiting children can provide both IADL and ADL care at the same time, then (1) and (2) are both true.

Second, identifying the child(ren) who are the most likely to give care among the non-cohabitants. The attribution of the care responsibility was based on the following hypotheses:

**Care imputation hypothesis 1: *Providing ADL care requires (nearly) daily visit and IADL care requires at least weekly visits*[23].**

**Therefore, if, at a given wave, for all the non-cohabiting children carelines**[24]

- **When non-cohabiting children ADL (and IADL) care is declared (*C-FAMILYCARE0*>1), each child who visits his parent nearly every days (*C-CONTACT*=1) get an imputed code (*C-IMPUTCODE)* equals to 'B', meaning that he meets the condition to provide care.** Of course, it is possible that children share the care responsibility (especially when the care load is heavy), for this reason, I accepted that the non-cohabiting child, visiting his parent weekly (*C-CONTACT*=2) should be declared as an ADL care-giver if there is another care-giver visiting the parent at least as often (*C-CONTACT*<3).
- **When only non-cohabiting children IADL care is declared (*C-FAMILYCARE0*=1), each child who visits his parent at least once a week (*C-CONTACT*= {1,2}) gets an imputed code (*C-IMPUTCODE)* equals to 'B', meaning that he meets the condition to provide care.**
- **When non-cohabiting children care is declared (*C-FAMILYCARE0*>0) but none of the children meet the above-mentioned visit frequency conditions, no imputed code is given. The care declaration is considered as unrealistic and will not be treated.**

**In the first two situations, the value of *C-FAMILYCARE1* is equal to the value of *C-FAMILYCARE0.* In the last situation, *C-FAMILYCARE1* is equal to zero (no care).**

## B. Differences in the care questions and imputation justification

The definition of care used to identify cohabiting care-givers and the one used for non-cohabiting differ in some aspects, which may influence the declaration of care. Those differences cannot be completely erased but it is possible to make hypotheses on their effects leading to over- or under-declaration of care in order to partially correct it by imputation.

The first difference is the **source of information**: for the care provided by cohabitants, the question is indirectly obtained (through the questionnaire of the potential care-giver). For the care provided by non-cohabiting children, the question is directly available through the adult questionnaire of the elderly. In the first case, the question is asked on 'provided' care, while in the second case, the question concerns 'received' care. As seen in chapter I, the declaration of a same care situation may

[23] Nisen (2004) demonstrated the relationship between visit frequency and care provided in his study on intergenerational relationships at waves 3 and 10 of the PSBH.
[24] At a given wave, all the non-cohabiting children have the same value for *C-FAMILYCARE0* but the cohabiting spouse and children may have another value.

vary according to the respondent and his cultural norms. In the present case, we **may expect an under-declaration of the care provided by cohabitants** (because helping for some activities may be considered as 'natural' or 'part of the household tasks division') and an **over-declaration of care provided by non-cohabiting children** (if the elderly parent wants to give a positive image of his children to the interviewer, he is more likely to over-declare the care, to show that his children are 'helpful'). This over-declaration was partly solved by the fact that the elderly having no children meeting the visit frequency criteria was considered as receiving no care from the non-cohabiting child.

The second difference is the **place of the question in the questionnaire**: the question on care from cohabitants is in the 'daily life' section, while the question on care from non-cohabitants is in the 'biographical information' section. This may have an effect on the way the respondent answered: thinking about the 'current' situation in the first case and on 'longer term' perspective in the second case. This **timing** difference is actually induced by the question wording: the cohabitants are asked whether their daily activities include care (might be understood as the current situation, even temporary, or as the usual situation)[25]; for the care received from non-cohabiting children, the elderly respondent is asked to consider any care received over the past three months. If the first question is understood by the respondent has referring to the current situation (the French version), it will be more influenced by the timing of the interview than the second question, because the current situation can change quicker. On the opposite, if the first question is understood as referring to the usual situation (the Dutch version), the question on non-cohabiting care can be more influenced by the timing of the interview, because it refers to the past three month while the 'habitual' or 'usual' situation may exist since a longer time.

A third difference is the definition of the **care activities**: for the care provided by cohabitants, the considered ADL items are "serving-up of food and drink" and help with "personal hygiene"; the IADL items are helping/doing " the laundry" helping/doing "the cleaning of the house" and "following the medication". For the care provided by non-cohabiting children, the ADL items are "aid in case of sickness" or "personal care"[26] ; the IADL items are help with "keeping house"**.** The differences prevent from doing a detailed analysis of the care provided for a given activity (e.g. are sons more likely to help for the medicine and daughters more likely to help with personal care?). However, it is possible to study globally the care provided for the ADL and for the IADL.

The imputation of the care variable (*C-FAMILYCARE0*) will partly solve the suspected under-declaration of cohabitant care by using a proxy variable on the influence of the respondent's health status on the other household members. Between-waves imputation will solve the problem of missing information on non-cohabiting children care at wave 7 and 9[27]. Another reason for imputing this variable is that most of the elderly respondents do not answer the care questions at every wave. Assimilating the missing answers to 'a no care situation' would lead to an under-declaration of care. Of course, the imputation may lead to the opposite: an over-estimation of care (due to between-waves imputation) may lead to an over-estimation of its stability over waves. However, I assume that **a well thought imputation (based on consistency principles, on the literature and using all the**

[25] The time notion is included in the English translation 'daily activities' but only present in the French original version ("***actuellement****, prenez-vous soin ou apportez-vous une aide a une personne malade, handicapée ou âgée?")* but absent in the Dutch original version ("*helpt of verzorgt u zieke, gehandikapte of bejaarde personen ?"*). The question wording may influence the answer (Billiet 1991).

[26] The first version (used in the official English translation) corresponds to the original question in Dutch "*Hebben uw kinderen u de laatste drie maanden geholpen door hulp in geval van ziekte te geven?*" but the original question in French is not restricted to sickness help "Au cours des trois derniers mois, vos enfants vous ont-ils rendu des soins?" and would be better translated as "help with personal care".

[27] Remember that the questions on the care provided by non-cohabiting children are not asked in these two waves.

**available information) will give a better image of the reality than the one given by the data before imputation.**

## C. Imputation rules

### *1. Use of a proxy for cohabiting care-givers*

Since wave 6, each respondent is asked whether he has any *"chronic health problem or handicap cause an extra effort or concern to the other members of the household"* (question code: W6A1701). I used this question to reduce the under-declaration of cohabitant care[28]:

> **If, at a given wave, no care from a cohabitant has been declared but the elderly respondent answers positively to the above-mentioned 'extra effort' question, then *W-EFFORT=1* and *C-IMPUTCODE=* C 'proxy of care from cohabitant' for all the carelines of the spouse and cohabiting children.**

Unfortunately, this proxy variable is not available before wave 6 and does not give information on the type of activities (IADL and/or ADL). However, the literature has shown that **cohabiting care-givers provide at least as intensive (if not more intensive) care than non-cohabiting care-giver (care imputation hypothesis 2).**

> **Therefore, if the elderly respondent who answers positively to the 'extra effort' question also receives care from non-cohabiting children at the given wave, then this type of activity is imputed to the cohabiting care-givers (*C-FAMILYCARE1* of cohabitants equals to *C-FAMILYCARE1* of non-cohabitants).**
>
> **If no care is provided at this wave but the given care-cohabitant has declared providing care at any other wave, the activities mentioned at this wave are imputed. This imputation is based on the hypothesis that *the cohabitants tend to provide long-term and stable care (care imputation hypothesis 3).***
>
> **Otherwise (no non-cohabitant caregiver) *C-FAMILYCARE1* of the cohabitants equals 4: 'undefined family care activities').**

### *2. Between-waves imputation*

The between-waves imputation uses the information available from the care declaration and the proxy. Starting with the imputation for non-cohabitant children:

The general rule is as follows:

> **If the respondent receives care from non-cohabiting children at a given wave and has received care (from a cohabitant or a non-cohabitant) one or two waves before and/or after the concerned wave, then each of the non-cohabitant children carelines meeting the**

[28] Another possible proxy could have been derived from the tasks division questions: at each wave the respondent is asked how often (never, rarely, often, always) he performs several tasks (cleaning the house, doing the washing-up and the ironing, doing the gardening, managing money, etc.). If a important reduction of the tasks responsibilities for the elderly respondent is observed between two waves and corresponds to an increase of tasks responsibilities for (an) other household member(s), we can make the hypothesis that this change in tasks division is associated with a health problem (explaining the decrease in tasks responsibility of the elderly) and to cohabitant care (explaining the increase in tasks responsibility for the cohabitant(s)). However, the task division variables could not be used as proxy because they were very often missing and few changes over waves are observed.

**visit frequency criterion at the in between waves has a *C-IMPUTCODE* = D 'imputed non-cohabiting children care' and the value of *C-FAMILYCARE1* at these carelines equals the closest value observed (before or after). This imputation is based on the idea that family care is often a long-term care involvement and that, in case of missing declaration, *care continuity is more likely than care discontinuity (care imputation hypothesis 4).***

For instance, when an elderly received IADL care from a non-cohabitant at waves 3 and 6 and that no care is declared at waves 4 and 5 and that two of the non-cohabitant children visit their elderly parent weekly during these two waves (they meet the visit frequency criterion for IADL care), these children will then receive a *C-IMPUTCODE* = D and a *C-FAMILYCARE1*= 1.

Specific cases of imputation are explained in appendix frame VI-1.

I did the imputation for the care from cohabitants in a second time.

The rules are the same as those applied to non-cohabitant children, except for the imputation code **(equal to E 'imputed cohabitants care'). A rule was added for cohabitant care: if the elderly respondent has ever received cohabitant care and that non-cohabitant care is declared before cohabitant care, backward imputation of cohabitant care is done** (e.g. the elderly respondent receives non-cohabitant care at waves 4 and 5 and cohabitant care is only declared at wave 5, then cohabitant care is imputed at wave 4). The imputation is based on the literature that shows that ***cohabitants and especially the spouse are the first to provide elderly care but they may take a longer time to declare themselves as care-givers (care imputation hypothesis 5)***. In some cases, they will recognise their caring role only when other care-givers (non-cohabitants children, for instance) join the care network.

At the end of the imputation phase, 24% of the 19,381 carelines of the study waves (3 to 11) were completed. Among the 'caring' carelines (*C-FAMILYCARE1*>0), 64% come from the declarations (*C-IMPUTCODE*={A, B}), 2% from a proxy (*C-IMPUTCODE*=D) and 34% from imputation.

## D. Addition of the care information to the carelines file

The attribution of the care responsibility results in the addition of four variables to the carelines: *C-FAMILYCARE0* which is based on declared care; *W-HHEFFORT* which equals 1 if the elderly respondent declares that his physical health status requires an "extra effort from the other household members"; *C-IMPUTCODE* which allows distinguishing the different types of care considered (according to the living arrangement – cohabitant or non- and the imputation status – care declared or imputed using a proxy or visit frequency information); *C-FAMILYCARE1* which gives the value of the provided care used for the analyses. The frame VI-4 gives an example of the available information in the carelines after the care responsibility attribution:

**FRAME VI-4**: Example of carelines information after the care attribution

| *INDID* | *WAVE* | *RANK* | *C-BIRTHYEAR* | *C-GENDER* | *C-PROXIMITY* | *C-CONTACT* | *C-FAMILYCARE0* | *W-HHEFFORT* | *C-IMPUTCODE* | *C-FAMILYCARE1* |
|---|---|---|---|---|---|---|---|---|---|---|
| 002097102 | 01 | 00 | 1926 | 0 | 0 | 0 | . | . | . | . |
| 002097102 | 01 | 01 | 1955 | 1 | 3 | 0 | . | . | . | . |
| 002097102 | 01 | 02 | 1957 | 1 | 3 | 0 | . | . | . | . |
| 002097102 | 01 | 03 | 1965 | 1 | 3 | 0 | . | . | . | . |
| 002097102 | 02 | 00 | 1926 | 0 | 0 | 0 | 0 | . | E | 2 |
| 002097102 | 02 | 01 | 1955 | 1 | 3 | 2 | 2 | . | B | 2 |
| 002097102 | 02 | 02 | 1957 | 1 | 3 | 2 | 2 | . | B | 2 |
| 002097102 | 02 | 03 | 1965 | 1 | 3 | 1 | 2 | . | B | 2 |
| 002097102 | 03 | 00 | 1926 | 0 | 0 | 0 | 0 | . | E | 1 |
| 002097102 | 03 | 01 | 1955 | 1 | 3 | 2 | 1 | . | B | 1 |
| 002097102 | 03 | 02 | 1957 | 1 | 2 | 2 | 1 | . | B | 1 |
| 002097102 | 03 | 03 | 1965 | 1 | 2 | 1 | 1 | . | B | 1 |
| 002097102 | 04 | 00 | 1926 | 0 | 0 | 0 | 1 | . | E | 1 |
| 002097102 | 04 | 01 | 1955 | 1 | 3 | 2 | 0 | . | . | 0 |
| 002097102 | 04 | 02 | 1957 | 1 | 2 | 2 | 0 | . | . | 0 |
| 002097102 | 04 | 03 | 1965 | 1 | 0 | 1 | 0 | . | . | 0 |
| 002097102 | 05 | 00 | 1926 | 0 | 0 | 0 | 1 | . | E | 1 |
| 002097102 | 05 | 01 | 1955 | 1 | 3 | 2 | 0 | . | . | 0 |
| 002097102 | 05 | 02 | 1957 | 1 | 1 | 3 | 0 | . | . | 0 |
| 002097102 | 05 | 03 | 1965 | 1 | 1 | 1 | 0 | . | . | 0 |
| 002097102 | 06 | 00 | 1926 | 0 | 0 | 0 | 3 | 0 | A | 3 |
| 002097102 | 06 | 01 | 1955 | 1 | 3 | 2 | 0 | 0 | . | 0 |
| 002097102 | 06 | 02 | 1957 | 1 | 2 | 2 | 0 | 0 | . | 0 |
| 002097102 | 06 | 03 | 1965 | 1 | 2 | 1 | 0 | 0 | . | 0 |
| 002097102 | 07 | 00 | 1926 | 0 | 0 | 0 | 0 | 0 | E | 3 |
| 002097102 | 07 | 01 | 1955 | 1 | 2 | 2 | 0 | 0 | . | 0 |
| 002097102 | 07 | 02 | 1957 | 1 | 3 | 2 | 0 | 0 | . | 0 |
| 002097102 | 07 | 03 | 1965 | 1 | 2 | 2 | 0 | 0 | . | 0 |
| 002097102 | 08 | 00 | 1926 | 0 | 0 | 0 | 0 | 1 | C | 3 |
| 002097102 | 08 | 01 | 1955 | 1 | 2 | 2 | 0 | 1 | . | 0 |
| 002097102 | 08 | 02 | 1957 | 1 | 3 | 2 | 0 | 1 | . | 0 |
| 002097102 | 08 | 03 | 1965 | 1 | 3 | 1 | 0 | 1 | . | 0 |

The elderly respondent whose *INDID*= 002097102 answered an adult questionnaire until wave 8. At all these 'waves of presence' he has four potential care-givers (a spouse, born in 1926 and three daughters born in 1955, 1957 and 1965). (For more detailed information on how to write the columns 1 to 7, see frame VI-3). The variable *C-FAMILYCARE0* is missing at wave 1 (because the information on the care provided by non-cohabitant children is only available since wave 2). The variable *W-HHEFFORT* is missing for waves 1 to 5, because the question is only asked since wave 6. The value of *C-FAMILYCARE0* at a given wave is always the same for all the non-cohabiting children (2=ADL at wave 2 and 1=IADL at wave 3). But the value of *C-FAMILYCARE1* can vary (in the present case), the value is the same, because the three non-cohabitant daughters meet the visit frequency criterion (e.g. at wave 2, one of them visits her mother nearly each day and the two other weekly. This is enough to contribute to the ADL care).

Cohabitant spouse care with ADL and IADL is declared at wave 6 (*C-IMPUTCODE*=A, *C-FAMILYCARE1= C-FAMILYCARE0=* 3*)* and an 'extra effort' from household member(s) is declared at wave 8 (*C-IMPUTCODE*=C, *C-FAMILYCARE0=* 0.The value of *C-FAMILYCARE1* is given by imputing the closer value declared: in this case '3' is observed at wave 6 according to the care imputation hypothesis 3). Finally, the imputation code 'E' is attributed to the cohabitant carelines at waves 2,3,4,5 and 7

(following the care imputation hypothesis 4). The value of *C-FAMILYCARE1* for these carelines was determined according to the care imputation hypothesis 2.

## *SECTION 4. Operationalisation of the concepts of family care*

In the final theoretical scheme, the three main research questions were divided into more precise and 'operational' questions, identified by a number between brackets from 0.1. to 3.3.

- The questions 0.1 and 1.1. are asked at the elderly respondent level (the most aggregated): "*Has he ever received care services at any of the PSBH waves?*" "*Has he ever received family care at any of the PSBH waves?*"
- The questions 1.2., 2.1., 2.2. and 2.3 derive from the aggregation of the carelines information at the wave level (e.g. the variable *W-CGNUMBER* which gives the number of care-givers at a given wave is based on the number of carelines where *C-FAMILYCARE1* >0).
- The question 2.3. on the combination 'care-givers/care services' is particular because it is not 'strictly' a family care aspect (based on the carelines) but a 'home care' aspect telling whether the elderly received family care and/or care services.
- The definition of the dependent variables used for the questions 3.1. to 3.3. will be explained in chapter X.
- As the variables used for the questions 0.1 and 1.1. are based on the wave variables created to answer the questions 1.2., 2.1., 2.2. and 2.3., the waves variables are presented first. They are followed by the variables aggregated at the elderly level (question 0.1. and 1.1.).

Each operational choice is justified (how the data and/or the research questions justify the choice of the variable(s) as indicator of the given aspect of care rather than other variables used in the literature?).

## A. 'Wave level' care variables

The wave variables on family care aspects are directly derived from the carelines and created only for the waves where family care is provided, except from the question 2.3. on the 'care-givers/care services combination' (see below). In this case, the variable is created at all the waves and two sources of information are used: the carelines for the presence of care-givers and the household questionnaire for the use of care services. I first explain how the care aspects variables directly derived from the carelines (care-givers relationship, then family care intensity) are built. Second, the way the combination variable was created is presented: How is the care services variable built? What are its particularities? How is this variable combined with a variable issued from the carelines to create the 'care-givers/care services combination' variable? The wave variables are created for all the 11 waves[29].

### *1. The care-giver types (scheme question 2.2)*

Three variables were created, corresponding to the three types of care-givers (spouse, daughter and son):

1. *W-SPOUSECARE (0,1)* equals to 1 when the elderly received care from spouse at a given wave.

   **At wave n, if there is at least one careline where *RANK*=00 (the spouse) and *C-FAMILYCARE1*>0 (provides care), then *W-SPOUSECARE*= 1, otherwise, *W-SPOUSECARE*= 0.**

[29] There is no information recorded on family care at the first wave: the values of these variables are therefore always equal to zero = 'no care', for this wave.

2. *W-DAUGHTERCARE (0,1)* equals to 1 when the elderly received care from a daughter at a given wave.

   **At wave n, if there is at least one careline where *RANK*>00 (child), *C-GENDER* = 1 (woman) and *C-FAMILYCARE1*>0 (provides care), then *W-DAUGHTERCARE*=1; otherwise, *W-DAUGHTERCARE*= 0.**

3. *W-SONCARE (0,1)* equals to 1 when the elderly received care from a son at a given wave.

   **At wave n, if there is at least one careline where *RANK*>00 (child), *C-GENDER* = 0 (man) and *C-FAMILYCARE1*>0 (provides care), then *W-SONCARE*= 1; otherwise, *W-SONCARE*= 0.**

Initially, it was planned to build a care-givers typology variable which combine the three preceding variables including the number of sons and daughters giving care. I tried several typologies but none of them met simultaneously the two following criteria: (1) having meaningful modalities (e.g. a typology only based on the presence of spousal care and the number of children caring but which does not consider the gender of the caring children is not really meaningful as the literature clearly shows a difference in care involvement between daughters and sons); (2) having enough observations[30] in each modality to allow multivariate analysis. Another difficulty with the use of a care-givers typology as dependent variable is that the multivariate analysis could only be carried out on the (sub-)sample being 'at risk' for all the modalities of the dependent variable. For instance, a typology based on the presence of a spouse, daughters and sons has eight modalities: 'no care', 'cared by spouse', 'cared by daughter(s)', 'cared by son(s)', 'cared by spouse and daughter(s)', 'cared by spouse and son(s)', 'cared by daughter(s) and son(s)' 'cared by spouse daughter(s) and son(s)'. The only respondents 'at risk' for all the modalities are those having a spouse, a daughter and a son, but restricting our analyses to this sub-population would lead to work on a too selected (and small) sample.

Indeed, no studies using a care-givers typology as dependent variable were found. Some typologies are theory-based (Clément *et al.* 2005), but, more frequently, they are empirically constructed (e.g. Jourdain *et al.* 1988; Kirsch & Warrant 2009). In this case, the purpose is often to describe the different care situations present in the sample and to which specific characteristics or problems are associated with each of them. The typologies which only include family or informal care-providers are often based on qualitative studies which aim at identifying the 'frail' care situations. The typologies including both formal and informal care-providers are more frequently used in quantitative studies either to validate or illustrate one of the 'informal-formal' care articulation (Tennstedt *et al.* 1996; Penning 2002) or compare the characteristics of the respondents by care situations (Dutheil 2001; Davin *et al.* 2008).

### *2. Family care intensity (question 2.3)*

Various measures of care intensity are found in the literature: the number of care-providers (e.g. Parrott & Bengston 1999; Dautzenberg *et al.* 2000), the number of caring hours (e.g. Deboosere *et al.* 2006) or the number of care activities: either their sum (e.g. Whitbeck *et al.* 1991; Taylor & Lynch 2004), or a weighted indicator accounting for the fact that the ADL are more constraining (e.g. De Koker 2009), or accounting for the level of care (helping the elderly to do the activity or do the activity for the elderly)(e.g. Leroy & Neirynck 1994). The indicator chosen depends mainly on the available information.

[30] The number of observations was computed for each study wave separately. Even when the most simple and meaningful typology is taken (based on the presence of spouse, daughter and sons without considering the number of children), some modalities never concern more than 29 respondents at a given wave (e.g. 'cared by spouse, 'daughter and son', 'cared by spouse and daughter', 'cared by spouse and son').

In the PSBH data, three types of information are available, the total number of caring hours provided by the respondent[31] (through the adult questionnaire), the number of care-givers and the type of caring activity assumed by each care-giver[32] (through the carelines file). It was decided not to use the information on the caring hours for the following reasons: (1) this information is not available for non-cohabitant care-givers, (2) the question concerns the total number of caring hours assumed by the respondent: if he cares for more than one person, he is asked to cumulate all the caring hours, (3) there are many missing values. (4) As shown by Folbre & Bittman (2004), the number of caring hours was often difficult to evaluate, especially when the care is provided to a cohabitant.

Two variables are used as indicators of care intensity. The first variable is the number of care-givers:

> **At wave n, if two or more carelines have *C-FAMILYCARE1*>0, then *W-CGNUMBER*=2 ('two care-givers or more'); otherwise, if only one careline has *C-FAMILYCARE1*>0, then *W-CGNUMBER*=1 ('one care-giver'); otherwise, *W-CGNUMBER*=0 ('no family care').**

The second variable used as care intensity indicator is the type of activities for which the elderly received care. The variable is built according to the following sequential order:

> **At wave n, if:**
> 1. **there is (1) at least one careline having *C-FAMILYCARE1*=3 (one care-giver provides ADL and IADL care) or (2) at least one careline having *C-FAMILYCARE1*=2 (ADL care) and at least one careline having *C-FAMILYCARE1*=1 ('IADL care'), then *W-CGACTIVITY* = 3 ('IADL and ADL care');**
> 2. **otherwise, if, there is at least one careline having *C-FAMILYCARE1*=2, then *W-CGACTIVITY* = 3 ('ADL care only');**
> 3. **otherwise, if, there is at least one careline having *C-FAMILYCARE1*=1, then *W-CGACTIVITY* = 1 ('IADL care only');**
> 4. **otherwise, if, at a given wave, there is at least one careline having *C-FAMILYCARE1*=4, then *W-CGACTIVITY* = 4 ('undefined care').**
> 5. **otherwise, *W-CGACTIVITY* = 0 ('no family care').**

### *3. Receiving family care (question 1.2) and care-givers/care services combination (question 2.1)*

The idea is to create a variable which tells if, at a given wave, the elderly respondent receives 'family care only', 'care services only', 'both' or 'none of them'. One has to keep in mind that, in most of the existing studies, the presence (or the characteristics) of family care is used as a determinant of professional care use (e.g. Auslander & Litwin 1990; Crets 1996; Blomgren *et al.* 2008) and conversely (e.g. Edelman & Hughes 1990). In both cases, this is an endogeneity problem: the decisions of relying on family care and the decision to use care services are usually interrelated (Charles & Sevak 2005; Fontaine *et al.* 2007). There are both based on available resources, type and level of needs and individual preferences (e.g. if the elderly needs intensive care, it is more likely that he opts for a combination of family care and care services to alleviate the care' load of his family). Choosing the care combination as dependent variable is a simple way to overcome this problem of endogeneity. Another advantage of this 'combination variable' is that it permits to test some of the family care/care services articulation hypotheses through the analyses of the transitions: if the transition from 'family care only' to 'both' or from 'care services only' to 'both' is more frequent than the transition from 'family care only' to 'care services only' or from 'care services only' to 'family care only', it would be an evidence that supplementation is more frequent than substitution.

[31] "Roughly how many hours a week do you spend looking after them?"

[32] Except in the case where the care attribution comes from the 'extra effort' proxy and that no activity could be imputed (n= 60 on the 2,433 carelines of the study waves where *C-FAMILYCARE1*>0).

The combination variable is based on the carelines file for the identification of family care and on the household questionnaire for the identification of care services. Each self-defined head of household answers a household questionnaire which treats topics concerning all the household members. One of the questions concerned the use of help from outside the household for seven types of IADL (cleaning, shopping, daily cooking, washing and/or doing the ironing, gardening or doing odd jobs, completing forms and doing administrative work, administering the money or controlling the finances)[33]. For each of the seven tasks, the respondent is asked whether his household received: 1= "paid help" and/or 2="unpaid help" or 3="no help". The variable indicating the use of care services was built as follows:

> **At wave n, if:**
> **the self-defined head of household declares that his household used at least one of the seven care services - whatever paid or not – (any 1 or any 2[34]), then all the elderly respondents living in the household are considered as receiving care services and *W-CARESERVICES*=1 ('receive care services');**
> **otherwise, (if the code 0 is given for all the seven types of IADL), then *W-CARESERVICES*=0 ('do not receive care services').[35]**

The PSBH information on care services present some limitations which cannot be overcome but should be mentioned.

1. The question is only asked at the household level making it impossible to identify which member(s) of the household receive(s) the care. However it is acceptable to consider that all the household members benefit (even indirectly) from any external help (e.g. help for cleaning the house benefits directly to the household member who asks for it but also benefit indirectly to the other household members.
2. The care services concern only the IADL. Nursing care or help for washing and dressing-up which are professional services often used by dependent elderly are not included. It is therefore not possible to build a combined variable which will account both for the intensity of care services and the intensity of family care.
3. The question is not conditioned on needs. External help with cleaning can be assumed by a needs-tested cleaning helper service, but can also be assumed by a private housemaid who works in the household since many years. This will probably result in a weaker relationship between the use of care services and the health status of the elderly respondent.
4. Most of the used care services probably come from formal care sources: according to the literature (e.g. Jacobs *et al.* 2004a), the professionals are the second care providers after the nuclear family. However, the way the question is asked does not exclude that the care services are provided by any person living outside the household (friends, neighbours, colleagues, etc.)[36].In short, the *W-CARESERVICES* variable combined with family care will allow studying the combination of family care with the other sources of at home care (except care provided by other household members).

[33] See chapter IV for the question codes and exact question wording.
[34] For waves 6 and onwards: any 1 or any 2 or any 3.
[35] Note that *W-CARESERVICES* was built on the IADL questions after imputation of the missing values. The imputation rules are the same then for the independent variables. They will be explained later in chapter VII. The imputation was done for each of the seven variables separately: 30 elderly were imputed on one of more waves for care services with cleaning, 40 for cooking, 44 for shopping, 58 for washing and ironings , 75 for gardening and odd jobs, 40 for completing forms and doing administrative work, and 38 for administering the money or controlling the finances.
[36] Although we cannot strictly exclude that the respondent considers care from non-cohabitant children here, we can reasonably think that it will not be the case as specific questions on non-cohabitant children are asked in the adult questionnaire.

Other variables were also created to measure the number of tasks for which help is provided {from 0 to 7}, the use of any 'unpaid' care service, the use of any 'paid' care service and the use of a given service (e.g. receiving care with gardening or doing odd jobs).

The combination variable, *W-COMBICARE* is based on *W-CARESERVICES* (see creation above) and *W-FAMILYCARE* is built on the carelines file as follows:

> **At wave n,**
> **if there is at least one careline having *C-FAMILYCARE1*>0 ('someone provides care'), then *W-FAMILYCARE*=1 ('the elderly receives family** needs-tested **care'); otherwise, *W-FAMILYCARE*=0.**

The *W-FAMILYCARE* variable will be used to answer the question 1.2 "Who is receiving care".

The combination care[37] variable is created to answer the question 2.3. on care combination :

> **At wave n,**
> **if *W-FAMILYCARE*=1 and *W-CARESERVICES*=1, then *W-COMBICARE*=3 ('mixed care');**
> **if *W-FAMILYCARE*=1 and *W-CARESERVICES*=0, then *W-COMBICARE*=2 ('family care');**
> **if *W-FAMILYCARE*=0 and *W-CARESERVICES*=1, then *W-COMBICARE*=1 ('care services');**
> **if *W-FAMILYCARE*=0 and *W-CARESERVICES*=0, then *W-COMBICARE*=0 ('no care').**

## B. 'Elderly level' care variables (questions 0.1 to 1.1)

The 'ever' care variables created at the elderly level are not frequently found in the literature. They summarise the information available at all or several waves of the respondent. The 'ever[38]' variables tell whether or not a given event (e.g. receiving family care) has 'ever' happened or not during a period of time, regardless of the timing and the duration of the event. They are time-invarying (either the event has occurred for the given respondent or not during the panel). In this sense, they cannot be considered as cross-sectional variables because they do not refer to a single period in time like the wave variables. Likewise, they cannot be considered as longitudinal variables because they do neither account for the timing of the event nor for the presence of a change. In the dissertation, two 'ever' variables are created to assess whether some socio-demographic characteristics of the elderly respondent which are stable over the panel (gender, birth cohort, education level, etc.) may have influenced the probability of 'ever' receiving a kind of care (family care and or care services). Two variables are created:

1. The first variable only considers care services and is built as follows:

   **If, at any wave (3 to 11), *W-CARESERVICES*=1, then *E-EVERCARESERVICES*=1 ('ever received care services'); otherwise *E-EVERCARESERVICES*=0 ('never received care services').**

2. The second variable is created based on the study waves only because the value of this 'ever' variable will later serve for selecting the sub-sample of the respondents who ever received family care for the care aspects analyses (see operational scheme). The *E-EVERCOMBICARE* variable has the same modalities as the *W-COMBICARE* variable except for the last one: in *W-COMBICARE*, 'mixed care' refers to the situation where the respondent received simultaneously (at the same wave) family care and care services. In *E-EVERCOMBICARE*, 'both

[37] I did an oral presentation on the creation of this combination variable (initially named W-FIMO for Formal, Informal, Mixed and nOcare) as a means to solve the endogeneity problem and to study the care transition and test the care articulation hypotheses (European Sociology Association Congress in Lisbon, the 5th September 2009 at the session "Care for older people, work and the family" organised by the network RN01 Ageing in Europe).

[38] I created this term of 'ever' variable to refer to this specific type of variables which I did not find in the elderly care literature. Note that 'ever' means 'ever during the panel' (the observed period) and not 'ever during the respondent life' (see the comment on the 'window of observation in chapter 5).

cares' refers to the situation where the respondent has received both family care and care services during the study waves (it may be simultaneous or not). The *E-EVERCOMBICARE* was built as follows:

**If, at any of the study waves (3 to 11), *W-CARESERVICES*=1 and at any study wave *W-FAMILYCARE*=1, then *E-EVERCOMBICARE*= 3 ('ever received both cares');**

**If, at all the study waves (3 to 11), *W-CARESERVICES*=0 and at any study wave *W-FAMILYCARE*=1, then *E-EVERCOMBICARE*= 2 ('ever received family care (and never care services)');**

**If, at any of the study waves (3 to 11), *W-CARESERVICES*=1 and at all the study wave *W-FAMILYCARE*=0, then *E-EVERCOMBICARE*= 1 ('ever received care services (and never family care)');**

**If, at all the study waves (3 to 11), *W-CARESERVICES*=0 and at all the study wave *W-FAMILYCARE*=0, then *E-EVERCOMBICARE*= 0 ('never received care');**

Frame VI-5 shows the result of the aggregation of the carelines information. When comparing this frame with the frame VI-4, we can see how the information provided by the 36 carelines of the elderly respondent 002097102 is summarised in 8 lines (one for each wave of presence) in the wave file. It is this wave file, composed of 8,807[39] lines or observations that will be used for the analyses.

**FRAME VI-5**: Example of the structure of the wave file after the aggregation of the care variables

| *INDID* | *WAVE* | *W-SPOUSE CARE* | *W-DAUGHTER CARE* | *W-SON CARE* | *W-CG NUMBER* | *W-CG ACTIVITY* | *W-CG ACTIVITY* | *W-FAMILY CARE* | *W-CARE SERVICES* | *W-COMBI CARE* | *E-CARE SERVICES* | *E-COMBI CARE* | *E-EVER CARE* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 002097102 | 01 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 1 | 3 | 1 |
| 002097102 | 02 | 1 | 1 | 0 | 4 | 2 | . | 1 | 1 | 3 | 1 | 3 | 1 |
| 002097102 | 03 | 1 | 1 | 0 | 4 | 1 | . | 1 | 0 | 2 | 1 | 3 | 1 |
| 002097102 | 04 | 1 | 0 | 0 | 1 | 1 | 11 | 1 | 1 | 3 | 1 | 3 | 1 |
| 002097102 | 05 | 1 | 0 | 0 | 1 | 1 | 11 | 1 | 0 | 2 | 1 | 3 | 1 |
| 002097102 | 06 | 1 | 0 | 0 | 1 | 3 | 12 | 1 | 1 | 3 | 1 | 3 | 1 |
| 002097102 | 07 | 1 | 0 | 0 | 1 | 3 | 22 | 1 | 1 | 3 | 1 | 3 | 1 |
| 002097102 | 08 | 1 | 0 | 0 | 1 | 3 | 22 | 1 | 1 | 3 | 1 | 3 | 1 |

[39] This number corresponds to the sum of waves of presence (from 1992 to 2002) of the 1,123 elderly respondents. If only the study waves are considered (from 1994 to 2002), it remains 6,561 observations.

## *CONCLUSION*

The purpose of this chapter was to explain and justify the creation of the carelines files and the care variables which will be used for the analyses. Data preparation, restructuration and imputation were a huge and complex, but necessary task. Otherwise, it would have been impossible to study the evolution of the family care using the PSBH. However, all these data handlings are not without consequences: the between-waves imputation leads to over-estimate the stability of care over time and prevents from studying the timing of care changes. The attribution of the care responsibility to individual non-cohabitant children was done following rules based on the literature and the common sense, but the result after imputation is not as reliable as if the respondent was directly asked to declare which kind of care he received from each of his children.

The dependent care variables created will allow making analyses which are a mix of elderly potential care-receiver individual analysis and network analysis: it is not really an individual analysis because there are not as many observations as the number of potential care relationships[40]. All the care variables are recorded at the elderly or at the wave level even if some of them result from an aggregation of the information available at the carelines level (e.g. receiving daughter care comes from the care declared by all the daughters of the elderly). The care variables at the elderly level (like having ever received care) imply working at the network level (the information is global and does not account for the particularities of the care-provider). Some of the variables related to the care characteristics at the wave level may also be related to a network level analysis (care activities and numbers, care combination) while the others (care from spouse, daughter(s) and son(s)) are between the individual and network level: they focus to a sub-group of potential care providers (the family care-givers) and it is possible to study the care provided by each of the (types) of potential family care-givers separately, while controlling for the presence of other potential family care-givers.

Initially, I planned to do more complex analyses (sequence analyses, multi-level analysis with unobserved heterogeneity, etc.). But, as I was trying to carry out these analyses, I realised that they did not fit to the data (e.g. the optimal matching), that the results were difficult to interpret (e.g. unobserved heterogeneity terms for the multi-level analysis) or that they lead to rely too much on aspects of the data which may have been too much influenced by the data imputation (e.g. the event-history analyses). Moreover, the study phenomenon - family care - refers to a huge variety of situations which are difficult to regroup into meaningful 'types' without over-simplifying the reality. All that led me to opt for more simple analysis which fit the data and their limitations and which are interpretable. Most of the results are consistent with the literature or can be explained by the Belgian context.

[40] To study each care relationship separately and their interdependence, it would be necessary to have, for each elderly, at each study wave, a number of observations equal to the number of potential care-giver. For instance, an elderly being in the panel until wave 9, having two children and no spouse would contribute to 7 study waves* 2 potentials care-givers = 14 observations.

# CHAPTER VII

## THE DETERMINANTS OF THE FAMILY CARE ASPECTS

This chapter closes the methodological part. After having presented the PSBH data and the study sample in chapter V and having prepared the carelines file with the operationalisation of the dependent variable (the care) in chapter VI, the last step before starting the analyses is the operationalisation of the care determinants (independent variables). The main determinants of family care were identified by the systematic literature review and classified according to the Andersen and Newman typology (chapter II) into 'predisposing factors', 'enabling factors' and 'needs factors'. This chapter presents and justifies the choice of the variables used to represent those factors.

The objectives of this chapter are: (1) to present the PSBH variables chosen to represent each of the care determinants; (2) to explain why and which variable modifications and imputations were needed to adapt the PSBH variables for the longitudinal analysis of family care; (3) to evaluate the validity of the variables and discuss their potential impact on the analysis results.

Section 1 explains how each determinant was translated into independent variable(s): (a) How the factor is supposed to influence family care? (b) Which PSBH variable was chosen to represent the determinant? (c) Which corrections and imputations were needed? (d) What is the validity of the variable? Section 2 presents how each predisposing factor was operationalised by following the question scheme presented in section 1. The same is done for the needs factors in section 3 and for the enabling factors in section 4.

## *SECTION 1. Operationalisation methodology*

The main determinants of family care were identified by the systematic literature review (chapter II): **gender**, **age**, **health status**, **family composition** and **geographical proximity of non-cohabiting children**, **socio-economic situation** (usually measured by the education level and/or the socio-economic status), **and level of urbanisation**. Another important determinant - rarely included in the multivariate analyses of family care aspects but often included in multivariate analyses of elderly care combinations in the descriptive and in the theoretical literature - are the characteristics of at-home care services. They vary much from one country to another and sometimes within a country. In Belgium, the at-home elderly care policies options taken in Flanders differ from those taken in Wallonia or in Brussels (chapter III). These options reflect the cultural differences in values, religiosity and in the perception of who should take care of the elderly. For these reason, the **region** should be included as a determinant of family care in Belgium: it works like a proxy of the differences in elderly care policies. **Religiosity** is included to reflect more traditional values in terms of family solidarity (e.g. elderly care as a community or family responsibility, mainly assumed by women) usually more frequent in Flanders and among older birth cohorts. The chapter on Belgian context also presented the characteristics of the Belgian cohorts aged 65+ at the first study wave of the PSBH (birth cohorts 1900-1929). There is a large heterogeneity of life experience within this cohorts group. For this reason, I decided to favour the **cohort** approach rather than the age approach.

The aim of this section is to prepare and facilitate the reading of the following sections. Each operationalisation step is explained in details: what is its purpose? Which choices should have been made? What are the technical terms which should be known? How are the results (graphs, tables, figures) displayed?

### A. The relationship with family care

The first step of the operationalisation is to justify why the given characteristic (e.g. gender) can be considered as a determinant of the presence of family care, of one of its aspects and/or its evolution over time. This step is based on a re-reading of the findings of the international systematic review (chapter II) and of the Belgian studies (chapter IV) centred on the effect of the study characteristic and its effect on family care[1]. Potential problems of concept measurement will be discussed too (e.g. How measuring economic means? Through which variable will the partnership status be represented?).

### B. Presentation and potential recoding of the selected variables

The second step is the presentation of the PSBH variable(s) that have been selected to represent the family care determinant: How is (were) the question(s) formulated[2]? Did there any change occur over waves? What is the status of the variable (time-invarying or time-varying? See frame VII-2). Is there any recoding needed (some modalities of the variable may be regrouped or recoded in order to have a 'standardised[3]' variable, with the same modalities over all the study waves and for which each elderly respondent could have a valid answer)?

[1] Unlike the chapters II and IV where the results were structured by the research questions and the concerned family care aspect (dependent variable).
[2] The PSBH questionnaires are only available in French and Dutch. Like in chapter IV, the English translation of the QNFE document is used.
[3] Standardisation often implies a loss in accuracy (e.g. regrouping the socio-professional status categories) but is necessary for longitudinal analysis.

**FRAME VII-1:** Time-invarying and time-varying

The distinction between time-invarying and time-varying variables is specific to longitudinal analyses:

Time-invarying variables refer to characteristics which are **stable** over time (e.g. gender, birth cohort) or which are **unlikely to change** in the study sample over the observation period (e.g. at 65+, the education level, the religiosity, socio-professional category or the number of children can be considered as time-invarying variables). Variables that are found to be **very stable in the data** will also be considered as time-invarying (e.g. in the PSBH data, very few elderly move to another private household[4]: as a consequence, variables related to the place of living – like region of residence and level of urbanisation may be considered as stable). The value of a time-invarying variable is constant over waves for a given elderly (e.g. the three last variables in the frame VI-5, *E-EVERCARE, E-COMBICARE, E-CARESERVICES* are time-invarying).

Time-varying variables refer to characteristics that are subject to **changes** over the observation period (e.g. health status, care aspects, economic resources, partnership status, etc.). The value of a time-invarying variable can change over waves for a given elderly and transition variables can be created (e.g. in the frame VI-5, *W-CGNUMBER* (number of care-givers) takes different values.

This distinction influences the treatment of the missing data.

If a respondent has missing data on a time-invarying variable at a given wave but answers the question related to this variable at least one of the other waves, this value is attributed[5] to all the other waves of the respondent. A problem occurs when different values are observed at two or more waves: in case of 'inconsistency', one of the values should be chosen and imputed to all the other waves.

If a respondent has missing data on a time-varying variable at a given wave but answers the question at least at one of the other waves, between-waves imputation is possible but will over-estimated the stability of the characteristic over waves. Unlike the time-invarying, the presence of different values at two waves is not considered as an inconsistency.

The sources used to solve these problems are the adult and household questionnaires (to identify conditional questions[6]) and the QNFE file (see frame VII-2).

**FRAME VII-2:** The QNFE

The PSBH team created the QNFE file[7] to help researchers who want to carry out longitudinal analyses. For every question ever asked in the adult, the household or a specific module questionnaire, the following information is given:

- The question wording and the response modalities (Dutch, French and English),
- For each wave, whether the question was asked or not, its localisation in the questionnaire (type of questionnaire, question number and page), the code in the data, the format applied, whether there was a change in the question wording, whether a 'forward-feeding[8]' variable was built, the reference to the 'remark' document[9] if there is something special to note when using the variable, etc.

[4] Remember that the respondents should be followed up as long as they live in a private household. If a panel respondent moves to another household, the interviewer should try to trace him but it might be more difficult to identify the new address of an isolated elderly who moves to cohabitate with a child (the new occupants of the house and the neighbourhood might not know the new address of the elderly). If the respondent moves to collective household (the most likely 'move' at old age), he is not followed.

[5] The term 'attributed' is used to make the difference with 'imputed': attribution refers here to a 'mechanical'/'logical' treatment of missing data (no hypothesis or rules are needed). Imputation is restrictively used for the treatment of missing data which are based on hypotheses or rules.

[6] For instance, the question on disability is only asked to respondents who declared having a chronic health problem. The 'disability' question is therefore a 'conditional' question.

[7] The QNFE file can be downloaded online at http://www.psbh.ulg.ac.be/pages/doc_gener.htm [accessed on 28/11/08].

[8] These 'forward-feeding' f-variables were created by the PSBH team to solve the problem of the missing data due to the fact that some questions were not asked because time-invarying information was obtained at a

At the end of the second step, simple cases of missing data are solved (coming from a conditional question, a missing data on a time-invarying variable which can be solved by the use of the forward-feeding variable or the attribution of a value observed at another wave). More complex cases of missing data will be treated at the next step.

## C. Imputation of the independent variables

The third step is the treatment of missing data which may have not been solved at the previous step. There is no consensus on the treatment of missing values in the literature. Some authors (e.g. Silverstein & Litwak 1993; Barrett & Lynch 1999) favour the accuracy of answer, do not use imputation at all but exclude the observations (respondents) having a missing value on any of the analysis variables ('listwise' deletion). The disadvantage is that the remaining sample of the respondents having a valid answer on all the variables might be a quite highly selected sample. Other authors (e.g. Dwyer & Coward 1991; Szinovacz & Davey 2007; Lin 2008) prefer to keep the sample as large and representative as possible even it implies making some imputations. The disadvantage of imputation is that it is based on hypotheses which are more or less realistic and that it tends to over-estimate the stability of the time-varying characteristics over time and to misidentify the timing of changes.

In the dissertation research, the imputation option is chosen. First because one of the particularities of the research is to work on a general sample of elderly and to avoid selectivity bias as much as possible. Secondly, an exploratory analysis of the PSBH dataset shows that most elderly respondents have missing data in one or another analysis variable at one or another wave. Therefore the 'listwise' deletion option would not only lead to work on a selected sample but also on a small size sample.

There are various ways for imputing missing data. Some are based on more or less sophisticated computations (random imputation, means/mode imputation, conditional or multiple imputation, etc., see Jamshidian 2004; Raghunathan 2004; Acock 2005) and are systematic. Others are based on the knowledge of the phenomenon, the literature and the common sense. Rules may be defined, but cannot solve all the cases. Some of them which will be treated specifically: imputation is more 'reasoned' than systematic.

The systematic imputation methods are mainly applied to quantitative variables[10] like income (e.g. Dwyer & Coward 1991, Lee *et al.* 1994) while the 'reasoned' imputation is often used for qualitative variables. As all the analysis variables are qualitative, the last option is chosen here. Four imputation rules were defined (see frame VII-3). Each of them concerns a specific problem. Note that the rule may be used in combination to another rule for a given variable.

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previous wave (e.g. the respondent entered retirement at the first wave. At that moment, the interviewer asked him what was the last job occupied. The response will not change over waves. For this kind of questions, a forward-feeding can be created for the waves 1993 and following. The value of the f-variable at the second wave will be equal to the value of the variable at the first wave. As advised on the PSBH website, the f-variables were used whenever they were available.

[9] This document (available online: http://www.psbh.ulg.ac.be/pages/doc_gener.htm [accessed on the 28/11/08]) contains useful information on some variables (e.g. routing errors, question decomposed in sub-questions at another wave, etc.).

[10] Systematic methods are also used for qualitative variables. For instance, Lin (2008) uses the 'univariate imputation' method to solve missing data on elderly characteristics (such as health status). This method used an algorithm that will find out which is the most likely value based on other characteristics of the respondent like age, gender, race, etc.

**FRAME VII-3:** Imputation rules

**Rule 1:** Inconsistency on a time-invarying variable:

1. The most frequent observed modality is imputed.
2. If none of the observed modalities is more frequent than others, the earlier observed modality is imputed to all the waves (hypothesis: earlier responses are more reliable because the elderly is younger, less likely to have memory problems.

**Rule 2:** Missing data at one or more waves of a time-varying variable (between-waves imputation):

1. Imputation of the value of the **closest wave** (before or after the missing wave) with a valid answer (e.g. if there are missing values at waves 5 and 6 and valid answers at waves 4 and 7, the modality observed at wave 4 is imputed to wave 5 (because 4 is closer than 7) and the modality of wave 7 is imputed to wave 6 (e.g. if the variable subjective health (1= (Very) good, 2=Fair, 3=(very) bad), distributed over all the study waves of a respondent gives the following sequence: '33.21.233' it will be imputed as '33**32**11233'. Similarly: '..3331.' becomes '**33**333**11'**.
2. If there is a valid answer at a wave before the missing wave and at a wave after the missing wave and that **none of them is closer than the other**, then:
   **2.1** if they have the same modality, this modality is imputed (e.g. 1.122 => 1**1**122);
   **2.2** if they have different modalities
      **2.2.1** If one of them is more frequently observed on the respondents' trajectory, this modality is imputed (e.g. 11.22222=>11**2**22222);
      **2.2.2** If none of them is more frequently observed on the respondents' trajectory, the modality of the wave before[11] is imputed (e.g. 11.22 => 11**1**22).

**Rule 3:** Missing data at all the waves and presence of other variables related to the determinant:

The response to other related questions is used to define which the most likely modality is. For instance, if a respondent declares to be 'severely disabled' but does not answer the question on subjective health status, one may assume that his health status is probably (very) bad. Similarly, if a respondent does not answer to the global question on religiosity but declared to go weekly to church, one may assume that he is a religious person.

**Rule 4:** Missing data at all the waves and absence of other variables related to the determinant:

If the missing data cannot be solved by between-waves imputation and if there are no other variables related to the determinant, then a solution is to impute the modal modality of the reference group. The reference groups should be defined by socio-demographic variables which are associated with the variable to impute. For instance, to impute the missing on the last occupation variable, the modal modality is computed for 40 reference groups defined by gender, birth cohort and education level. For each respondent having missing data, the modal modality of his reference group is imputed. This method has the disadvantage of increasing the correlation between the variables considered for the correction.

For the time-varying variables, a graph will display the distribution of the variable before and after imputation for each wave. This allows seeing if the imputation over-estimates the stability of the characteristics over time in the sample. For the time-invarying variable, only the number of imputed elderly respondents is given.

At the end of this step, a first descriptive analysis is done:

[11] It implies that imputation may lead to delay the exact timing of the transition : in the example '11.22', we cannot know if the transition from (very) good health (1) to fair health (3) occurs between the second and the third study wave ('11222') or between the third and the fourth study wave (11**1**22). It might also be possible that the respondent had a (very) bad health status during the wave when he did not answer the question (11**3**22): he had a good health status at the first two waves (11) then had an accident (3) and partially recovered from it (22). The imputation implies making choices and hypotheses.

- For the time-varying variables, the frequency of different types of individual trajectories is given: it shows how many elderly respondents have made at least one transition (mixed trajectory) and how many elderly respondents have a stable trajectory.
- For the time-invarying variables, the survival function is computed for each modality (e.g. for men and women) and compared. This graph complements the information provided in chapter V by the graphs comparing attritors and non attritors. The attritors/non-attritors graphs did not account for the timing of the attrition. The survival function displays the evolution of attrition over time.
- For all the variables (time-varying and time-invarying), a graph representing the distribution over the waves is displayed.

## D. Validation

The last operationalisation step consists in the validation of the analysis variables. Two kinds of validation are done.

The first aims at assessing the consistency of the variable with the study determinant (e.g. is subjective health a valid indicator of the health needs?). For each analysis variable, one or two other variables[12] usually associated with the variable are selected. It might be variable(s) measuring the same determinant (e.g. subjective health and recent hospitalisation are two possible measures of the health needs) or, if such variable(s) are not available (e.g. gender), variable(s) measuring another characteristic which is usually associated with the determinant is used (e.g. gender will be validated with birth cohort because the higher life expectation of women bring about that there is a larger proportion of women in the older cohorts). As all the variables are qualitative, the **Chi$^2$ test** is used as measure of bivariate association (the null hypothesis is that the distribution of the two variables is independent). The analyses are done on each study wave **separately**. If the association is significant[13] and in the excepted direction at all the study waves (e.g. a positive association between being married and living in couple at the nine waves), it gives evidence of the consistency of the analysis variable. In doing so, two other interesting pieces of information are produced: first, if there are no large differences in the results over waves, we may assume that there are no **wave effects; s**econd, it allows identifying potential **multicollinearity** problems (e.g. between subjective health and disability).

The second validation test concerns the relationship between the (independent) analysis variables and family care (dependent variable): if the variables represent adequately the family care determinants, one may expect that those variables are associated with the family care variable. In chapter VI, all the analysis dependent variables were presented (from 'ever receiving family care' to 'transition in care-givers number'). Some of these variables require to work on a sub-sample (e.g. 'transition in care-givers number' can only be studied on elderly respondents having at least three potential care-givers and still being in the panel at wave 4[14]). The validation analyses will only be done for the variable *W-FAMILYCARE* (receiving family care) because it is the simplest time-varying care variable and because the definition of the sub-sample is not too constraining (only the elderly respondents who do not have any potential care-givers at the given wave are excluded from the

[12] The variables used for the validation are not necessarily analysis variables. For instance, the marital status will be used to validate the partnership variable. As the association analyses are carried out on the total sample of 1,123 elderly respondents, imputation on marital status or other variables used was needed. The imputation rules were the same than those applied to the analysis variables.
[13] Note that working one each wave separately may lead to small cell counts (especially at the last waves of the panel) and make the Chi² test invalid.
[14] The definition of the sub-samples for each analysis will be specified in the analyses part.

analyses[15] because they are not 'at risk' of receiving family care). The validation analysis will consist in computing the **relative risk** of receiving family care. The analyses will be done for each independent analysis variable, separately for each study wave. The relative risk was chosen as association measure because it is very easy to interpret: it compared the risk of receiving family care for a given modality of the variable compared to a reference category (rc). The confidence interval at the 95% level is given for each modality (if the 95% confidence interval comprises the 1 value, then the null hypothesis of independence cannot be rejected: the likelihood of receiving family care at this given wave might not differ between those elderly being in this modality and those being in the modality used as reference category). In addition, a global $Chi^2$ test of independence is computed to test the association between the independent analysis variable (all modalities considered) and the family care.

In general, the modality having *a priori* the lowest 'risk' of receiving family care is used as reference (good health, no disability, youngest cohort, etc.). In a few cases, another modality was selected as reference category either to avoid problem of small numbers or because there is a reason to compare one modality with all the others (e.g. Wallonia is used as reference for region, because it allows looking at the differences Flanders/Wallonia but also to see if there are some differences between Brussels and Wallonia).

As for the first validation analysis, one of the interests of doing the analyses on each wave separately is that it allows identifying a potential **wave effect**. Significant relative risks for all or some of the variable modalities is considered as an evidence of a relationship between the variable and receiving family care.

# *SECTION 2. Predisposing factors of family care*

## A. Gender

### *1. Relationship with family care*

In the study cohorts, the relationship between gender and family care is mainly due to the higher life expectancy of women and to the differentiated gendered roles in the society (see chapter IV, section 4, A 2). Women are more likely to **receive family care** because they are more likely to reach very old ages and to have long-term disability problems (Jette 1996). Moreover, the care provided to older men is less likely to be 'declared' because it is mainly assumed by their spouses who do not consider the housework and added health related care as 'care'.
The gender also influences the family care aspects. Women are more likely to become a widow than men. Therefore, they are less likely to receive spousal care but more likely to receive **children care.** They are also more likely to have **multiple care-givers** or to receive **mixed care** (from family and care services): first, because children tend to share the care responsibility with others; second, because they are more likely to reach very old age and to have degenerative[16] illnesses requiring intensive care. However, their use of care services may be influenced by the cost of the care services: remember that most of the women born between 1900 and 1929 are lower educated and have

[15] At wave 3, 115 elderly were 'family less', the analyses are therefore done on the remaining 1,008 elderly. The sub-sample decreases over waves because of attrition but also because some respondents become family less (when they have lost their partner and are childless).
[16] Note that cases of degenerative illnesses are likely to be absent or very rare in the study sample because people suffering from such illnesses (e.g. Alzheimer) are usually unable to answer a questionnaire alone. Remember that the completion of the adult questionnaire is one of the selection criteria and that this questionnaire cannot be filled-in by a proxy.

never worked. Their pension level depends on their husband occupation and most of the widowed women of this generation in Belgium have a very low pension (CEV/SVV[17] 2010).

The gendered differences in care aspects influence the evolution of care. The care trajectory of elderly women is likely to be less stable (children may share the responsibility over time; the use of care services may occasionally replace a child who is temporarily not available, etc.).

## *2. Construction of the variable*

The elderly gender is considered as a **time-invarying** variable. The question *"man (1) or woman (2)?"* (W1A006[18]) is asked at the beginning of each **adult questionnaire**. All the elderly respondents provide a valid answer at the first wave and no inconsistencies were observed over waves.

The variable, *E-GENDER* (gender of the elderly) has two modalities:
**0.** Man (if W1A006=1);
**1.** Woman (if W1A006=2).

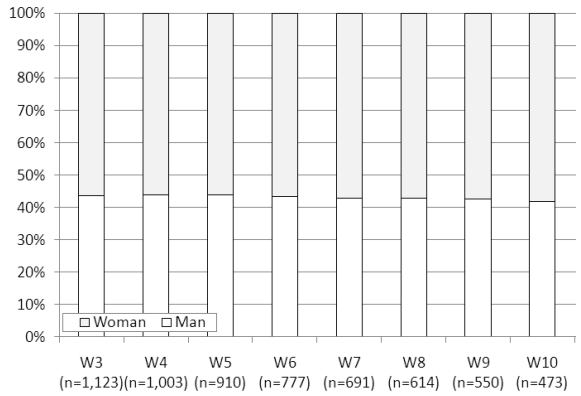
## *3. First description of the variable*

There is no missing data on elderly gender.

A first description of the analysis variable is given in graph VII-1a and VII-1b. The first is a simple distribution of the variable over waves. In graph VII-1a, the distribution is quite stable (around 56-58% of women at each wave). The Chi² test is computed on the pooled sample (all the study waves), the fact that it is non-significant indicates that there is no association between the analysis variable (here: gender) and the wave. In other words, that the distribution of the variable is stable over waves. The second graph compares the survival function of the modalities of the variable (here, men and women). It allows seeing how the attrition patterns of the subgroups differ. This type of graphs is used as a description tool in survival analysis to compare the timing of an event in various sub-groups (defined by time-invarying characteristic(s)) (Allison 1995). For instance, it is used to compare the timing (age) of the first birth of the higher educated, mid educated and lower educated women through retrospective data collected among women aged 35. Here, the survival function is used as a descriptive tool for the time-invarying variables. The 'event' is the attrition, non-attritors are considered as censored observations. There are different aspects to compare in the graph: the shape of the function (which may indicate 'period' effect if the attrition is particularly low or high at a given wave for one or more sub-groups); the slope (the steeper the slope, the quicker the attrition); the survival rate at wave 11 (which corresponds to the proportion of non-attritors in the sub-group); the value of the 'estimated median lifetime'. The median lifetime gives the time (number of waves) when 50% of the sub-group is still 'alive' (still in the study); as the time is discrete here, the interpretation of the values is not directly meaningful but it gives a measure of the difference in attrition rate. Looking at the vertical lines on graph VII-1b, we see that the median lifetime (median stay during the panel) of men equals 8.6 waves and that the median lifetime of women is a bit longer, approximately 9 waves. The log-rank test (also known as Mantel-Haenszel test) was used as a measure of association: it tests whether the hazard functions are equal (null hypothesis) for all the sub-groups (see Klein & Moeschberger 2003). Here, the log-rank test for gender indicates that we cannot reject the null hypothesis: the hazard function (and therefore the survival function) of women and of men are thus similar.

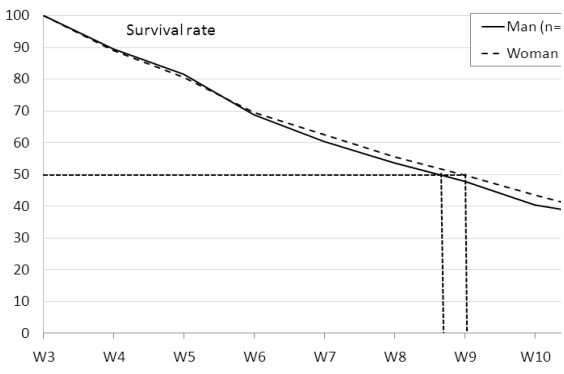
[17] *Comité d'étude sur le vieillissement du Conseil Supérieur des Finances/Studiecommissie voor de Vergrijzing van de Hoge Raad van Financiën.*
[18] Like in chapter IV, the question code refers to the code of the question at the first wave when it was asked. For instance, the question code of gender is W1A006 at wave 1, W2A006 at wave 2, ,.. WZA006 at wave 11. As the question is asked since wave 1, the code W1A006 is displayed.

**GRAPH VII-1A:** Study sample by gender over the study waves (PSBH 1994-2002), Chi²: ns




*Note:* figures are in appendix table VII-1a

**GRAPH VII-1B:** Survival function by gender (PSBH 1994-2002), Log-rank test: ns



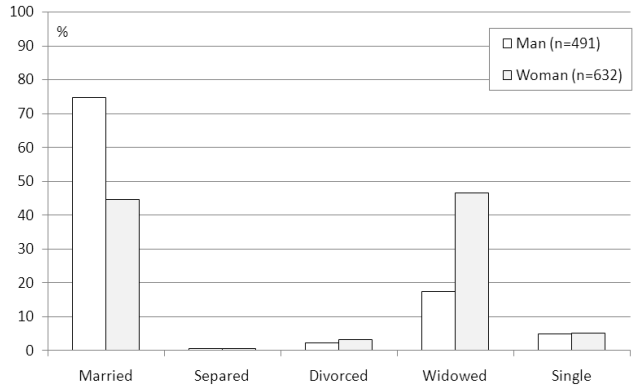

*Note:* figures are in appendix table VII-1b

## *4. Validation*

Two variables are used for the consistency validation of gender: marital status and birth cohort. It might seem strange to assess the consistency of 'gender' because this is an objective characteristic which is not subjected to misidentification or inconsistency. However, testing the association between gender and some characteristics which are usually stronger associated with it, is a way of assessing the consistency of the answers of the respondents. Because of gender differences in life expectancy, one may expect an over-representation of women among the very old and among the widowed and a relative over-representation of men among the young cohorts and among the married people.

The next graphs show the distribution of men and women at the first study wave (1994) by birth cohort (graph VII-2) and by marital status (graph VII-3). As this distribution may change over time, a table displayed below the graph gives the lowest and the highest proportion observed for the modality over the waves. For instance, in the graph, we can see that about 74% of the men were married in 1994. The figures indicated in the table show that this proportion varies between 70.72% and 74.75% over waves. The detailed figures for each wave are given in appendix table VII- 2 and 3.

**GRAPH VII-2:** Marital status of men and women at wave 3 (PSBH 1994)




As expected, women are more likely to be widowed (47% against 18% for men) and men are more likely to be married (74% against 45% for women). The proportions of single, separated and of divorced are low and show no clear gender difference (which is consistent with the fact that long-life marriage is the norm for the study cohorts).

*Note:* the Chi² test is significant at 0.01% for all the waves.

Variation in marital status distribution for men and women over waves (PSBH 1994-2002)

| | MARITAL STATUS | | | | |
|---|---|---|---|---|---|
| **GENDER** | **Married** | **Separated** | **Divorced** | **Widowed** | **Single** |
| **Man** | (70.72-74.75) | (0.38-0.75) | (2.24-3.31) | (17.52-19.77) | (4.89-6.08) |
| **Woman** | (38.18-44.62) | (0.36-1.01) | (2.96-3.49) | (46.52-53.45) | (4.60-5.68) |

**GRAPH VII-3:** Birth cohorts of men and woman at wave 3 (PSBH 1994)




As expected, the proportion of oldest old women is more important than the proportion of oldest old men (8% against 4%). On the contrary, the proportion of 1925-1929 is higher for men (37% against 31% for women).

*Note:* the Chi² test is significant at 0.1% at least for all the waves (except at waves 8, 9 and 10). For both genders, the proportion of 1925-1929 tends to increase over time while the proportion of 1910-1914 and of oldest old decreases over time.

Variation in birth cohort distribution for men and women over waves (PSBH 1994-2002)

| | BIRTH COHORT | | | | |
|---|---|---|---|---|---|
| **GENDER** | **1925-1929** | **1920-1924** | **1915-1919** | **1910-1914** | **Before 1910** |
| **Man** | (37.27-43.43) | (31.14-36.46) | (11.11-15.07) | (8.84-12.42) | (1.10-3.87) |
| **Woman** | (30.85-42.26) | (30.3-33.65) | (17.58-19.25) | (5.86-12.18) | (0.00-8.39) |

The second validation test consists in computing the relative risk of receiving family care for women compared to men, for each study wave and for the last study wave[19]. Man was chosen as reference category because they are expected to be less likely to receive family care than women (they are younger, and more likely to receive care from their spouse, which tends to be under-declared). Table

[19] This allows seeing if there is a difference between the first study wave - 1994 for all - and the last study wave – which varies from one respondent to another.

VII-1 gives the proportion of men receiving care and the relative risk for women (equals to % women receiving family care divided by the % of men receiving family care). At wave 3, women are 1.39 times as likely to receive care as men are (or 39% times more likely). The fact that '1.00' is not included in the 95% confidence interval implies that the risk of the modality is significantly different than the risk of the reference category (at 95%). The last column gives the significance level of the Chi² test (variable**W-FAMILYCARE*).

The relative risk is a bit lower at the following waves but not much (with the ageing process occurring during the panel, the gender difference decreases), the difference is not significant at wave 6.

**TABLE VII-1:** Relative risk of receiving family care by gender (PSBH 1994-2002)

| | | GENDER | | |
|---|---|---|---|---|
| | ***RC: Man*** | **Woman** | | **Chi²** |
| **WAVES** | *% care* | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *29.27* | **1.39** | (1.17-1.65) | *** |
| **Wave 4** (n=904) | *32.18* | **1.30** | (1.09-1.54) | *** |
| **Wave 5** (n=823) | *32.70* | **1.22** | (1.02-1.47) | ** |
| **Wave 6** (n=696) | *41.04* | **1.10** | (0.92-1.30) | ns |
| **Wave 7** (n=616) | *33.21* | **1.23** | (1.00-1.52) | * |
| **Wave 8** (n=549) | *39.42* | **1.24** | (1.02-1.50) | ** |
| **Wave 9** (n=496) | *41.20* | **1.20** | (0.99-1.46) | * |
| **Wave 10** (n=432) | *42.39* | **1.28** | (1.05-1.57) | ** |
| **Wave 11** (n=384) | *49.40* | **1.24** | (1.03-1.48) | ** |
| **Last wave** (n=999) | *45.66* | **1.21** | (1.07-1.37) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## B. Birth cohort

### *1. Relationship with family care*

As people are growing older, their health status tends to decline (the probability to have a disability or a chronic physical or cognitive disease increases) and the use of care tends to increase. The signs and the timing of the ageing process are influenced by individual, demographic and historical characteristics and behaviours. The Life Course epidemiologic studies (Rank & Hirschl 2001; Ben-Shlomo & Kuh 2002; Blane *et al.* 2007) focus on the Lifespan principle and show how the past behaviours and lifestyle (e.g. smoking, eating habits, alcoholic consumption etc.) and the health history (past illnesses) may influence the ageing process. The demographic and historical contexts also have an effect: either direct (e.g. the life condition of the general population, the state of development of care services, of knowledge of the ageing process and related diseases) or indirect by influencing the individual behaviours (e.g. higher educated are more likely to use preventive medicine and to have access to high quality medical care). Therefore, it is very difficult to tell how would be the health status and the care needs of people at a given age. Whatever the diversity of the ageing experiences, everybody is ageing and some general relationships between age and family care can be drawn. As care needs tend to increase with age, one may hypothesise a positive relationship between age and **receiving family care** and a higher proportion of elderly receiving mixed care (family care and care services). Similarly, a positive relationship with the **number of care-givers** and with receiving care for both the **ADL and IADL** is expected. Concerning the evolution of family care, it might be useful to distinguish changes in care aspects (the family continues to provide care but the characteristics of care are changing) and changes in care combination (the family can start, end or

continue caring)[20]. In a panel study, respondents are observed over a same period of time but, during this period they are not all at the same life-stage (the youngest have just or will soon get retired, the oldest are 85+). We may assume that, the younger elderly (cohorts) are more likely to have short-term health problems and to have short spells of family care (e.g. after an operation). They are therefore more likely to experience changes in the care combinations (the family starts and stops to care). The older elderly (cohorts) are more likely to be already enrolled in a long-term care spell. They are more likely to experience changes in care aspects (increase in the number of care-givers, in the caring activities or in the use of care services to complement family care) and less likely to experience 'start(s)' or 'end(s)' of family care.

## *2. Construction of the variable*

It was decided to use the birth cohort (time-invarying variable) and not the age or the period (time-varying variables) as a determinant of family care for the analyses. The question: "In which year were you born?" (W1A010) was asked in the adult questionnaire. The response given at the first wave was compared to the response provided at the other waves to check for consistency and to attribute the response of the other waves in case of missing data at wave 1.

The modalities of the *E-COHORT* variable (birth cohort) were regrouped into five modalities
**1.** 1925-1929 (if 1925≤W1A010≤1929);
**2.** 1920-1924 (if 1920≤W1A010≤1924);
**3.** 1915-1919 (if 1915≤W1A010≤1919);
**4.** 1910-1914 (if 1910≤W1A010≤1914);
**5.** Before 1910 (called 'oldest old') (if W1A010<1910) .

Each modality comprises five birth years except the last one which is open (before 1910[21]). The groups are built according to two principles:

1. The **substantive meaning**: the groups are formed according to **the period of life** when the elderly experienced a given historic event. For instance, the cohorts 1920-1924 and 1925-1929 did not experience World War I and were children during the economic crisis of 1929, while cohorts 1910-1914 and the oldest old spent part of their childhood during World War I and underwent World War II as adults. The 1915-1919 cohort was born (or conceived) during World War I[22].
2. The **distribution** of the variable in the sample: the 1920-1924 and 1925-1929 cohorts are the more numerous (together, they represent 64.5% of the study sample, respectively 346 and 378 elderly respondents). This is not surprising: they are in their 60s at the beginning of the panel and thus very likely to still live at-home. Most of them are already retired and thus more likely to be at-home and available to answer the interview. The smaller proportion of the older cohort groups (17% for the 1915-1919, 12% for the 1910-1914 and 6.5% for the oldest old) is explained by the fact that they are already aged 70+ at the beginning of the panel, the institutionalisation is more frequent, especially among the 85+ which explains the lower proportion of this age group in the community in general and in private household surveys in particular because of the health selection (see chapter V). The oldest old group could have been split into 1900-1904 and 1905-1909 to comprise five birth years like for the other cohort, but it would have resulted in too small numbers.

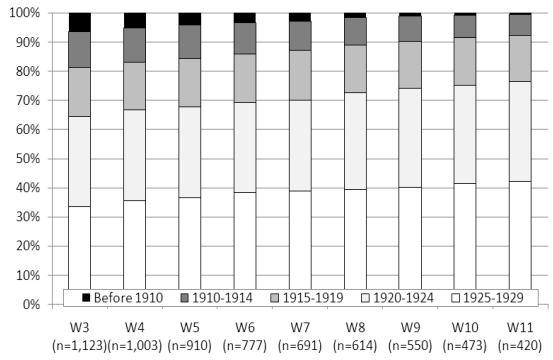
[20] If there is a transition from 'no care' to 'family care' or 'mixed care', the family starts to care; if there is a transition from 'mixed care' or 'family care' to 'no care', the family ends caring. If there is a transition from 'mixed care' to 'family care' or in the opposite direction, the family continues to care (this last type of transition can also be considered as a care aspect change).
[21] The oldest elderly is born in 1886. For a distribution of the birth year in the study sample, see appendix table VII-4)
[22] Cutting points can always be discussed: those born in 1914 could be grouped with the 1915-1919 because they were also born during World War I and the cohorts 1920-1924 and 1925-1929 could be regrouped as no specific historic event could be found to differentiate one cohort group from the other.

## *3. First description of the variable*

There is no missing data to impute on *E-COHORT*.

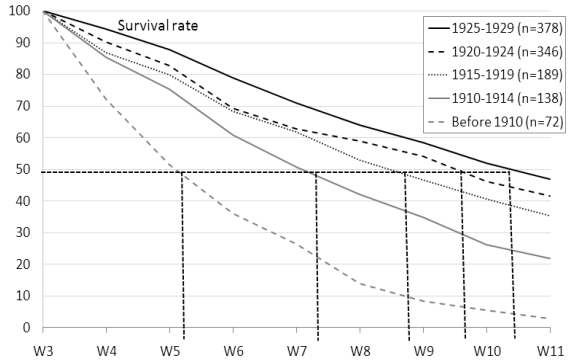
Graph VII-4a shows that the proportions of the oldest cohorts decrease over time. This is consistent with the figures on attrition showed in chapter V (the non-attritors are globally younger than attritors). The graph VII-4b highlights the birth cohorts' differences: the older, the shorter the median lifetime (with about 5.2 waves for the oldest old and around 10.3 waves for the 1925-1929). At wave 11, there are still 47% of the 1925-1929 in the sample but less than 3% of the oldest old.

**GRAPH VII-4A:** Study sample by birth cohort over the study waves (PSBH 1994-2002), Chi²: ***




*Note:* figures are in appendix table VII-5a

**GRAPH VII-4B:** Survival function by gender (PSBH 1994-2002), Log-rank test: ***

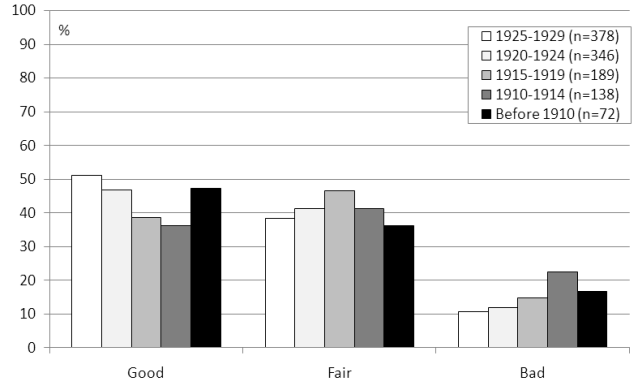



*Note:* figures are in appendix table VII-5b

## *4. Validation*

Two variables are used for the consistency validation of the birth cohorts: subjective health (graph VII-5) and disability (graph VII-6). One can expect that, due to the ageing process, older cohorts are more likely to have health problems.

**GRAPH VII-5:** Subjective health of birth cohorts at wave 3 (PSBH 1994)




Variation in subjective health distribution for birth cohorts over waves (PSBH 1994-2002)

| BIRTH COHORT | SUBJECTIVE HEALTH | | |
|---|---|---|---|
| | Good | Fair | Bad |
| **1925-1929** | (35.04-51.06) | (38.02-45.2) | (10.54-16.29) |
| **1920-1924** | (39.71-50.00) | (38.46-46.52) | (10.00-17.36) |
| **1915-1919** | (35.04-48.00) | (35.00-50.00) | (16.73-22.39) |
| **1910-1914** | (30.00-46.43) | (38.89-50.96) | (11.90-23.33) |
| **Before 1910*** | (10.00-47.22) | (36.11-70.00) | (7.69-20.00) |

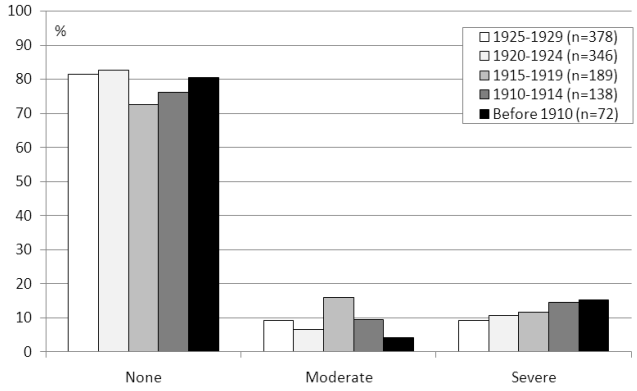
* computed on waves 3-8 (where n>10)

For all the cohorts (except 1915-1919), the proportion of respondents in good health is the highest and the proportion of bad health in the lowest. In the cohort 1915-1919, there a higher proportion of respondents declare having a fair health. This shows that the question refers to a subjective appreciation: In 1994, this cohort was aged 75-80 years and it is usually at that time that ageing related problems start. Interestingly, the proportion of respondents being in good health is higher among the oldest old than among the 1910-1914. This suggests that there is a healthy selection among the oldest old.

*Note:* the Chi² test was only significant at 0.1% at waves 3 and 5.The variation between waves can be quite large. Detailed figures are given in appendix table VII-6.

The relationship between disability and the birth cohort at wave 3 is only visible for 'severe disability': the older, the higher the proportion of severely disabled. Severe disability (%) increases over waves until wave 8 for all the birth cohorts (according to the ageing process), see appendix table VII-7. This also explains the large variations between the waves. The relationship between birth cohorts and disability is significant at 0.05% level at least until wave 7. The fact that the proportion of severely disabled elderly does no longer increase over the last waves and the fact that the relationship is not significant is probably due to the fact that the elderly still in the panel at the last waves are healthy selected.

**GRAPH VII-6:** Disability of birth cohorts at wave 3 (PSBH 1994)




Variation in disability distribution for birth cohorts over waves (PSBH 1994-2002)

| BIRTH COHORT | DISABILITY | | |
|---|---|---|---|
| | None | Moderate | Severe |
| **1925-1929** | (61.15-81.48) | (8.26-22.45) | (8.26-17.51) |
| **1920-1924** | (58.33-82.66) | (6.65-23.61) | (16.69-19.82) |
| **1915-1919** | (50.43-72.49) | (15.87-26.5) | (11.64-25.97) |
| **1910-1914** | (45.71-76.09) | (9.42-32.86) | (14.49-33.33) |
| **Before 1910*** | (36.84-80.56) | (2.70-21.05) | (15.28-50.00) |

* computed on waves 3-8 (where n>10)

For the second validation (computation of relative risks), 1925-1929 is chosen as reference category because this is the youngest group of cohorts and therefore the least likely to receive family care.

Table VII-2 shows that, at each wave, the older have a higher risk of receiving family care. For instance, at wave 3, the oldest old are nearly two times as likely (RR=1.88) to receive family care than the 1925-1929 cohort.

**TABLE VII-2**: Relative risk of receiving family care by birth cohort (PSBH 1994-2002)

| | | BIRTH COHORT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ***RC: 1925-1929*** | **1920-1924** | | **1915-1919** | | **1910-1914** | | **Before 1910** | | **Chi²** |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *28.94* | **1.25** | (1.11-1.40) | **1.34** | (1.15-1.56) | **1.39** | (1.17-1.66) | **1.88** | (1.36-2.61) | *** |
| **Wave 4** (n=904) | *32.42* | **1.15** | (1.05-1.26) | **1.23** | (1.08-1.41) | **1.43** | (1.14-1.80) | **1.47** | (1.15-1.89) | * |
| **Wave 5** (n=823) | *33.22* | **1.08** | (1.02-1.13) | **1.19** | (1.05-1.35) | **1.22** | (1.06-1.42) | **1.64** | (1.15-2.35) | ns |
| **Wave 6** (n=696) | *37.36* | **1.12** | (1.06-1.20) | **1.30** | (1.13-1.50) | **1.46** | (1.19-1.78) | **1.75** | (1.29-2.35) | *** |
| **Wave 7** (n=616) | *28.86* | **1.33** | (1.18-1.50) | **1.48** | (1.25-1.74) | **1.95** | (1.47-2.59) | **2.17** | (1.56-3.00) | *** |
| **Wave 8** (n=549) | *35.43* | **1.32** | (1.16-1.50) | **1.48** | (1.24-1.77) | **1.69** | (1.33-2.16) | **2.20** | (1.53-3.15) | *** |
| **Wave 9** (n=496) | *39.02* | **1.20** | (1.08-1.33) | **1.38** | (1.15-1.67) | **1.47** | (1.18-1.84) | **2.14** | (1.38-3.31) | ** |
| **Wave 10** (n=432) | *43.96* | **1.08** | (1.02-1.14) | **1.31** | (1.06-1.62) | **1.52** | (1.09-2.11) | **2.28** | (1.19-4.36) | ** |
| **Wave 11** (n=384) | *51.53* | **1.07** | (1.02-1.12) | **1.17** | (1.05-1.31) | **1.47** | (1.12-1.95) | **1.94** | (1.20-3.13) | ns |
| **Last wave** (n=999) | *47.26* | **1.09** | (1.00-1.18) | **1.10** | (1.00-1.20) | **1.19** | (1.01-1.39) | **1.22** | (1.01-1.48) | ns |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## C. Religiosity

### *1. Relationship with family care*

Religiosity is considered as a cultural determinant. It is supposed to affect family care through two channels: **beliefs** (or values) and **practices**. Religious people share religious values such as community or family solidarities (Blazer & Palmore 1976; Chang *et al.* 1998; Daatland & Herlofson 2003; Cranswick & Derrick 2005). They are therefore more likely to prefer **receiving family** care rather than professional care (from an unknown person) but they may also be less likely to declare the family care they provide because they tend to consider this solidarity as 'natural'. If they are **active** in a religious community, they may also be more likely to receive non-family informal care[23] (from members of their religious community). Religiosity is thought to influence the presence of family care and the care combination but to have neither influence on the other family care aspects nor on their evolution over time. According to the literature (Blazer & Palmore, 1976; Benjamins & Brown 2004; Cranswick & Derrick 2005), the effect of religion on care use is usually stronger for women.

### *2. Construction of the variable*

Religiosity is considered here as a **time-invarying** variable. In the adult questionnaire, each respondent is asked: *Do you believe in god (1), are you not religious (2), or are you indifferent to religion (3)?* (W1A604). The response given at the first wave was compared to the response provided at the other waves to check the response consistency and attribute the response of the other waves in case of missing data at wave 1.

In the *E-RELIGION* variable (religiosity) has two modalities
**1.** Not religious (if W1A604=2, 3);
**2.** Religious (if W1A604=1).

[23] In Belgium, the community care services were initiated by the associative sector and the religious communities (community care services were initiated by the associative sector and the religious community (Gilain & Nyssens 2001). Before the development of professional care services, many Parishes organised volunteering services to provide non-medical care or company to the older members of the community. This kind of service is still organized today.

Note that this variable refers to a broad concept of 'religiosity': first no distinction is made between Catholic, Jewish, Muslim, etc. but the Belgian birth cohorts 1900-1929 are more likely to be Catholic. Second, the variable refers to the beliefs and not to the practical experience. Most of the Belgian born in the beginning of the XX$^{th}$ century received a rather strict religious education and are likely to apply some of the related values (community or family solidarity principle) but it does not mean that they are still active in a religious community at old age. This broad definition may reduce the effect of religion.

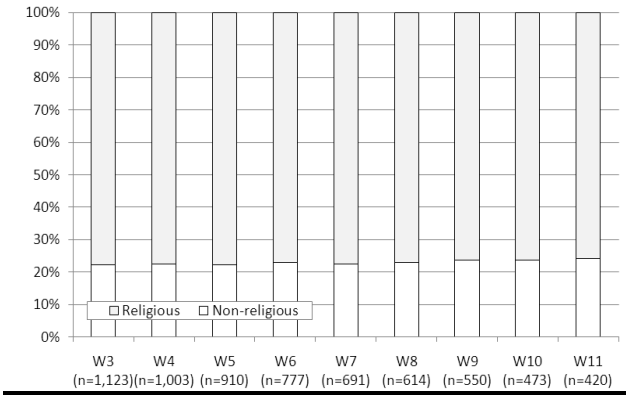
Respondents who have declared to be 'not religious' or 'indifferent' are regrouped because the focus is on the effect of being religious or not. Nine hundred and fifty-seven elderly respondents provided a valid and consistent answer (no change over waves). Among the remaining 166, 146 provided an 'inconsistent'[24] response (changing over waves) and 20 did not answer the question at any wave.

## *3. Imputation of the missing data and first description of the variable*

The **146** cases showing inconsistencies were treated according to rule 1 (see section 1 point 3). The 20 cases with complete missing data were treated according to rule 3: other variables related to religiosity[25] were used to impute the most likely modality.

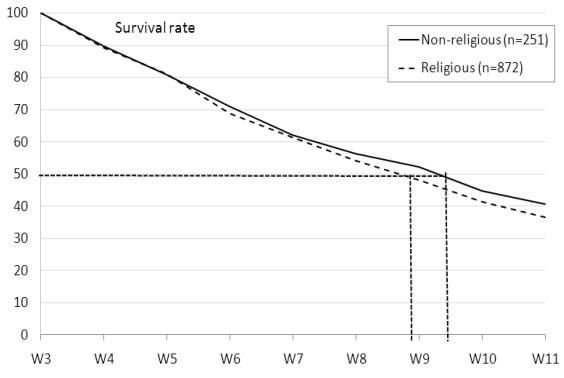
Graph VII-7a shows the distribution of *E-RELIGION* after imputation: no significant differences over waves are observed. The proportion of non-religious is always around 23%. Graph VII-7b shows that the survival function of religious and non-religious are quite similar. The median lifetime of the first group is about 8.7 waves against 9.3 for the second group. The proportion of non-attritors is close to 41% for non-religious and about 36% for non-religious.

**GRAPH VII-7A:** Study sample by religiosity over the study waves (PSBH 1994-2002), Chi²: ns




*Note:* figures are in appendix table VII-8a

**GRAPH VII-7B:** Survival function by religiosity (PSBH 1994-2002), Log-rank test: ns




*Note:* figures are in appendix table VII-8b

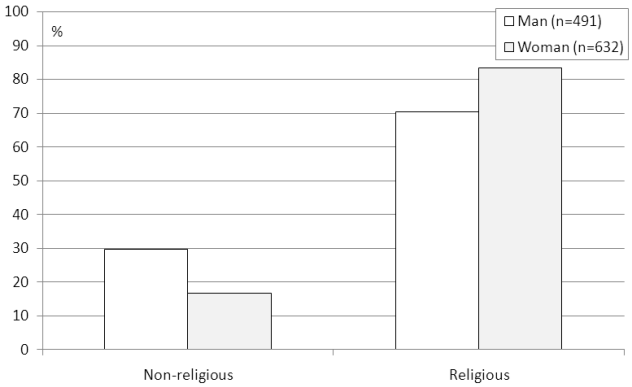
[24] 'Inconsistent' if we consider the religiosity as a time-invarying variable. In reality, it can happen that people change their beliefs, even at old ages.

[25] *Have you been brought up in the catholic faith ?* (W1A602); *Have you been brought up in another religious tradition ?* (W1A603) *What's the importance of religion in your life ? (not important at all (1), Not very important (2); more or less important (3), quite important (4), very important (5) ?* (W1A605) *Do you attend divine services ?* (W1A606) ; *How often do you attend divine services? (only for special occasions (1), a few times per week (2), weekly (3), almost every week (4), sometimes =5)*(W1A607). There is one elderly respondent who did not answer to any of the religion questions. He was considered as not religious (he does not answer, he is probably indifferent to religion).

## *4. Validation*

The variables used for the consistency validation of religion are gender (graph VII-8) and region (graph VII-9): Women are traditionally more attached to religious values. The proportion of religious people are also expected to be lower in Brussels (urban citizens tend to be less religious) and higher in Flanders (as the secularisation process started later than in Wallonia).

**GRAPH VII-8:** Religiosity of men and women at wave 3 (PSBH 1994)




Variation in the proportion of religious people for men and women over waves (PSBH 1994-2002)

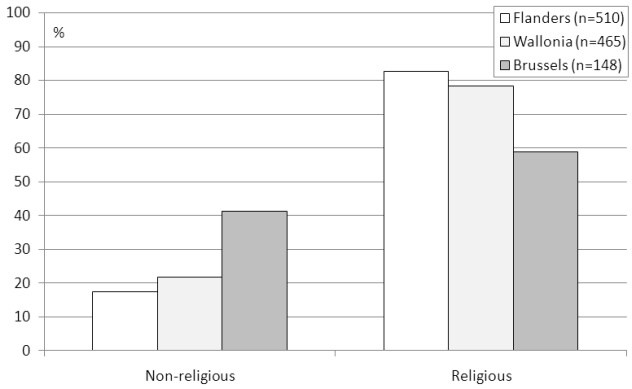
| GENDER | Religious people |
|---|---|
| **Man** | (65.75-70.5) |
| **Woman** | (82.54-83.54) |

As expected, the proportion of religious people is higher among women (83% against 70% for men).

*Note:* the Chi² test is significant at 0.01% for all the waves. For both gender, the proportion of religious decrease over time (probably because the oldest are more religious and are also more likely to leave the panel earlier. Detailed figures are given in appendix table VII-9.

**GRAPH VII-9:** Religiosity by region at wave 3 (PSBH 1994)

As expected, the proportion of religious is the highest in Flanders (83%) but not so different than in Wallonia (78%). Its proportion is much lower in Brussels (59%).




Variation in the proportion of religious people for each region over waves (PSBH 1994-2002)

| REGION | Religious people |
|---|---|
| **Flanders** | (80-83.87) |
| **Wallonia** | (76.4-78.85) |
| **Brussels** | (54.05-59) |

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-10.

For the second validation, to be non-religious is chosen as reference category as they are supposed to be less likely to receive family care. Table VII-3 shows that religious people are always more likely to received family care (about one third more likely than the non-religious ones).

**TABLE VII-3:** Relative risks of receiving family care by religiosity (PSBH 1994-2002)

| | | RELIGIOSITY | | | |
|---|---|---|---|---|---|
| | | *RC: Non-religious* | Religious | | Chi² |
| **WAVES** | | *% care* | **RR** | CI 95% | p value |
| **Wave 3** | (n=1,008) | *28.76* | **1.31** | (1.05-1.62) | ** |
| **Wave 4** | (n=904) | *31.68* | **1.24** | (1.00-1.53) | * |
| **Wave 5** | (n=823) | *30.60* | **1.26** | (1.00-1.58) | * |
| **Wave 6** | (n=696) | *35.63* | **1.28** | (1.03-1.59) | ** |
| **Wave 7** | (n=616) | *27.14* | **1.49** | (1.14-1.96) | *** |
| **Wave 8** | (n=549) | *31.75* | **1.53** | (1.19-1.96) | *** |
| **Wave 9** | (n=496) | *38.98* | **1.24** | (0.97-1.57) | * |
| **Wave 10** | (n=432) | *41.90* | **1.23** | (0.97-1.56) | * |
| **Wave 11** | (n=384) | *48.45* | **1.21** | (0.98-1.50) | * |
| **Last wave** | (n=999) | *43.75* | **1.21** | (1.04-1.41) | ** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

# D. Education level

## *1. Relationship with family care*

The education level of the elderly acts on family care in various ways. First, it plays through the health needs: higher educated have more often a healthier lifestyle. They are likely to be in better health longer. A negative effect of education on having ever family care is therefore expected. Second, education plays through related values: higher educated people are more likely to be 'formal care' oriented because they don't want to depend on their family. Thus the use of care services only is assumed to be more frequent than family care only. Third, the education level plays through the availability of family care: higher educated elderly are more likely to have higher educated children who are full-time working and have not much time left to provide parental care. Therefore higher educated elderly are assumed to receive less (intensive) children care. Finally, the preference for care services is strengthened by the positive association between education and income: higher educated elderly tend to be wealthier and are more likely to afford buying higher quality and/or very intensive care services.

However, the effect of education may be weakened by two elements in the dissertation research. The first element is linked to the study cohorts: most of the women born between 1900 and 1929 are low educated and have never worked. Therefore, the education level may be not a good indicator of their values and potential resources (Broese van Groenou & Van Tilburg 2003). If they were/are married, the education level of the spouse would have been a better choice but this was not technically possible (because this variable is only available if the spouse is still alive during the panel and has accepted to be interviewed). The second element is linked to the operationalisation of the care services used: the information is limited to the use of IADL care services. There is no information about eligibility criteria, cost or quality of these services and there is no information on the use of ADL care services. Therefore, it is difficult to see if the elderly can use only care services even when they have intensive needs.

## *2. Construction of the variable*

The education level is considered as a **time-invarying** variable. In the adult questionnaire, each respondent is asked: *What is the highest certificate/degree you obtained until now?* (W1A230). The response modalities proposed are more or less detailed from one wave to another. Some of the responses refer to education levels which did not exist at the time when the study birth cohorts were at school (e.g. upper secondary artistic level). For the analyses, it seemed sufficient to distinguish only four levels.

In the *E-EDUCATION* variable (education level) has four modalities

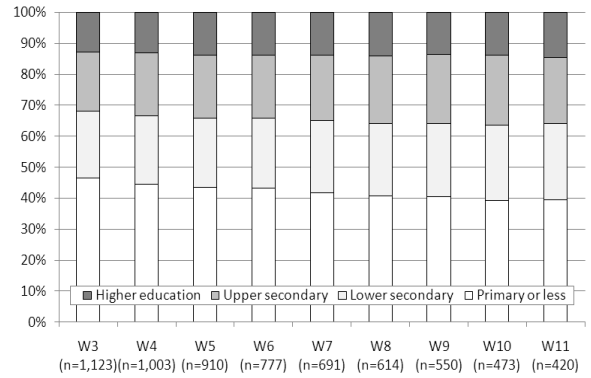
**1.** Higher education;
**2.** Upper secondary;
**3.** Lower secondary;
**4.** Primary or less.

The response given at the first wave was compared to the response provided at the other waves to check for consistency and attribute the response of the other wave(s) in case of missing data at wave 1.

## *3. Imputation of the missing data and first description of the variable*

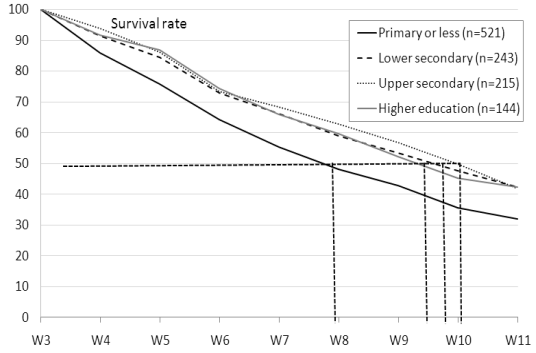
**Eighty-nine** elderly have inconsistent answers on education and were imputed according to the rule 1. Graph VII-10a shows the distribution of the *E-EDUCATION* variable after imputation. Among the 1,123 elderly respondents (wave 3), 46% have only a primary school diploma or no diploma at all, 22% have a lower secondary school diploma, 19% an upper secondary school diploma and 13% have a diploma of higher education. These proportions stay quite stable over time. Only the proportion of 'primary or less', decreases slightly over waves. This is probably due to the positive relationship between education, health and being not attritors (see chapter V). Graph VII-10b shows that the lowest educated leave the panel quicker than the other groups. Their median lifetime is 7.7 waves, whilst it is higher than 9 waves for all the other groups. However the log-rank test shows that this difference is not significant.

**GRAPH VII-10A:** Study sample by education level over the study waves (PSBH 1994-2002), Chi²: ns




*Note:* figures are in appendix table VII-11a

**GRAPH VII-10B:** Survival function by education level (PSBH 1994-2002), Log-rank test: ns

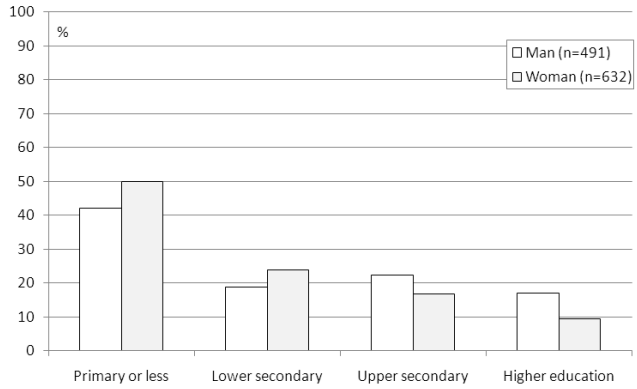



*Note:* figures are in appendix table VII-11b

## *4. Internal and association validity*

The variables used for the consistency validation are gender (graph VII-11) and cohorts (graph VII-12): as seen in chapter III (Belgian context) the women of the study cohorts are less educated than men. Over the XX$^{th}$ century, schooling was progressively generalised and lengthened. Therefore, we may assume that younger cohorts have reached higher education levels.

**GRAPH VII-11:** Education level of men and women at wave 3 (PSBH 1994)




As expected, men tend to be higher educated than women. Women are more likely to have lower secondary diploma or less, while men are more likely to have at least an upper secondary school diploma. The stronger gender difference is observed for the higher educated: there are nearly twice as many educated men than women (17% against 9%).

*Note:* the Chi² test is significant at 0.05% for all the waves. Detailed figures are given in appendix table VII-12.

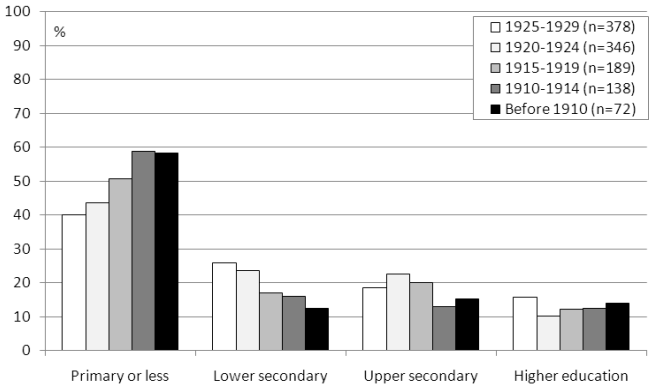
Variation in education level distribution for men and women over waves (PSBH 1994-2002)

| | EDUCATION LEVEL | | | |
|---|---|---|---|---|
| **GENDER** | **Primary** | **Lower** | **Upper** | **Higher** |
| **Men** | (33.70-40.45) | (19.09-22.10) | (23.18-25.48) | (17.27-19.89) |
| **Women** | (42.91-49.84) | (23.89-26.55) | (16.77-21.09) | (9.45-10.54) |

As expected, the proportion of respondents having no more than a primary school diploma is higher among older cohorts (58% of the oldest old, 59% of the 1910-1914, 51% of the 1915-1919, 44% of the 1920-1925 and 40% of the 1925-1929). The relationship is less clear at the other education levels. Again, there some evidence of selection for the oldest old (the proportion of respondents having an upper secondary school diploma or more is higher than for the 1910-1914 while the contrary was expected).

*Note:* the Chi² test is significant at 0.1% at waves 3, 4 and 5, non-significant at waves 6, 7 and 9 and invalid at waves 10 and 11 due to the small numbers among the oldest old. Detailed figures (proportion for all the study waves are given in appendix table VII-13).

**GRAPH VII-12:** Education level of birth cohorts at wave 3 (PSBH 1994)




Variation in education level distribution for men and women over waves (PSBH 1994-2002)

| | EDUCATION LEVEL | | | |
|---|---|---|---|---|
| **BIRTH** | **Primary** | **Lower** | **Upper** | **Higher** |
| **1925-1929** | (35.03-39.95) | (23.97-27.04) | (18.52-22.03) | (15.61-17.45) |
| **1920-1924** | (40.69-43.64) | (23.13-25.35) | (21.20-24.06) | (10.12-12.50) |
| **1915-1919** | (47.73-52.24) | (16.93-22.08) | (13.43-23.18) | (10.00-13.43) |
| **1910-1914** | (30.00-58.70) | (15.94-23.33) | (13.04-33.33) | (12.32-20.69) |
| **Before 1910** | (0.00-58.33) | (11.54-50.00) | (13.51-33.33) | (0.00-16.22) |

For the second validation, the higher educated are chosen as reference category[26] because they are thought to be less likely to need and to receive family care. Table VII-4 shows that the respondents

[26] Since now, the education level modalities will be presented in the tables in decreasing order (starting from higher education). For the graphs, the increasing order is kept as it easier to read.

having a lower secondary diploma or less are always more likely to receive family care than the higher educated. The difference between higher education and upper secondary is less clear: at the three first study waves, respondents having an upper secondary diploma are less likely to receive family care, but since wave 6, the relationship is reversed. If the relative risk at wave 3 and the last study wave are compared, we can see that the effect of education is higher at wave 3.

**TABLE VII-4:** Relative risk of receiving family care by education level (PSBH 1994-2002)

| | | EDUCATION LEVEL | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ***RC: Higher education*** | **Upper secondary** | | **Lower secondary** | | **Primary or less** | | **Chi²** |
| **WAVES** | | *% care* | RR | CI 95% | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** | (n=1,008) | *30.53* | **0.91** | (0.96-0.86) | **1.15** | (1.06-1.24) | **1.33** | (1.13-1.57) | *** |
| **Wave 4** | (n=904) | *31.62* | **0.86** | (0.92-0.80) | **1.14** | (1.08-1.21) | **1.41** | (1.21-1.65) | *** |
| **Wave 5** | (n=823) | *31.53* | **0.90** | (0.96-0.85) | **1.16** | (1.06-1.26) | **1.35** | (1.13-1.60) | ** |
| **Wave 6** | (n=696) | *31.58* | **1.10** | (1.05-1.15) | **1.31** | (1.16-1.48) | **1.65** | (1.32-2.07) | *** |
| **Wave 7** | (n=616) | *17.86* | **1.78** | (1.42-2.23) | **2.10** | (1.58-2.81) | **2.63** | (1.81-3.84) | *** |
| **Wave 8** | (n=549) | *23.68* | **1.73** | (1.39-2.16) | **1.81** | (1.43-2.30) | **2.32** | (1.66-3.26) | *** |
| **Wave 9** | (n=496) | *19.12* | **2.16** | (1.63-2.87) | **2.64** | (1.84-3.77) | **2.88** | (1.95-4.25) | *** |
| **Wave 10** | (n=432) | *25.00* | **1.73** | (1.37-2.17) | **2.31** | (1.63-3.29) | **2.24** | (1.60-3.14) | *** |
| **Wave 11** | (n=384) | *37.50* | **1.45** | (1.15-1.82) | **1.63** | (1.21-2.21) | **1.61** | (1.20-2.16) | ** |
| **Last wave** | (n=999) | *44.19* | **1.01** | (1.00-1.02) | **1.18** | (1.05-1.32) | **1.24** | (1.07-1.44) | ** |

*Note***:** ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## E. Last occupational status

### *1. Relationship with family care*

The last occupational status is an indicator of social class like education. The same relationships with family care are expected: to have been active in white collar jobs is - like having a higher education- an indicator of belonging to a higher social class. Like the higher educated, the '**white collars' are assumed to be less likely to receive family care** (especially care from their children) and more likely to use care services in substitution to family care. The mechanisms and the limitations explained for the education level variable are also valid for the last occupational status. The added value of occupational status (compared to education) is that it is more closely linked to the pension scheme (e.g. higher educated are more likely to have worked as white collar or as self-employed but if they have worked as white collar, their pension is probably higher).

### *2. Construction of the variable*

To build the **time-invarying** variable 'last occupation', several questions asked at **wave 1** of the **adult questionnaire** are combined. This is because some questions are only asked to respondents still in employment at the time of the interview and some other questions asked to respondents who are retired. Among the 1,123 elderly respondents, **47** are still working at the first wave, **one** respondent did not answer the question and all the others have either never worked or are no longer working.

The first question used is the following: *"Do you have paid work (1) or not (2) or are you temporarily absent for some reason (3) ?"* (W1A278).

If the respondent answers 1 or 3 (normally working), he is asked: *"Do you work as part of your main occupation as employee or civil servant (1), as self-employed person (2), as assistant or as assisting a member of the family (3) or do you have another status (4) ?* (W1A310)

If the respondent is employed or civil servant (1), he is asked: *"To which socio-professional category do you*

*belong: unskilled labourer (1), skilled labourer (2), employee (3), senior official, executive staff (4), other (5)?"* (W1A313)

- If the respondent answers 2 (normally not working), he is asked: *"Have you ever worked in a paid job? Yes (1) or no (2)"* (W1A443)
- If yes (1), he is asked: *"What was your previous professional group: Unskilled labour worker (1), skilled labour worker (2), employee (3), senior official executive staff (4), self-worker (5), farmer (6), professional (7), company manager (8), helper (9), other occupation (10)?"* (W1A446).

The combined variable, *E-OCCUPATION* (last occupational status) has five modalities:

**0.** Never worked (if W1A443=2);
**1.** Blue collar (if W1A446=1,2 or W1A313=1,2);
**2.** White collar (if W1A446=3, 4 or W1A313 =3, 4);
**3.** Self-employed (if W1A446=5, 6, 7, 8, 9);
**4.** Other (W1A446=10 or W1A313=5).

## *3. Imputation of the missing data and first description of the variable*

The last occupation variable is missing for **20** elderly respondents. As there are no other variables related to the socio-professional category, the most likely modality was defined according to rule 4. Forty reference groups were defined. Each of them corresponds to a particular combination of gender, education level and birth cohort because these variables are likely to influence the occupational status of the study cohorts: the very old and lower educated women are more likely to have never worked. The proportion of women who has ever worked is likely to be higher among younger cohorts, etc. Each of the twenty elderly respondents received the modal modality of his reference group.

Graph VII-13a shows the distribution of the variable after imputation. No significant differences were observed between waves. Among the 1,123 elderly respondents (wave 3), 23% have never worked, 30% are/were blue collar, 27% are/were white collars, 15% are/were self-employed and 6% has/had another occupation. These proportions stay quite stable over time.

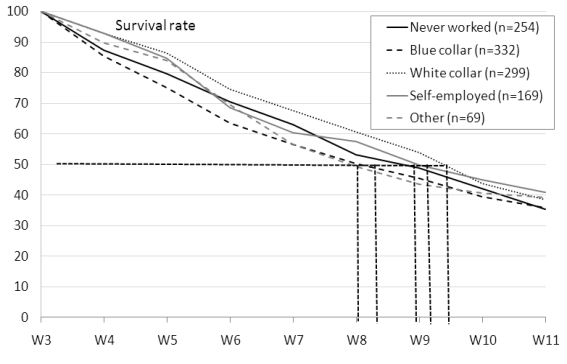
Graph VII-13b shows that the white collars and the self-employed have a longer median lifetime (>9 waves) than the three other groups. However, the differences in attrition patterns are not significant.

**GRAPH VII-13A:** Study sample by last occupation status over the study waves (PSBH 1994-2002), Chi²: ns




*Note:* figures are in appendix table VII-14a

**GRAPH VII-13B:** Survival function by last occupation status (PSBH 1994-2002), Log-rank test: ns

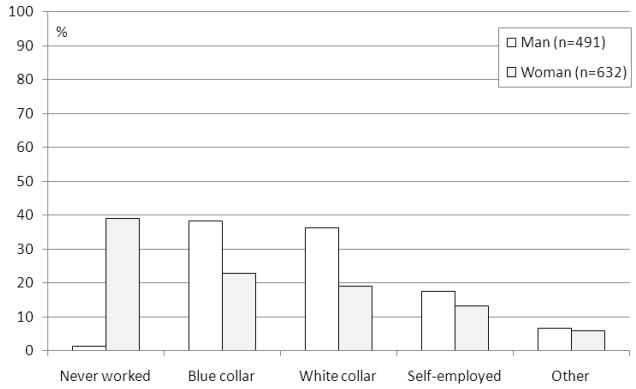



*Note:* figures are in appendix table VII-14b

## *4. Validation*

The two variables used for the validation is gender (graph VII-14) and education (graph VII-15): women are expected to be over-represented in the 'never worked' group and under-represented in the 'white collar' group. Although the relationship between occupational status and education was probably weaker in the study cohorts than it is in the current active population, one can expect that higher educated are mainly 'white collar' or 'self-employed' and that the lower educated are more likely to be 'blue collar' or to have never worked.

**GRAPH VII-14:** Last occupational status of men and women at wave 3 (PSBH 1994)




Variation in last occupational status distribution for men and women over waves (PSBH 1994-2002)

| | LAST OCCUPATIONAL STATUS | | | | |
|---|---|---|---|---|---|
| **GENDER** | **Never worked** | **Blue collar** | **White collar** | **Self-employed** | **Other** |
| **Men** | (1.43-1.78) | (36.00-39.90) | (35.35-39.53) | (15.20-18.18) | (5.70-6.63) |
| **Women** | (36.40-39.41) | (18.91-22.78) | (19.15-22.86) | (13.13-16.32) | (5.08-6.28) |

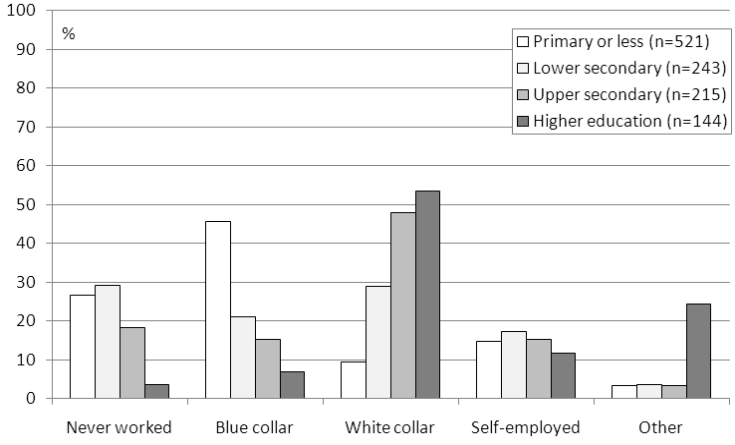
The relationship between gender and last occupation status is obvious: the women are nearly forty times more likely to have never worked (39% against 1%). The proportion of men among the self-employed, the blue collars and the white collars is always much larger than the proportion of women.

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-15.

As expected, most of the respondents having no more than a primary school level are found among the 'never worked' (27%) and the 'blue collars' (46%), while most of the higher educated are 'white collars' (53%). The higher educated are also more likely to be in the category 'other' (24%) than the lower educated (about 3-4%). No association is found between the self employed and level of education: as a wide variety of activities can be led under this occupational status (e.g. from the medical doctor to craftsman or farmer), this is not surprising.

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are in appendix table VII-16.

**GRAPH VII-15:** Last occupational status by education level at wave 3 (PSBH 1994)




Variation in last occupational status distribution by education level over waves (PSBH 1994-2002)

| | LAST OCCUPATIONAL STATUS | | | | |
|---|---|---|---|---|---|
| **EDUCATION LEVEL** | **Never worked** | **Blue collar** | **White collar** | **Self-employed** | **Other** |
| **Primary or less** | (26.62-29.17) | (40.36-45.68) | (9.40-10.80) | (1.78-18.07) | (3.24-3.80) |
| **Lower secondary** | (27.32-30.17) | (20.99-28.16) | (21.55-28.83) | (17.28-19.83) | (1.40-3.70) |
| **Upper secondary** | (17.04-18.69) | (15.35-18.89) | (45.56-50.00) | (12.15-15.35) | (2.72-3.74) |
| **Higher education** | (0.00-3.79) | (6.06-9.33) | (53.47-58.67) | (9.33-11.81) | (21.33-26.23) |

For the second validation white collar is chosen as reference category because this socio-economic category is thought to be less likely to need and to receive family care (better social position and probably better access to formal care).

Table VII-5 shows that the respondents who have never worked, who were blue collar or self-employed are always more likely to receive family care than the white collars. The difference between the white collars and the respondents having an 'other' job is less stable. This is probably because the two modalities are quite similar in the distribution of education (a large proportion of the higher educated) and because the 'other' modality concerns few people (n=69 at wave 3) which may result in an instability of the relationship with family care over time.

**TABLE VII-5:** Relative risk of receiving family care by the last occupational status (PSBH 1994-2002)[27]

| | | | LAST OCCUPATIONAL STATUS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ***RC: White collar*** | **Never worked** | | **Blue collar** | | **Self-employed** | | **Other** | | **Chi²** |
| **WAVES** | | *% care* | **RR** | CI 95% | **RR** | CI 95% | **RR** | CI 95% | **RR** | CI 95% | p value |
| **Wave 3** | (n=1,008) | *26.94* | **1.48** | (1.19-1.83) | **1.41** | (1.17-1.71) | **1.39** | (1.16-1.67) | **1.56** | (1.22-1.99) | *** |
| **Wave 4** | (n=904) | *27.60* | **1.54** | (1.25-1.90) | **1.56** | (1.26-1.94) | **1.35** | (1.16-1.56) | **1.45** | (1.21-1.74) | *** |
| **Wave 5** | (n=823) | *28.94* | **1.34** | (1.11-1.62) | **1.43** | (1.14-1.80) | **1.40** | (1.13-1.74) | **1.20** | (1.07-1.34) | * |
| **Wave 6** | (n=696) | *35.15* | **1.29** | (1.11-1.50) | **1.47** | (1.17-1.84) | **1.22** | (1.09-1.38) | **1.10** | (1.04-1.16) | ** |
| **Wave 7** | (n=616) | *29.83* | **1.44** | (1.14-1.81) | **1.44** | (1.14-1.82) | **1.27** | (1.09-1.48) | **0.96** | (0.98-0.93) | ** |
| **Wave 8** | (n=549) | *34.57* | **1.48** | (1.23-1.78) | **1.54** | (1.25-1.89) | **1.34** | (1.16-1.53) | **0.77** | (0.87-0.68) | *** |
| **Wave 9** | (n=496) | *39.02* | **1.20** | (1.10-1.30) | **1.38** | (1.19-1.61) | **1.47** | (1.23-1.77) | **2.14** | (1.49-3.05) | *** |
| **Wave 10** | (n=432) | *36.44* | **1.49** | (1.22-1.83) | **1.66** | (1.28-2.15) | **1.28** | (1.13-1.44) | **1.27** | (1.12-1.43) | *** |
| **Wave 11** | (n=384) | *43.40* | **1.37** | (1.16-1.61) | **1.56** | (1.23-1.98) | **1.31** | (1.13-1.52) | **1.11** | (1.05-1.17) | *** |
| **Last wave** | (n=999) | *44.57* | **1.19** | (0.39-3.68) | **1.26** | (0.28-5.63) | **1.11** | (0.55-2.25) | **1.12** | (0.53-2.36) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## F. Region

### *1. Relationship with family care*

Regional differences in Belgium were shown in chapter III (cultural differences, fertility differences and elderly care policies orientations). Their impact on family care use was highlighted in chapter IV (Belgian surveys on family care). To sum up, the Flemish are expected to be more likely to receive family care only or in combination with care services (community care oriented). As the fertility rate of the women born between 1900 and 1929 is higher in Flanders, having more children is another factor that makes the **Flemish more likely to receive family care**. As the community formal care services are better developed in Flanders, by combining family care and care services, the elderly can stay longer in the community even when they need more intensive care. The elderly living in the two other regions are more likely to move to an institution as soon as they need intensive care. It is thus expected that the **Flemish are more likely to receive intensive care in the community** (higher number of care-givers and higher proportion of elderly receiving care for the IADL and ADL). No specific regional effect is expected on family care evolution.

[27] For the legibility of the relative risks, the 'white collar' modality (reference) is presented in the first column. In the other tables, the usual order 'never worked', 'blue collar', 'white collar', 'self-employed' and 'other' is applied.

## 2. Construction of the variable

The region is considered as a **time-invarying** variable as very few elderly respondents change their region of living during the panel (less than 5)[28] but also because the region is used as a proxy for the cultural living context of the elderly: regional cultural differences influence individual behaviours in the long-term. The region where the household is located is indicated by the interviewer in the contact sheet. The analysis variable can be directly created and defined as follows:

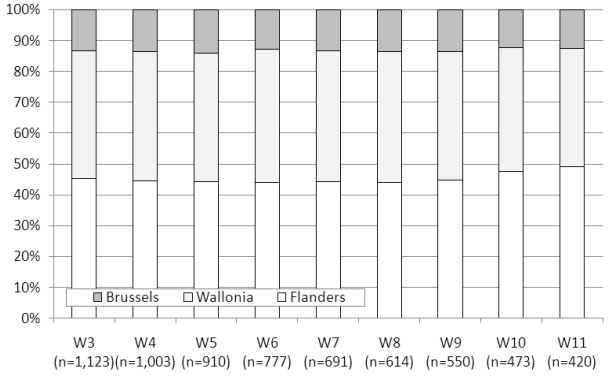
The variable, *E-REGION* (region) has three modalities:
**1.** Flanders;
**2.** Wallonia;
**3.** Brussels.

## 3. First description of the variable

No missing data is found for *E-REGION*.

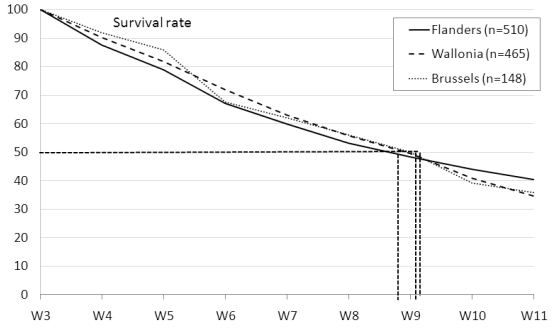
Graph VII-16a shows the distribution of the study sample by region over the study waves: at wave 3, 45% of the elderly live in Flanders, 41% in Wallonia and 13% in Brussels. These proportions are quite stable over waves (except at the two last waves where the proportion of Walloons and Brussels inhabitants decrease slightly). The analysis of the attrition pattern by region (graph VII-16b) shows that the Flemish sub-sample decreases more quickly at the beginning. In Wallonia and Brussels, the attrition is more important at the two last waves. Those differences are not large but they are significant.

**GRAPH VII-16A:** Study sample by region over the study waves (PSBH 1994-2002), Chi²: ns




*Note:* figures are in appendix table VII-17a

**GRAPH VII-16B:** Survival function by region (PSBH 1994-2002), Log-rank test: ns




*Note:* figures are in appendix table VII-17b

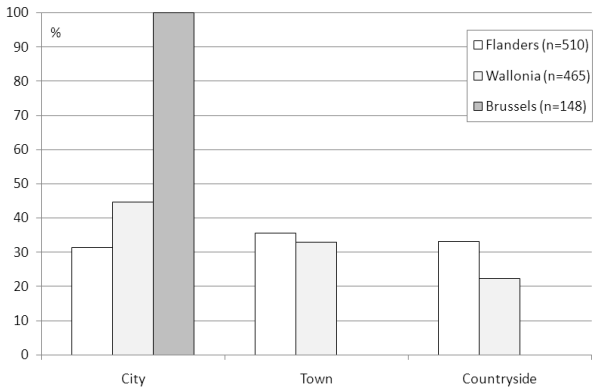
## 4. Validation

The two variables used for the consistency validation are the urbanisation level and the number of children. It is expected that Brussels inhabitants always declare to live in a city. Concerning the

[28] In these cases, the region at wave 1 is used: it is because the elderly lived in this region in 1991 that his household was selected for the first wave in 1992. Another reason is that people who moved at old age usually do it to move to a bigger city where services and health care are more developed or they move to cohabit with children. In both cases, the initial region is likely to be the region where the elderly spent a large part of his life: it is his cultural environment.

number of children, it is expected that according to the fertility figures of the study cohorts given in chapter III, the Flemish elderly would have more children.

**GRAPH VII-17:** Urbanisation level by region at wave 3 (PSBH 1994)




Variation in urbanisation level by region over waves (PSBH 1994-2002)

| | URBANISATION LEVEL | | |
|---|---|---|---|
| **REGION** | **City** | **Town** | **Countryside** |
| **Flanders** | (31.32-32.52) | (30.1-36.47) | (32.21-37.38) |
| **Wallonia** | (44.35-46.84) | (30.43-32.9) | (22.11-24.35) |
| **Brussels** | (100-100) | (0.00-0.00) | (0.00-0.00) |

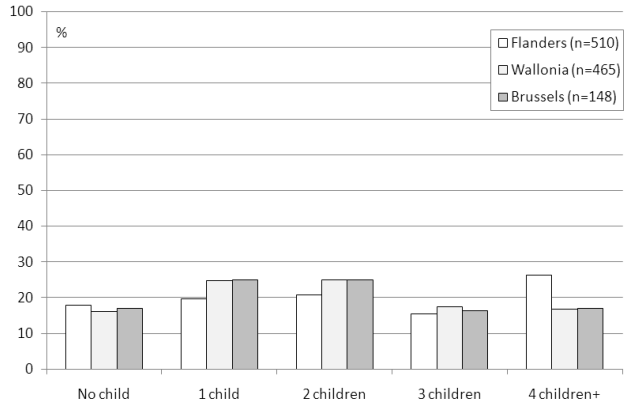
Graph VII-17 highlights the perfect association between living in Brussels and living in a city[29]. The proportion of respondents living in the countryside is higher in Flanders than in Wallonia.

Note: the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-18.

The analysis was firstly carried out with the variable distinguishing three cases 'no child', '1 child', '2+ children'. As no significant regional differences were observed, the analyses were rerun with a more detailed variable (graph VII-18). Then, it appears that the Flemish were more likely to have a large family (more than three children). However, the relationship between the region and the detailed children variable is not significant at all the waves. Nevertheless, it is a useful information because it tells that Flemish tend to have more potential care-givers.

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-19.

**GRAPH VII-18:** Number of children by region at wave 3 (PSBH 1994)




Variation in number of children by region over waves (PSBH 1994-2002)

| | NUMBER OF CHILDREN | | | | |
|---|---|---|---|---|---|
| **REGION** | **No child** | **1 child** | **2 children** | **3 children** | **4 children+** |
| **Flanders** | (16.44-17.84) | (28.08-20.36) | (20.76-23.11) | (14.99-16.34) | (24.72-26.83) |
| **Wallonia** | (11.18-16.13) | (24.73-26.84) | (22.11-24.95) | (16.52-18.63) | (16.72-10.50) |
| **Brussels** | (7.55-16.89) | (25.00-32.76) | (20.69-25.00) | (16.22-26.42) | (13.21-17.65) |

[29] It means that both variables cannot be used conjointly in a multivariate analysis. To solve the multicolinearity problem, a combined variable was created and is detailed in the next point (after the presentation of the urbanisation level variable).

For the second validation test, Wallonia is chosen as reference category[30] because this allows comparing Wallonia and Flanders (where the strongest region differences are expected) and to compare the two regions having a French majority (Wallonia and Brussels). As part of the elderly care policies are taken at the community level, the two regions are expected to be quite similar. However, another part of the elderly care policies is taken at the regional level and this may result in differences between the two regions. These differences may be strengthened by the fact that elderly people living in the capital city tend to share specific characteristics (higher educated, non-family care oriented). But these differences may also be weakened by the higher proportion of Walloon elderly living in cities and thus more likely to share similar (urban) characteristics with the Brussels inhabitants.

Table VII-6 shows that the proportion of respondents receiving family care is lower in Brussels than in Wallonia. As expected, the Flemish is more likely to receive family care than the Walloon does. Note that the regional differences become insignificant from wave 9. The relative risks are still significant at the last study wave but lower than at the first one: everybody is ageing and the socio-demographic characteristics tend to be less influential over time.

**TABLE VII-6:** Relative risk of receiving family care by region (PSBH 1994-2002)

| | | REGION | | | | |
|---|---|---|---|---|---|---|
| | ***RC: Wallonia*** | **Flanders** | | **Brussels** | | **Chi²** |
| **WAVES** | *% care* | **RR** | CI 95% | **RR** | CI 95% | p value |
| **Wave 3** (n=1,008) | *31.59* | **1.37** | (1.21-1.55) | **0.71** | (0.82-0.62) | *** |
| **Wave 4** (n=904) | *34.03* | **1.29** | (1.12-1.47) | **0.82** | (0.91-0.74) | *** |
| **Wave 5** (n=823) | *32.28* | **1.36** | (1.17-1.59) | **0.84** | (0.92-0.77) | *** |
| **Wave 6** (n=696) | *40.40* | **1.23** | (1.09-1.38) | **0.78** | (0.90-0.67) | *** |
| **Wave 7** (n=616) | *34.98* | **1.26** | (1.10-1.43) | **0.70** | (0.86-0.57) | *** |
| **Wave 8** (n=549) | *45.53* | **1.04** | (1.00-1.07) | **0.72** | (0.96-0.54) | * |
| **Wave 9** (n=496) | *45.93* | **1.03** | (0.96-1.11) | **0.89** | (1.13-0.70) | ns |
| **Wave 10** (n=432) | *46.29* | **1.11** | (0.91-1.36) | **1.10** | (0.92-1.32) | ns |
| **Wave 11** (n=384) | *52.00* | **1.14** | (0.94-1.38) | **1.06** | (0.98-1.15) | ns |
| **Last wave** (n=999) | *48.93* | **1.16** | (1.07-1.24) | **0.78** | (0.88-0.69) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## G. Urbanisation level

### *1. Relationship with family care*

The effect of the urbanisation level on family care is acting in two ways: first, on the alternatives to family care: the care services are usually better developed in large cities than in the countryside (Dwyer & Coward 1991, Goins *et al.* 2009). Second, people living in an urban area are usually more independent. Like the higher educated, the white collars and the non-religious people, the **urban people are expected to be less likely to receive family care or more likely to use care services.** No particular effects are expected on family care aspects or evolution over time.

### *2. Construction of the variable*

For the same reasons as the region, the urbanisation level is considered as a **time-invarying** variable. The question *"would you say you live in a rural area or village (1), a small of middle sized town (2) or*

[30] For the legibility of the relative risks, 'Wallonia' (reference) is presented in the first column. In the other tables, the usual order 'Flanders', 'Wallonia' , 'Brussels' is applied.

*a larger town (3)?*[31]*"*(H080075) is asked in the **household questionnaire** at wave 10 to all the household respondents in Brussels and Wallonia and only to those who moved to another place since wave 9 in Flanders. The analysis variable can directly be created.

The variable, *E-URBANISATION* (level of urbanisation) has three modalities:
**1.** City (if H080075=3);
**2.** Town (if H080075=2);
**3.** Countryside (if H080075=1).

The main problem is that most of the elderly respondents have missing data on the variable (n=654): all those who have left the sample before wave 10 and most of the Flemish did not answer the question.

## *3. Imputation of the missing data and first description of the variable*

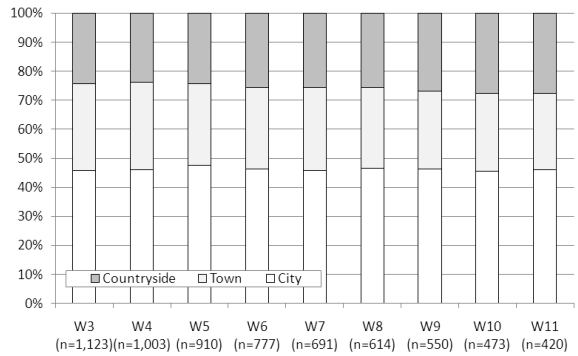
The imputation was quite complex and involved several steps:

- First step: Each household was selected within a cluster of addresses. All the households of the cluster belong to a same municipality. The three first figures of the individual number (*INDID*) refer to the cluster. It is therefore possible to **identify the cluster to which each elderly respondent belongs to.**
- Second step: I used a file provided by the Antwerp research team to make **each cluster correspond to a municipality.** This file contents the municipality and the identification number if it happens that a given individual did move during the panel (for the whole country). It was not possible to identify the corresponding municipality for each cluster. But, as clusters having close numbers refer to municipalities which are geographically close, it was possible to infer its level of urbanisation (e.g. if the surrounding clusters correspond to rural municipalities, it is likely that the cluster also correspond to a rural municipality).
- Third step: I used the urbanisation typology proposed by the INS/NIS (1996b) to make each municipality correspond to an urbanisation level. This typology comprises six types: "Main municipality of the agglomeration" (1), "other municipality of the agglomeration" (2), "suburb municipality/old suburbs" (3), "alternant migrant area/new suburbs" (4), "small town" (5), "rural" (6). The codes 1 and 2 are assimilated to 'city', the codes 3 and 4 to 'town' and the codes 5 and 6 to 'countryside' in the analysis variable *E-URBANISATION.*
- Fourth step: I **validated the imputation** in two ways: first, the typology was also applied to elderly respondents who gave a valid answer to the urbanisation question at wave 10 in order to compare the two respective urbanisation levels. Second, I used a proxy variable on the environment of the habitation[32] answered at waves 1 and 2 (all the elderly respondents answered at wave 1) and compared the responses with the imputed urbanisation level. These two tests were conclusive and showed that despite the complexity of the process and the great number of respondents imputed, the corrected variable should provide a good picture of the reality.

Graph VII-19a shows the distribution of the variable after imputation over the study waves. At wave 3, 24% of the elderly respondents lived in the countryside, 30% in town and 46% in a city. These proportions remain quite stable over time. Graph VII-19b shows that the attrition pattern is quite similar between the three urbanisation levels (log-rank non-significant).

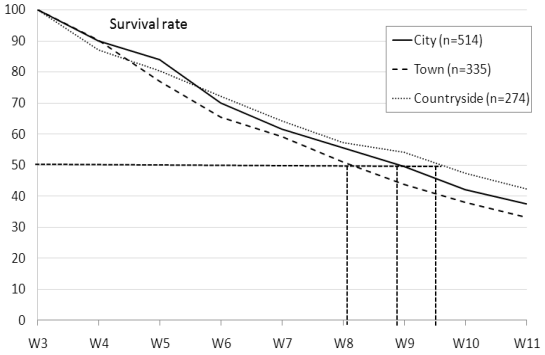
[31] Note that the question refers to the subjective appreciation of the head of household and not on objective criteria (population size, services available, etc.)
[32] *"Which of the following descriptions fits best for the environment of the accommodation?"* (W1R157). If the respondent answers "countryside environment" (1) or "small rural place" (2), we may assume that he lives in the countryside. The other modalities were not used because they may equally refer to a town or a city.

**GRAPH VII-19A:** Study sample by urbanisation level over the study waves (PSBH 1994-2002), Chi²: ns




*Note:* figures are in appendix table VII-20a

**GRAPH VII-19B:** Survival function by urbanisation level (PSBH 1994-2002), Log-rank test: ns



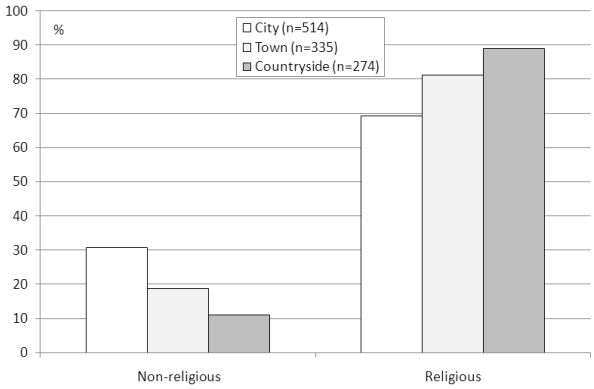

*Note:* figures are in appendix table VII-20b

## *4. Validation*

The variable used for the consistency validation is religiosity: it is expected that the proportion of religious people would be the lowest in cities and the highest in the countryside (usually more traditional).

As expected, the proportion of religious people is the lowest in cities (69%) and the highest in the countryside (89%).

**GRAPH VII-20:** Religiosity by urbanisation level at wave 3 (PSBH 1994)




Variation in religiosity distribution by urbanisation level over waves (PSBH 1994-2002)

| | RELIGIOSITY | |
|---|---|---|
| **URBANISATION** | **Non-religious** | **Religious** |
| **City** | (29.86-32.12) | (67.88-70.14) |
| **Town** | (18.60-24.32) | (75.68-81.40) |
| **Countryside** | (10.95-12.16) | (87.84-89.05) |

*Note*: the Chi² test is significant at 0.01% for all the waves. Detailed figures (proportion for all the study waves are given in the appendix table VII-21.

As the region and the urbanisation level are strongly associated, especially in the case of the Brussels region, where 100% inhabitants are living in a city, a combined variable is created as follows:

The variable *E-REGURB* (place of living) has seven modalities:

**1.** Flemish city (if *W-REGION*=1 and *W-URBANISATION*=1) (n=160 of the 1,123 elderly);
**2.** Flemish town (if *W-REGION*=1 and *W-URBANISATION*=2) (n=181 elderly);
**3.** Flemish countryside (if *W-REGION*=1 and *W-URBANISATION*=3) (n=169 elderly);
**4.** Walloon city (if *W-REGION*=2 and *W-URBANISATION*=1) (n=208 elderly);
**5.** Walloon town (if *W-REGION*=2 and *W-URBANISATION*=2) (n=153 elderly);
**6.** Walloon countryside (if *W-REGION*=2 and *W-URBANISATION*=3) (n=104 elderly);
**7.** Brussels (if *W-REGION*=3) (n=148 elderly).

For the second validation test, the chosen reference categories are 'city' for the 'urbanisation level' and Brussels for the combined variable 'place of living'. As expected, respondents living in the countryside or in towns are more likely to receive family care than those living in the city (table VII-7), but the urbanisation level is not significant at all the waves. When the region and urbanisation level are combined (table VII-8), we can see that respondents living in Flanders, whatever the urbanisation level are more likely to receive family care than Walloons and Brussels inhabitants. Within the regions, respondent living in the countryside are usually more likely to receive family care. This is true for Flanders and for Wallonia. Note however that there are no significant differences at waves 8, 9 and 10. The relative risks at the last wave are still significant but usually lower than at the first wave (except from the Walloon cities where the relative risk is higher). The fact that the relative risk for 'town' becomes negative at the two last waves is probably due to smaller sample size at these waves: respondents remaining in the sample are older and more selected. One may not exclude that this 'unclear' result is partly due to the imputation of the urbanisation variable. Therefore, the variables based on it (urbanisation and place of living) should be used cautiously.

**TABLE VII-7:** Relative risk of receiving family care by urbanisation level (PSBH 1994-2002)

| | | **URBANISATION LEVEL** | | | | |
|---|---|---|---|---|---|---|
| | ***RC: City*** | **Town** | | **Countryside** | | **Chi²** |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *31.56* | **1.15** | (1.05-1.25) | **1.35** | (1.11-1.65) | ** |
| **Wave 4** (n=904) | *34.83* | **1.05** | (1.01-1.09) | **1.26** | (1.03-1.54) | * |
| **Wave 5** (n=823) | *34.09* | **1.08** | (1.00-1.16) | **1.23** | (0.99-1.53) | ns |
| **Wave 6** (n=696) | *39.94* | **1.13** | (0.98-1.31) | **1.18** | (0.98-1.43) | ns |
| **Wave 7** (n=616) | *32.29* | **1.24** | (1.06-1.46) | **1.37** | (1.08-1.73) | ** |
| **Wave 8** (n=549) | *38.85* | **1.24** | (1.06-1.44) | **1.33** | (1.08-1.65) | ** |
| **Wave 9** (n=496) | *42.49* | **1.03** | (1.00-1.06) | **1.27** | (1.03-1.58) | * |
| **Wave 10** (n=432) | *47.00* | **0.99** | (1.00-0.98) | **1.19** | (0.97-1.46) | ns |
| **Wave 11** (n=384) | *54.49* | **0.83** | (0.92-0.75) | **1.27** | (1.11-1.45) | *** |
| **Last wave**(n=999) | *50.00* | **0.97** | (1.00-0.94) | **1.11** | (0.99-1.26) | ns |

*Note***:** ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**TABLE VII-8:** Relative risk of receiving family care by place of living (PSBH 1994-2002)

| | | PLACE OF LIVING | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *RC: Brussels* | Flemish city | | Flemish town | | Flemish countryside | | Walloon city | | Walloon town | | Walloon countryside | | Chi² |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | RR | CI 95% | RR | CI 95% | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *22.56* | **1.79** | (1.44-2.22) | **1.80** | (1.44-2.24) | **2.16** | (1.62-2.88) | **1.37** | (1.22-1.54) | **1.39** | (1.23-1.57) | **1.48** | (1.28-1.71) | *** |
| **Wave 4** (n=904) | *27.87* | **1.38** | (1.20-1.60) | **1.52** | (1.26-1.84) | **1.81** | (1.38-2.36) | **1.31** | (1.16-1.48) | **1.07** | (1.04-1.10) | **1.25** | (1.13-1.39) | *** |
| **Wave 5** (n=823) | *27.19* | **1.33** | (1.19-1.49) | **1.60** | (1.33-1.93) | **1.92** | (1.49-2.47) | **1.36** | (1.21-1.53) | **1.06** | (1.04-1.09) | **0.99** | (0.99-0.99) | *** |
| **Wave 6** (n=696) | *31.46* | **1.31** | (1.15-1.49) | **1.62** | (1.29-2.04) | **1.77** | (1.35-2.32) | **1.40** | (1.19-1.64) | **1.24** | (1.12-1.37) | **1.11** | (1.05-1.16) | *** |
| **Wave 7** (n=616) | *24.39* | **1.53** | (1.23-1.89) | **1.78** | (1.33-2.39) | **2.07** | (1.43-3.00) | **1.39** | (1.18-1.64) | **1.49** | (1.22-1.82) | **1.45** | (1.20-1.76) | ** |
| **Wave 8** (n=549) | *32.88* | **1.23** | (1.08-1.41) | **1.48** | (1.15-1.92) | **1.6** | (1.18-2.16) | **1.26** | (1.08-1.46) | **1.43** | (1.13-1.81) | **1.58** | (1.17-2.12) | ns |
| **Wave 9** (n=496) | *40.91* | **1.12** | (1.03-1.22) | **1.09** | (1.02-1.17) | **1.25** | (1.06-1.48) | **0.99** | (1.00-0.98) | **1.05** | (1.01-1.08) | **1.46** | (1.10-1.93) | ns |
| **Wave 10** (n=432) | *50.94* | **0.95** | (0.99-0.91) | **1.00** | (1.00-1.00) | **1.07** | (1.01-1.14) | **0.84** | (0.98-0.73) | **0.81** | (0.98-0.68) | **1.14** | (1.01-1.28) | ns |
| **Wave 11** (n=384) | *55.10* | **0.98** | (0.99-0.97) | **0.94** | (0.97-0.91) | **1.28** | (1.13-1.45) | **0.99** | (0.99-0.98) | **0.67** | (0.82-0.55) | **1.21** | (1.10-1.33) | ** |
| **Last wave**(n=999) | *38.17* | **1.42** | (1.23-1.65) | **1.42** | (1.23-1.64) | **1.61** | (1.32-1.96) | **1.43** | (1.23-1.65) | **1.1** | (1.06-1.15) | **1.24** | (1.13-1.36) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

# *SECTION 3. Needs factors*

## A. Subjective health status

### *1. Relationship with family care*

Question on subjective health status is often asked in surveys. It gives an indication of the general health status of the respondent and is therefore likely to be associated with care needs and thus with received family care. **Elderly declaring to be in bad health are more likely to receive family care.** However the relationship between subjective health and effective family care might be weaker than the relationship between objective measures of health and family care (e.g. disability level): the subjective health evaluation is quite broad: a person may feel in bad health because of depression or other psychological problems. This will not *per se* influence family care.

### *2. Construction of the variable*

Subjective health is considered as a time-varying variable. Since wave 3, each adult respondent is asked to evaluate his health: *"How is your health in general: Very good (1), good (2), fair (3), bad (4), very bad (5)?*(P01301). For the analyses, it was decided to regroup "very good" and "good" on the one hand, "very bad" and "bad" on the other hand in order to have modalities with larger numbers.

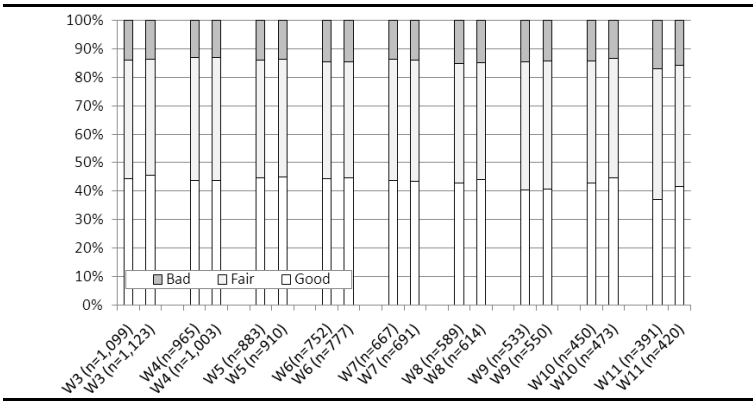
The variable *W-SUBJECTIVEHEALTH* (subjective health) has three modalities:

**1.** Good (if P01301=1, 2);
**2.** Fair (if P01301=3);
**3.** Bad (if P01301=4, 5).

### *3. Imputation of the missing data and first description of the variable*

The missing data problems were solved here by applying rule 2 first and then rule 4: imputation concerned **43** elderly respondents having never answered the question. The responses to the questions on disability level and on recent hospitalisation were used to impute the most likely modality.

**GRAPH VII-21:** Study sample by subjective health over the study waves before and after imputation (PSBH 1994-2002)




*Note:* figures are in appendix table VII-22

Graph VII-21 shows the distribution of the subjective health variable over the study waves[33]. For each study wave, there are two bars: the first represent the distribution before imputation (on the elderly respondents having a valid answer at this wave, n=1,099 at wave 3, 965 at wave 4, etc.) and the second, the distribution after imputation (on all the elderly respondents still present at this wave, n=1,123 at wave 3, 1,003 at wave 4, etc.). This graph gives two pieces of information. First, it shows how the distribution of the analysis variable (second bar of each pair) evolves over time[34]. In the case of subjective health, the distribution is quite stable over waves with small fluctuations at the three last waves (the proportion of respondents being in (very) good health is slightly lower at waves 9 and 11 than at the other waves). Second, the graph allows seeing how imputation affects the distribution of the variable: the smaller the difference between the 'before' and 'after' imputation distribution, the less impact the imputation had and the better it is. In the case of subjective health, the difference is generally small.

Considering the individual trajectories, a third of the elderly respondents (37%) have a stable[35] subjective health trajectory: 18% (203) have always declared to have a good health status, 13% (147) have always declared to have a fair health status and 6% (66) have always declared to have a bad health status. Two thirds of the sample have an unstable subjective health trajectory: 8% (89) have an improving health trajectory, 16% (180) have a worsening one and 438 (40% of the whole elderly sample) have a mixed health trajectory (with changing subjective health status).

## *4. Validation*

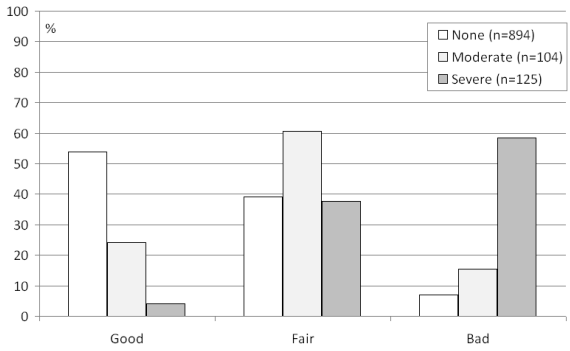
Two other variables measuring the health status are used for the consistency validation, 'recent hospitalisation' and 'disability'. A positive relationship is expected between declaring a bad health status and having disability or having been recently hospitalised.

[33] No survival graph is displayed because it is a time-varying variable.

[34] Remember that it is the evolution in the all sample and not the individual trajectories of the elderly respondents over waves: the relative stability of the distribution in the sample does not mean that the elderly respondents have a stable trajectory. If many elderly have short spells of illness or disability, the distribution of the variable over waves can be quite stable because the elderly are not all sick and disabled at the same time. Conversely, instability of the distribution over waves does not mean that most of the elderly respondents have an unstable health trajectory. It may also be due to selective attrition on health.

[35] Note that the 120 elderly respondents who left the sample before the wave 4 are necessary in this category because the first transitions are observed at wave 4 (the second study wave).

**GRAPH VII-22:** Subjective health by disability at wave 3 (PSBH 1994)



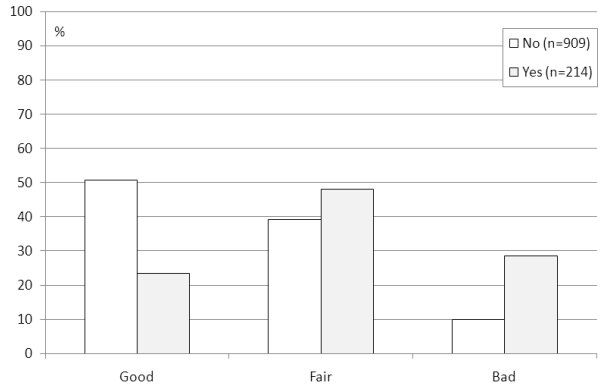

Variation in subjective health distribution by disability over waves (PSBH 1994-2002)

| | SUBJECTIVE HEALTH | | |
|---|---|---|---|
| **DISABILITY** | **Good** | **Fair** | **Bad** |
| **None** | (53.91-64.14) | (33.59-39.04) | (2.27-7.05) |
| **Moderate** | (16.22-29.13) | (55.12-72.07) | (8.51-15.75) |
| **Severe** | (4.00-13.10) | (37.60-46.92) | (44.77-58.40) |

As expected, most of the respondents having no disability declared having a good health status (54%) while this is the case for only 24% of the moderately disabled and of 4% of the severely disabled. At the other end, most of the severely disabled elderly (58%) declared having a bad health status while it is the case for only 15% of the moderately disabled and of 7% of the non-disabled. Finally, most of the moderated disabled (61%) declared having a fair health status. The relationship between the two variables is quite strong[36].

*Note*: the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-23.

**GRAPH VII-23:** Subjective health by recent hospitalisation at wave 3 (PSBH 1994)




Variation in subjective health distribution by recent hospitalisation over waves (PSBH 1994-2002)

| RECENT HOSPITALISATION | SUBJECTIVE HEALTH | | |
|---|---|---|---|
| | **Good** | **Fair** | **Bad** |
| **No** | (46.65-51.68) | (37.43-42.14) | (9.87-13.11) |
| **Yes** | (19.08-29.84) | (40.88-56.52) | (20.87-32.70) |

As expected, the proportion of respondents declaring to have a bad health condition is higher among those who have been recently hospitalised (51% against 23%) and the proportion of respondents declaring having a good health status is higher among those who have not been recently hospitalised (29% against 10%). However, the relationship is less obvious for those declaring having a fair health status. It shows that the two variables are associated but not that much.

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-24.

For the second validation test, having a good health status is chosen as reference category because it is the modality the least 'at risk' of receiving family care. Table VII-9 shows the respondents having a bad health status are nearly two times more likely to receive family care than those having a good health status, respondents having a fair health status have an intermediate risk. The relative risks are significant at all the waves.

[36] A combined variable was created and is detailed below.

**TABLE VII-9:** Relative risk of receiving family care by subjective health (PSBH 1994-2002)

| | SUBJECTIVE HEALTH | | | | | |
|---|---|---|---|---|---|---|
| | ***RC: Good*** | **Fair** | | **Bad** | | **Chi²** |
| **WAVES** | *% care* | **RR** | CI 95% | **RR** | CI 95% | p value |
| **Wave 3** (n=1,008) | *36.60* | **1.40** | (1.24-1.57) | **1.76** | (1.41-2.21) | *** |
| **Wave 4** (n=904) | *33.00* | **1.51** | (1.31-1.73) | **2.18** | (1.68-2.84) | *** |
| **Wave 5** (n=823) | *34.01* | **1.30** | (1.18-1.45) | **1.77** | (1.41-2.24) | *** |
| **Wave 6** (n=696) | *34.84* | **1.53** | (1.32-1.78) | **2.02** | (1.58-2.58) | *** |
| **Wave 7** (n=616) | *27.01* | **1.62** | (1.38-1.90) | **2.20** | (1.67-2.88) | *** |
| **Wave 8** (n=549) | *38.66* | **1.39** | (1.26-1.53) | **1.80** | (1.43-2.27) | *** |
| **Wave 9** (n=496) | *26.34* | **1.52** | (1.30-1.77) | **2.00** | (1.59-2.51) | *** |
| **Wave 10** (n=432) | *28.17* | **1.33** | (1.21-1.47) | **1.80** | (1.45-2.24) | *** |
| **Wave 11** (n=384) | *28.33* | **1.51** | (1.28-1.78) | **1.92** | (1.53-2.40) | *** |
| **Last wave** (n=999) | *42.07* | **1.59** | (1.32-1.91) | **1.73** | (1.47-2.03) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

# B. Disability

## *1. Relationship with family care*

The disability level of the elderly is one of the main health variables used to forecast the presence of informal care. **The higher the disability level, the higher the probability to receive care.**
According to the literature, a positive relationship may be expected between disability and receiving care, in general, but also between having a disability and each aspect of family care: a higher probability of combining family care and care services, of receiving ADL and IADL care and of having multiple care-givers is expected. **The presence of disability is positively associated with receiving care from the spouse and from children**. The evolution of the family care of a disabled elderly is likely to be either stable (if intensive care is provided since the beginning) or to show an increase in the provided care over waves (because disability at old age is likely to increase and requires more intensive care).

## *2. Construction of the variable*

The disability level is considered as a time-varying variable.

> In the adult questionnaire, the respondent is asked *"Do you have any chronic physical or mental health problem, illness or disability? yes (1) no (2)"*(W1A576). Since wave 3[37], in case of positive answer (1), the respondent is asked: "*Are you hampered in your daily activities by any chronic physical or mental health problem, illness or disability? Yes, severely (1). Yes, to some extent (2). No (3)*[38]*"* (P01302).

To create a variable having a valid answer for all the 1,123 elderly respondents, those who answered "no" (2) to the question on whether having a chronic problem (and who were therefore not asked about their disability level) were assimilated to those having a chronic problem with no disability. The analysis variable is defined as follows:

[37] The disability level variable can only be created for the waves 3 to 11. At waves 1 and 2, it is only possible to know whether the elderly has a chronic health problem or not.
[38] At waves 4 and 5, five possible answers are proposed: "*yes completely (1), yes, severely (2), yes, to some extent (3), not really (4), not at all (5)* ". For standardisation purposes, the analysis variable keeps the three modalities available at waves 3 and 6 to 11. The modalities (1) and (2) of waves 4 and 5 are assimilated to *"severely disabled"* (1), and the modalities (4) and (5) to *"not disabled"* (3).

The variable *W-DISABILITY* (disability) has three modalities:

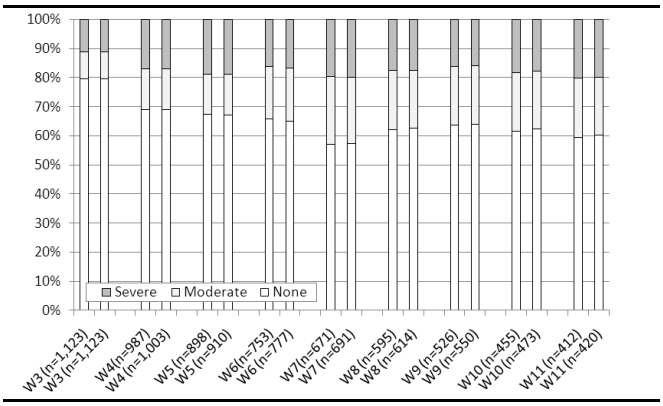
**0.** None (if W1A576=2 or P01302=3);
**1.** Moderate (P01302=2);
**2.** Severe (P01302=1).

## *3. Imputation of the missing data and first description of the variable*

The missing data problems were solved by applying rule 2 first and then rule 4 for the Imputation: imputation concerned **67** elderly respondents having never answered the chronic health problem question or having declared to have at least one chronic health problem but having never answered the disability question. The responses to the questions on subjective health and on recent hospitalisation were used to impute the most likely modality.

Graph VII-24 compares the distribution of the variable over waves, before and after imputation. No difference before-after waves are observed. There is about 40% of disabled at each wave. Slight variations in the distribution are observed over waves but no clear pattern was detected.

**GRAPH VII-24:** Study sample by disability over the study waves, before and after imputation (PSBH 1994-2002)




*Note:* figures are in appendix table VII-25

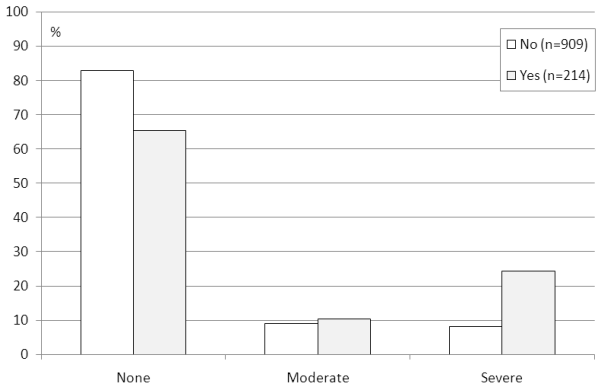
Considering the individual trajectories, half of the elderly respondents have a stable disability trajectory: 494 have never had a disability, 69 have always had a severe disability and 6 have always had a moderate disability. The other half shows an unstable trajectory: 160 have an increasing disability trajectory (from lower disability level to higher disability level), when 35 have a decreasing disability trajectory, and 359 (a third of the total elderly sample) have a mixed disability trajectory (with changing disability levels).

## *4. Validation*

The strong association between disability and subjective health was already shown in the previous point. Here, an additional validation is done with recent hospitalisation. A positive association is expected between disability and recent hospitalisation.

As it was the case with subjective health, the relationship is visible at the two ends: the proportion of severely disabled is higher among those who have been recently hospitalised (24% against 8%), while the proportion of not disabled is higher among those who have not been recently hospitalised (83% against 65%).

**GRAPH VII-25:** Disability by recent hospitalisation at wave 3 (PSBH 1994)




Variation in disability distribution by recent hospitalisation over waves (PSBH 1994-2002)

| RECENT HOSPITALISATION | DISABILITY | | |
|---|---|---|---|
| | None | Moderate | Severe |
| **No** | (61.55-82.95) | (9.02-22.18) | (8.03-17.07) |
| **Yes** | (42.00-65.42) | (10.28-25.22) | (24.30-33.82) |

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures for all the study waves are given in appendix table VII-26.

As subjective health and disability level are strongly associated, a combined variable 'health' was created. Note that the disability level has a stronger weight in the definition of the modalities because this is an objective health criterion and is more likely to involve the use of care.

The *W-HEALTH* variable (health) has four modalities:
- **0.** No problem (if *W-DISABILITY*=0 and *W-SUBJECTIVEHEALTH*=1) (n=482 elderly at wave 3);
- **1.** Subjective problem (if *W-DISABILITY*=0 and *W-SUBJECTIVEHEALTH*>1) (n=412 elderly);
- **2.** Moderate disability (if *W-DISABILITY*=1) (n=104 elderly);
- **3.** Severe disability (if *W-DISABILITY*=2) (n=125 elderly).

The second validation test is done for disability (no disability is taken as the reference category) and for the combined variable 'health' (having no problem is taken as the reference category).

**TABLE VII-10:** Relative risk of receiving family care by disability (PSBH 1994-2002)

| | | DISABILITY | | | | |
|---|---|---|---|---|---|---|
| | *RC: None* | Moderate | | Severe | | Chi² |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *32.75* | **1.20** | (1.10-1.31) | **1.61** | (1.29-2.00) | *** |
| **Wave 4** (n=904) | *31.63* | **1.50** | (1.30-1.73) | **1.68** | (1.40-2.02) | *** |
| **Wave 5** (n=823) | *31.65* | **1.33** | (1.18-1.50) | **1.61** | (1.31-1.97) | *** |
| **Wave 6** (n=696) | *34.15* | **1.59** | (1.39-1.81) | **1.95** | (1.61-2.36) | *** |
| **Wave 7** (n=616) | *28.29* | **1.47** | (1.31-1.66) | **2.15** | (1.70-2.72) | *** |
| **Wave 8** (n=549) | *36.23* | **1.34** | (1.22-1.48) | **1.95** | (1.57-2.42) | *** |
| **Wave 9** (n=496) | *36.68* | **1.45** | (1.29-1.62) | **2.05** | (1.64-2.57) | *** |
| **Wave 10** (n=432) | *40.74* | **1.52** | (1.27-1.82) | **1.60** | (1.31-1.96) | *** |
| **Wave 11** (n=384) | *45.22* | **1.49** | (1.29-1.73) | **1.70** | (1.40-2.07) | *** |
| **Last wave** (n=999) | *40.63* | **1.62** | (1.44-1.82) | **1.66** | (1.47-1.88) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

Table VII-10 shows that the disabled elderly are significantly more likely to receive family care than those having no disability: at wave 2, severely disabled are 60% more likely to receive care as elderly

having no disability. The relative risks vary over time but not in a linear way. It is significant at all the waves.

The relationship between family care and the combined variable (table VII-11) is also significant at all the waves and going in the expected direction. Compared to the disability variable, only the two first modalities differ. As the reference category includes those having no health problem at all, we may expect that the relative risks of severely disabled and of moderately disabled would be higher than in the previous table. This is the case: at wave 3, the relative risks of the severely disabled moved from 1.61 in table VII-10 to 1.95 in table VII-11. The other difference is that it is possible to compare the relative risks of respondents declaring having only a subjective health problem and of respondents having disability problems. As expected, the disability has a stronger effect on receiving family care (the relative risks of 'subjective problem' are lower than the relative risks of those being moderately or severely disabled).

**TABLE VII-11:** Relative risk of receiving family care by the combined health variable (PSBH 1994-2002)

| | | HEALTH | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ***RC: No problem*** | **Subjective problem** | | **Moderate disability** | | **Severe disability** | | **Chi²** |
| **WAVES** | | % care | RR | CI 95% | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** | (n=1,008) | *26.94* | **1.48** | (1.29-1.69) | **1.46** | (1.28-1.67) | **1.95** | (1.55-2.46) | *** |
| **Wave 4** | (n=904) | *26.63* | **1.43** | (1.28-1.60) | **1.78** | (1.49-2.14) | **2.00** | (1.61-2.48) | *** |
| **Wave 5** | (n=823) | *25.08* | **1.63** | (1.39-1.91) | **1.67** | (1.41-1.98) | **2.03** | (1.61-2.57) | ** |
| **Wave 6** | (n=696) | *31.62* | **1.20** | (1.14-1.26) | **1.71** | (1.47-1.99) | **2.11** | (1.71-2.60) | *** |
| **Wave 7** | (n=616) | *22.84* | **1.68** | (1.45-1.94) | **1.82** | (1.54-2.16) | **2.66** | (2.03-3.50) | *** |
| **Wave 8** | (n=549) | *32.06* | **1.33** | (1.22-1.45) | **1.52** | (1.33-1.73) | **2.20** | (1.72-2.81) | *** |
| **Wave 9** | (n=496) | *32.07* | **1.34** | (1.23-1.46) | **1.65** | (1.42-1.92) | **2.35** | (1.82-3.03) | *** |
| **Wave 10** | (n=432) | *32.72* | **1.61** | (1.37-1.91) | **1.90** | (1.52-2.37) | **2.00** | (1.57-2.54) | *** |
| **Wave 11** | (n=384) | *39.29* | **1.39** | (1.24-1.55) | **1.72** | (1.43-2.06) | **1.96** | (1.56-2.46) | ** |
| **Last wave** | (n=999) | *35.16* | **1.32** | (1.24-1.41) | **1.87** | (1.62-2.16) | **1.92** | (1.65-2.23) | ** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## C. Recent hospitalisation

### *1. Relationship with family care*

Finally, to measure the influence of health on family care, the presence of a recent hospitalisation is also considered. This measure complement the two others, because hospitalisation at old age may be due to a chronic disease (in which case the respondent is likely to declare feeling in bad health), or to a temporary problem. Temporary health problems may have involved short-term care and may not be captured by the two previous health variables, because the health problem has been solved at the time of interview. For instance, if the elderly underwent a hip surgery three months before the interview, it is likely that he has received some care from his spouse, his children or professionals when he went back home. But, at the time of interview, he was no longer disabled and has even an improved health status since his hospitalisation, a situation that brings him to declare a better subjective health. Therefore, one may assume **that recent hospitalisation is positively associated with receiving (or having received in a recent past) family care and/or care services.**

### *2. Construction of the variable*

Recent hospitalisation is considered as a time varying variable. In the adult questionnaire, each respondent is asked: *"Have you been admitted to a hospital as an in-patient during the 12 last months?"* (W1A574). The analysis variable can be built directly.

The variable *W-HOSPITAL* (recent hospitalisation) has two modalities:

**0.** No (if W1A574=2);

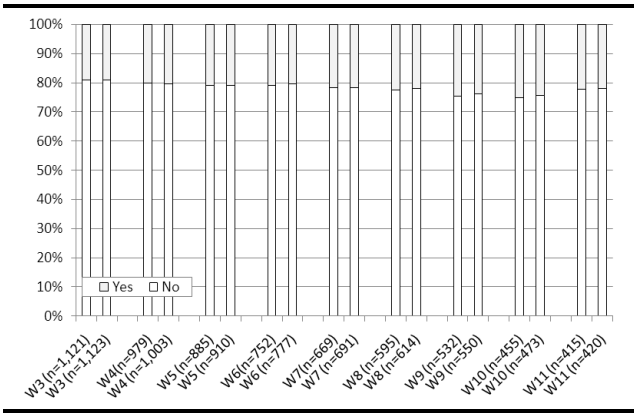
**1.** Yes (if W1A574=1).

## *3. Imputation of the missing data and first description of the variable*

The missing data problems were solved by applying rule 2 first and then the rule 4 for the Imputation: imputation concerned **57** elderly respondents having never answered the question. Answers to the questions on subjective health and on disability level were used to impute the most likely modality.

Graph VII-26 compares the distribution of the variable over waves, before and after imputation. No difference before-after waves are observed. A slightly higher proportion of recent hospitalisation is observed at wave 9 and 10 (around 24% while 22% is observed at the other waves).

**GRAPH VII-26:** Study sample by recent hospitalisation over the study waves before and after imputation




*Note:* figures are in appendix table VII-27

When individual trajectories are considered, 42% (n=470) of the elderly respondents have never been hospitalised during their stay in the panel. To be recently hospitalised at each study wave of presence concerns a total of 60 respondents. The remaining half (53%, n=593), have a mixed trajectory: they were hospitalised at least once but not always (at all the study waves).

## *4. Validation*

The association between recent hospitalisation variable and the two other health variables was tested in the previous two points. In both cases, a significant association was found but no multicollinearity problems were identified. Recent hospitalisation can therefore be used simultaneously with the combined health variable.

For the second validation test, having no recent hospitalisation is chosen as reference category (table VII-12). As expected, the elderly who have been recently hospitalised are nearly always more likely to receive family care (except at waves 7, 10 and 11 where the relationship is not significant). This relatively weak association can be explained by the fact that having been hospitalised does not necessarily involve need for family care and that common post-hospitalised care (such as injections) is often performed by a nurse at-home.

**TABLE VII-12:** Relative risk of receiving family care by recent hospitalisation (PSBH 1994-2002)

| | RECENT HOSPITALISATION | | | |
|---|---|---|---|---|
| | ***RC: No*** | **Yes** | | **Chi²** |
| **WAVES** | *% care* | **RR** | CI 95% | p value |
| **Wave 3** (n=1,008) | *32.92* | **1.42** | (1.18-1.72) | *** |
| **Wave 4** (n=904) | *35.97* | **1.21** | (0.99-1.47) | * |
| **Wave 5** (n=823) | *34.57* | **1.29** | (1.05-1.58) | ** |
| **Wave 6** (n=696) | *39.13* | **1.51** | (1.25-1.82) | *** |
| **Wave 7** (n=616) | *36.12* | **1.19** | (0.93-1.51) | ns |
| **Wave 8** (n=549) | *40.56* | **1.46** | (1.19-1.79) | *** |
| **Wave 9** (n=496) | *39.42* | **1.70** | (1.39-2.07) | *** |
| **Wave 10** (n=432) | *47.85* | **1.12** | (0.91-1.39) | ns |
| **Wave 11** (n=384) | *53.82* | **1.19** | (0.97-1.46) | ns |
| **Last wave** (n=999) | *47.74* | **1.25** | (1.10-1.42) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

# *SECTION 4. Enabling factors*

## A. Partnership status

### *1. Relationship with family care*

As seen in the systematic literature review and in the hierarchical compensation theory, the spouse is the first, the most intensive and most stable care provider. He usually tries to assume alone the whole care responsibility as long as possible. **A positive relationship between being in couple and receiving family care** can be expected. However, a **negative relationship is also possible.** This for two reasons: if there is a spouse, he is likely to care alone and to not declare the provided care, as caring is considered as 'natural'. The second reason is that most of the studied elderly have been married. As separation and divorces were very rare in these cohorts, the main reason for no more living in couple is widowhood. Therefore, the partnership status is associated with age and gender: older women are more likely to be widowed, but older men are more likely to be still in couple because of their shorter life expectancy. Therefore, for women especially, living in couple is expected to be negatively associated with receiving family care (because women in couple tend to be younger and are therefore less likely in need of care). Concerning the family care aspects, the elderly living in couple are expected to **have fewer** (declared) **care-givers** and to be **less likely to receive care from sons and/or daughters or to use care services**. However, if the care needs become too heavy or if the spouse is no longer able to assume the totality of the care load, depending on their orientation (family or formal care) and the availability of alternative care resources, children or care services will complement (but not completely replace) spousal care. **Changes from 'family care' to 'mixed care', are therefore more likely to occur than are changes from 'family care' to 'care services'.**

### *2. Construction of the variable*

It was decided to favour the factual situation (living in couple or not) rather than the legal marital situation. The former allows capturing most of the living arrangements where a spouse or a partner is available for care. Yet, the two variables are strongly associated (see point 4), but married people are not always living in couple (the elderly can be married and have his spouse living in an institution) and widowed, separated or divorced elderly may live in couple (new cohabitations at old age).

The building process of the variable was explained in chapter VI.

The variable *W-SPOUSE* (partnership status) has two modalities:

**0.** Not in couple

**1.** In couple

The literature has shown that the health status of the spouse may influence the family care aspects: if the spouse has a bad health status, the couple is more likely to receive (additional) care from children or care services) (Feld *et al.* 2010).The number of care-givers is therefore expected to be higher if the spouse has a bad health status. However, two elements may complicate this relationship: the health problems of the spouse can be a **consequence** of the provided intensive care (Deboosere *et al.* 2006, De Koker 2009). If it is the case, a spouse having a bad health status may be more likely to declare the provided care (because of its consequences) while a healthy spouse may be less likely to declare it. It might also be possible that spouses who continue to provide intensive care even when they have health problems are less likely to accept external help (they want to assume the care responsibility alone whatever the consequences. On the opposite, healthy spouses are able to maintain their 'good' health because they accept external help in order to keep their care load at an acceptable level. To study this complex relationship, a variable accounting for the presence of a spouse and his health status has been created.

The variable *W-SPOUSALHEALTH* (spousal health)

**0.** Not in couple

**1.** Good

**2.** Fair

**3.** Bad

This variable is based on *W-SPOUSE* and on the available information on the health of the spouse. Three types of situations can be distinguished:

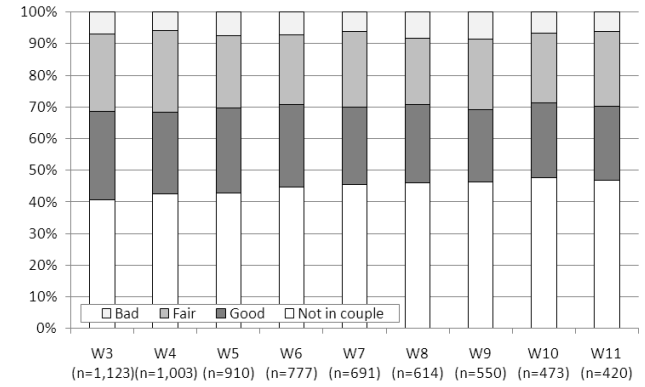
- First: if the spouse is also one of the 1,123 elderly respondents, the value of *W-DISABILITY* is used.
- Second: if the spouse is not included in the study sample but answered the adult questionnaire, the information on subjective health is used. If not available, the question on disability or on recent hospitalisation can be used. Between-wave imputation can be used (if the spouse answered to one or another health-related question at some waves but not at all of them).
- Third: if the spouse never answered an adult questionnaire, proxy variables are used (if the reason for refusal is 'sickness' or if the elderly respondent declared to provide spousal care, the spousal health is defined as 'bad', else it is defined as 'fair').

## *3. Imputation of the missing data and first description of the variable*

The partnership status variable has no missing data. However, as the imputation of the combined spousal health variable was complex (see point 2), it is difficult to give accurate figures. Graph VII-27, shows the distribution of the spousal care variable over waves after imputation.

As expected in an elderly population, the proportion of spouseless increases over waves (from 41% at wave 3 to 47% at wave 11). In most couples, the spouse has a fair or a bad health status (he is also ageing).

**GRAPH VII-27:** Study sample by spousal health over the study waves after imputation (PSBH 1994-2002)




*Note:* figures are in appendix table VII-28

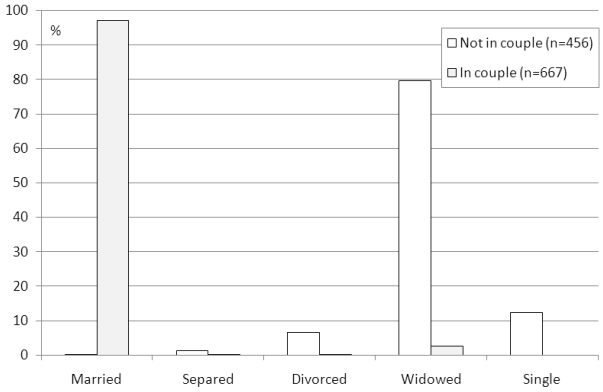
If one looks at the individual partnership status trajectories, he can see that half of the sample (53%, n=593) are always in couple and 40%[39] (452) have never been in couple during the study waves. The remaining sub-sample has an unstable partnership status trajectory: 72 lost their partner (including 60 transitions to widowhood), 4 enter in a new partnership and 2 elderly have a mixed trajectory (exiting and entering in partnership).

## *4. Validation*

The consistency validation test is only done for the partnership status variable and not for spousal care (because there is no other information available on the spouse which should be used for the validation). The partnership status is validated using the gender and the marital status variable: the marriage is the norm among the study birth cohorts. Therefore, it is expected that most of the elderly living in couple are married and most of the elderly not living in couple are widowed. Due to gender differences in life expectancy and the fact that widowed men are more likely to start a new union, it is expected that the proportion of respondents in couple would be higher among men.

[39] This higher proportion is due to the high proportion of elderly respondents being widowed since the first study wave (34%).

**GRAPH VII-28:** Marital status by partnership status at wave 3 (PSBH 1994)




As expected, nearly all the respondents living in couple are married (97%), 2.5% are widowed and the rest are either separated or divorced. Four-fifth of the respondents not living in couple are widowed and 12% are single.

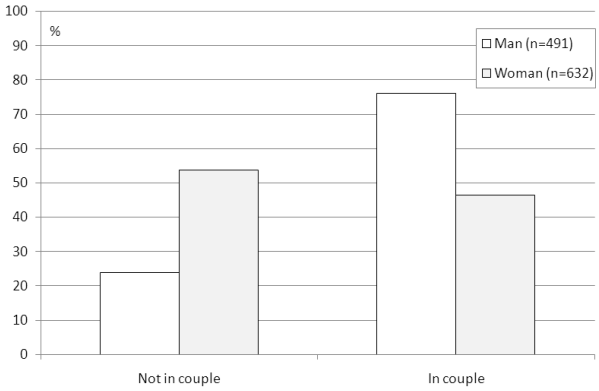
Variation in marital status distribution by partnership status over waves (PSBH 1994-2002)

| | MARITAL STATUS | | | | |
|---|---|---|---|---|---|
| **PARTNERSHIP** | **Married** | **Separated** | **Divorced** | **Widowed** | **Single** |
| **Not in couple** | (0.22-1.78) | (0.89-1.59) | (6.22-6.92) | 78.10-80.20) | (11.11-12.68) |
| **In couple** | (97.15-98.39) | (0.00-0.38) | (0.00-0.45) | (1.21-2.55) | (0.00-0.00) |

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-28.

**GRAPH VII-29:** Partnership status of men and women at wave 3 (PSBH 1994)

As expected, most of the men are in couple (76%) while most of the women are not in couple (54%).




Variation in partnership status distribution for men and women over waves (PSBH 1994-2002)

| **GENDER** | **In couple** |
|---|---|
| **Man** | (70.72-76.17) |
| **Woman** | (38.18-46.36) |

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-30.

For the second validation test, the reference category is 'not in couple'. It would also have been possible to choose 'in couple' as reference because it is difficult to evaluate whether living in couple has a positive or negative effect on the fact of receiving family care or not. As the spouse is usually the first and the main care-giver a positive effect of living in couple is expected, but the usual under-declaration of spousal care goes in the direction of a negative effect of living in couple. Table VII-13 suggests that spousal care in under-declared in the PSBH study sample: respondents not living in couple are more likely to receive care. However the relationship is not significant at waves 6 and 7.

**TABLE VII-13:** Relative risk of receiving family care by partnership status (PSBH 1994-2002)

| | | PARTNERSHIP STATUS | | | |
|---|---|---|---|---|---|
| | | *RC: Not in couple* | In couple | | Chi² |
| **WAVES** | | *% care* | RR | CI 95% | p value |
| **Wave 3** | (n=1,008) | *44.28* | **0.70** | (0.83-0.60) | *** |
| **Wave 4** | (n=904) | *43.12* | **0.80** | (0.94-0.67) | *** |
| **Wave 5** | (n=823) | *42.90* | **0.77** | (0.92-0.64) | *** |
| **Wave 6** | (n=696) | *45.69* | **0.91** | (1.09-0.77) | ns |
| **Wave 7** | (n=616) | *39.58* | **0.91** | (1.12-0.74) | ns |
| **Wave 8** | (n=549) | *50.00* | **0.82** | (0.99-0.68) | ** |
| **Wave 9** | (n=496) | *56.72* | **0.68** | (0.82-0.56) | *** |
| **Wave 10** | (n=432) | *59.24* | **0.71** | (0.86-0.59) | *** |
| **Wave 11** | (n=384) | *64.60* | **0.77** | (0.92-0.65) | *** |
| **Last wave** | (n=999) | *56.75* | **0.83** | (0.94-0.73) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

Table VII-14 shows that, when accounting for the health of the spouse, the elderly having a healthy spouse are slightly more likely to receive family care than the elderly having no spouse. On the contrary, elderly having a spouse with a bad or fair health status are less likely to receive family care. It is very difficult to draw conclusions without accounting for the availability of other potential care-givers (the children).

**TABLE VII-14:** Relative risks of receiving family care by spousal health (PSBH 1994-2002)

| | | | SPOUSAL HEALTH | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *RC: No spouse* | Good | | Fair | | Bad | | Chi² |
| **WAVES** | | % care | **RR** | CI 95% | **RR** | CI 95% | **RR** | CI 95% | p value |
| **Wave 3** | (n=1,008) | *44.28* | **1.26** | (1.18-1.35) | **0.72** | (0.79-0.65) | **0.55** | (0.66-0.46) | *** |
| **Wave 4** | (n=904) | *43.12* | **1.16** | (1.10-1.23) | **0.93** | (0.96-0.91) | **0.57** | (0.71-0.47) | *** |
| **Wave 5** | (n=823) | *42.90* | **1.17** | (1.10-1.24) | **0.85** | (0.91-0.80) | **0.59** | (0.73-0.48) | *** |
| **Wave 6** | (n=696) | *45.69* | **1.02** | (1.00-1.03) | **0.97** | (1.00-0.93) | **0.84** | (1.03-0.69) | ns |
| **Wave 7** | (n=616) | *39.58* | **1.23** | (1.09-1.39) | **1.06** | (1.02-1.09) | **0.69** | (0.86-0.56) | *** |
| **Wave 8** | (n=549) | *50.00* | **1.29** | (1.16-1.44) | **0.85** | (0.91-0.80) | **0.64** | (0.77-0.52) | *** |
| **Wave 9** | (n=496) | *55.32* | **1.03** | (1.02-1.03) | **0.51** | (0.65-0.39) | **0.78** | (0.85-0.71) | *** |
| **Wave 10** | (n=432) | *59.24* | **0.95** | (0.97-0.93) | **0.83** | (0.90-0.77) | **0.53** | (0.69-0.40) | *** |
| **Wave 11** | (n=384) | *64.60* | **1.01** | (1.01-1.02) | **0.88** | (0.90-0.85) | **0.60** | (0.68-0.53) | *** |
| **Last wave** | (n=999) | *56.75* | **1.10** | (1.05-1.15) | **0.87** | (0.93-0.81) | **0.69** | (0.82-0.59) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## B. Number of children

### *1. Relationship with family care*

The literature review highlighted **the positive relationship between the number of children and the probability that they will receive care from at least one child**. The literature also showed that children (especially sons) try to share the care responsibility (with the other parent, siblings or professionals), the more if long-term care is needed. Therefore, one may assume a **positive relationship between the number of children and receiving 'family care' or 'mixed care' and the number of care-givers.** Concerning the family care evolution, **changes in care aspects are assumed to be more frequent** (the higher the number of children, the higher the possibility of sequential

sharing) while **the provision of family care as a whole is assumed to be more stable** (less transitions from 'family care' or 'mixed care' to 'no care' or 'care services') because the sharing possibilities reduce the individual care load and protect against the care-giver burnout.

## *2. Construction of the variable*

As explained in chapter VI, the number of children is considered as a **time-invarying** variable. The building of the variable was explained in details in that chapter.

The variable *E-CHILDNUMBER* (number of children) as three modalities:
- **0.** No child;
- **1.** 1 child;
- **2.** 2+ children.

Two additional variables were created, the first accounting only for the number of daughters.

The variable *E-DAUGHTERNUMBER* (number of daughters) as three modalities:
- **0.** No daughter;
- **1.** 1 daughter;
- **2.** 2+ daughters.

The second accounts only for the number of sons.

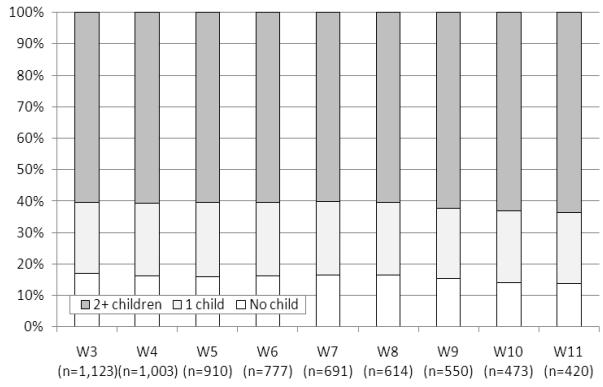
The variable *E-SONNUMBER* (number of daughters) as three modalities:
- **0.** No son;
- **1.** 1 son;
- **2.** 2+ sons.

## *3. First description of the number of children and of the daughters and sons variables*

The imputation of the variable was very complex and was treated in chapter VI.

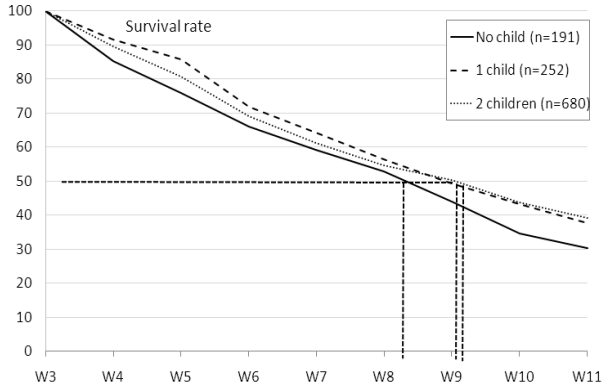
As a first description of these three variables, the graphs VII-30a to VII-32a show that the distribution of number of children, of daughters and of sons is stable over time. Graphs VII-30b to VII-32b give the survival function for each modality. Graphs VII-30b shows that there are no large differences in the survival functions but that the survival rate decreases more quickly for the childless elderly. This suggests that having children has a protective effect. Interestingly, the slowest decreasing survival function is that of the elderly having only one child. One may hypothese that the parent-child relationship is particular (and usually closer) when there is only one child. When the gender of the children is accounted for, there are no larger differences in the survival functions displayed by number of daughters Graph VII-31b. Concerning the number of sons, it seems that the survival function of the elderly having many sons decreases at a slower pace than when they have only one son Graph VII-32b.

**GRAPH VII-30A:** Study sample by number of children over the study waves (PSBH 1994-2002), Chi²: ns



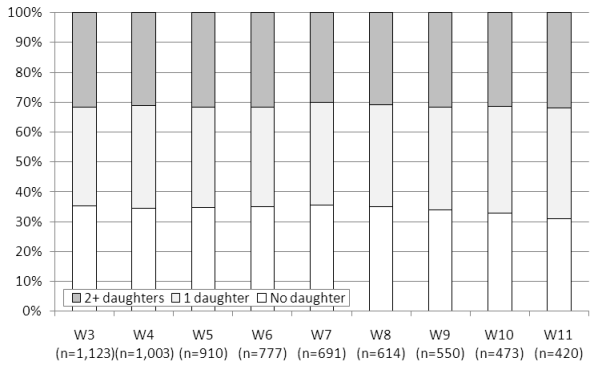

*Note:* figures are in appendix table VII-31a

**GRAPH VII-30B:** Survival function by number of children (PSBH 1994-2002), Log-rank test: ***



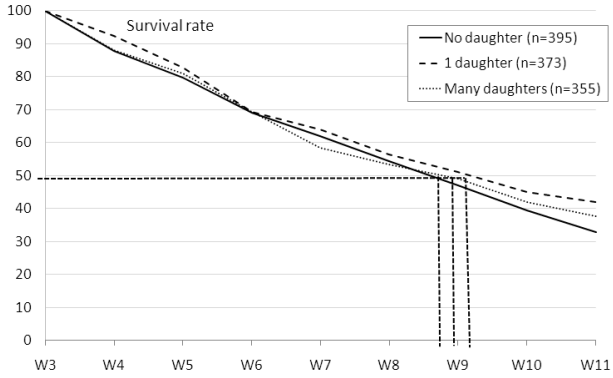

*Note:* figures are in appendix table VII-31b

**GRAPH VII-31A:** Study sample by number of daughters over the study waves (PSBH 1994-2002), Chi²: ns



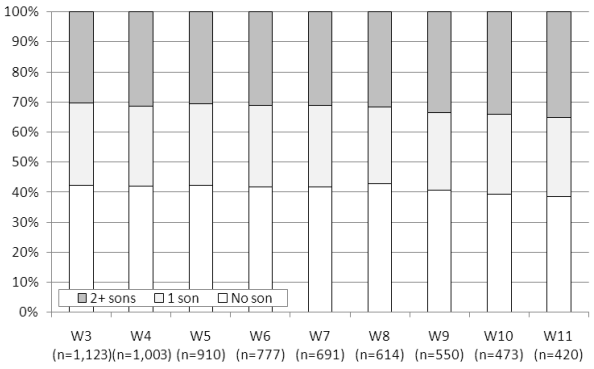

*Note:* figures are in appendix table VII-32a

**GRAPH VII-31B:** Survival function by number of daughters (PSBH 1994-2002), Log-rank test: ***



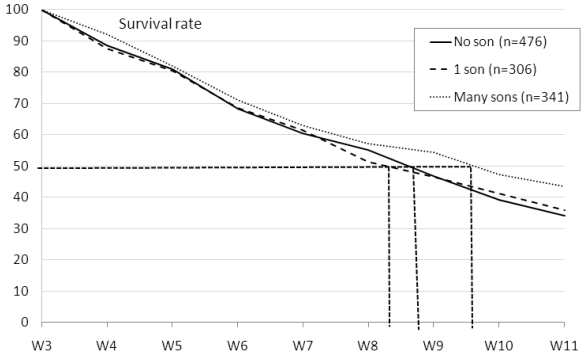

*Note:* figures are in appendix table VII-32b

**GRAPH VII-32A:** Study sample by number of sons over the study waves (PSBH 1994-2002), Chi²: ns




*Note:* figures are in appendix table VII-33a

**GRAPH VII-32B:** Survival function by number of sons (PSBH 1994-2002), Log-rank test: ***




*Note:* figures are in appendix table VII-33b

A combined variable accounting for the gender of children and the presence of a spouse was created. This variable allows comparing the various family constellations and to clearly distinguish the family-less elderly from the rest of the sample. It will therefore be possible **to test whether the family-less elderly are more likely to use care services (to substitute family care)**.

As one of the initial variables (partnership status) is time-varying, the family constellation variable is first considered as a **time-varying** variable and is built as follows:

The variable *W-FAMILY* (family constellation) has six modalities:

- **0.** Family less (*W-SPOUSE*=0 and *W-CHILDNUMBER*=0) (n=115 elderly at wave 3);
- **1.** Only spouse (if *W-SPOUSE*=1 and *W-CHILDNUMBER*=0) (n=76 elderly);
- **2.** Spouse & daughter(s) (if *W-SPOUSE*=1 and *W-DAUGHTERNUMBER*>0 and *W-SONNUMBER*=0) (n=194 elderly);
- **3.** Spouse & son(s) (if *W-SPOUSE*=1 and *W-DAUGHTERNUMBER*=0 and *W-SONNUMBER*>0) (n=125 elderly);
- **4.** Spouse & daughter(s) & son(s) (if *W-SPOUSE*=1 and *W-DAUGHTERNUMBER*>0 and *W-SONNUMBER*>0) (n=276 elderly);
- **5.** Only children (if *W-SPOUSE*=0 and *W-DAUGHTERNUMBER*>0 or *W-SONNUMBER*>0) (n=337 elderly).

This combined variable will be used for the descriptive analyses and for some of the regression analyses in replacement of the three initial variables (*W-SPOUSE, W-DAUGHTERNUMBER* and *W-SONNUMBER*). A time-invarying version of the variable (*E-FAMILY*) was also created to be used in the regression analyses of 'having ever received family care'. The modalities are the same than for *W-FAMILY*. The sole difference is that it is not the current partnership status (*W-SPOUSE*) which is used, but the fact of having been in couple at any of the study waves (*E-SPOUSE*). This is a kind of time-invarying version of the partnership variable. Finally, a dichotomous variable *E-FAMMEMBER* (family membership) distinguishes respondents who are 'family-less' from respondent who had spouse and/or children for at least one of the study waves, the 'family-members'.

## *4. Validation*

The consistency validation was already done with region.

The second validation was done for the four variables (number of children, of daughters, of sons and for family constellation). As to the number of children a first attempt used 'no child' as reference category but as there are no childless respondents receiving family care at wave 10 and 11, the relative risks could not be computed. For technical reasons, the analysis was therefore run again using '1 child' as reference category. As expected, respondents having two or more children are more likely to receive family care than those having only one child while respondents having no children are the least likely to receive family care. Not many differences are observed over waves (table VII-15).

Respondents who have one or many daughters have also higher risks of receiving care than respondents having no one (reference category)(table VII-16). But no real differences are observed between having one or many daughters: even if the relative risks differ slightly, the confidence interval shows that those differences are not significant. The same is observed for the number of sons (table VII-17).

**TABLE VII-15:** Relative risks of receiving family care by number of children (PSBH 1994-2002)

| | NUMBER OF CHILDREN | | | | | |
|---|---|---|---|---|---|---|
| | ***RC:1 child*** | **No child** | | **2+ children** | | **Chi²** |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *32.14* | **0.16** | (0.33-0.08) | **1.25** | (1.17-1.35) | *** |
| **Wave 4** (n=904) | *36.36* | **0.13** | (0.28-0.06) | **1.14** | (1.09-1.19) | *** |
| **Wave 5** (n=823) | *33.80* | **0.15** | (0.31-0.07) | **1.22** | (1.14-1.31) | *** |
| **Wave 6** (n=696) | *40.33* | **0.44** | (0.60-0.32) | **1.16** | (1.08-1.25) | *** |
| **Wave 7** (n=616) | *36.42* | **0.29** | (0.47-0.18) | **1.11** | (1.05-1.17) | *** |
| **Wave 8** (n=549) | *45.77* | **0.18** | (0.35-0.09) | **1.04** | (1.02-1.06) | *** |
| **Wave 9** (n=496) | *45.97* | **0.15** | (0.30-0.07) | **1.07** | (1.04-1.11) | *** |
| **Wave 10** (n=432) | *50.46* | **0.00** | (0.00-0.00) | **1.05** | (1.03-1.07) | *** |
| **Wave 11** (n=384) | *58.95* | **0.00** | (0.00-0.00) | **1.01** | (1.01-1.01) | *** |
| **Last wave** (n=999) | *51.19* | **0.23** | (0.36-0.15) | **1.07** | (1.05-1.09) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**TABLE VII-16:** Relative risks of receiving family care by number of daughters (PSBH 1994-2002)

| | NUMBER OF DAUGHTERS | | | | | |
|---|---|---|---|---|---|---|
| | ***RC: No daughter*** | **1 daughter** | | **Many daughters** | | **Chi²** |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *24.64* | **1.59** | (1.30-1.94) | **1.65** | (1.33-2.04) | *** |
| **Wave 4** (n=904) | *28.23* | **1.40** | (1.17-1.68) | **1.51** | (1.21-1.89) | *** |
| **Wave 5** (n=823) | *25.88* | **1.54** | (1.25-1.91) | **1.62** | (1.28-2.04) | *** |
| **Wave 6** (n=696) | *32.81* | **1.39** | (1.16-1.68) | **1.49** | (1.19-1.86) | *** |
| **Wave 7** (n=616) | *28.63* | **1.37** | (1.12-1.69) | **1.68** | (1.20-2.35) | ** |
| **Wave 8** (n=549) | *32.00* | **1.44** | (1.20-1.74) | **1.65** | (1.28-2.13) | *** |
| **Wave 9** (n=496) | *35.61* | **1.29** | (1.10-1.50) | **1.52** | (1.18-1.96) | *** |
| **Wave 10** (n=432) | *36.52* | **1.42** | (1.15-1.74) | **1.54** | (1.19-2.00) | *** |
| **Wave 11** (n=384) | *41.49* | **1.51** | (1.19-1.93) | **1.40** | (1.15-1.71) | *** |
| **Last wave** (n=999) | *39.85* | **1.43** | (1.22-1.68) | **1.33** | (1.17-1.51) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**TABLE VII-17:** Relative risk of receiving family care by number of sons (PSBH 1994-2002)

| | NUMBER OF SONS | | | | | |
|---|---|---|---|---|---|---|
| | ***RC: No son*** | **1 son** | | **2 + sons** | | **Chi²** |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *26.87* | **1.36** | (1.20-1.55) | **1.64** | (1.34-2.01) | *** |
| **Wave 4** (n=904) | *30.43* | **1.23** | (1.10-1.36) | **1.48** | (1.21-1.81) | *** |
| **Wave 5** (n=823) | *29.87* | **1.22** | (1.09-1.37) | **1.48** | (1.19-1.83) | *** |
| **Wave 6** (n=696) | *37.70* | **1.07** | (1.03-1.12) | **1.36** | (1.12-1.64) | *** |
| **Wave 7** (n=616) | *30.52* | **1.25** | (1.07-1.47) | **1.43** | (1.12-1.84) | ** |
| **Wave 8** (n=549) | *41.12* | **1.04** | (1.00-1.08) | **1.21** | (0.98-1.49) | ns |
| **Wave 9** (n=496) | *39.05* | **1.14** | (1.04-1.24) | **1.37** | (1.10-1.71) | ** |
| **Wave 10** (n=432) | *41.38* | **1.25** | (1.04-1.49) | **1.32** | (1.05-1.66) | * |
| **Wave 11** (n=384) | *44.44* | **1.43** | (1.15-1.78) | **1.35** | (1.13-1.63) | *** |
| **Last wave** (n=999) | *44.60* | **1.13** | (1.06-1.21) | **1.30** | (1.13-1.51) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

Finally, the test is done with the combined variable 'family care' on the sub-sample of elderly having a spouse and/or children. In this case, the reference category is 'spouse, daughter(s) and son(s). This choice is justified by a practical reason: the idea was to keep the same reference category for all the

analyses. As some analyses of care aspects requires having a spouse (*W-SPOUSECARE*), a daughter (*W-DAUGHTERCARE*) or a son (*W-SONCARE*), the only possibility was to choose as reference category the modality which meets all these criteria. Table VII-18 shows that respondents having only a spouse are the least likely to receive family care. This suggests that spousal care is under-declared. Respondents having a spouse and daughter(s) or a spouse and son(s) are less likely to receive family care except at waves 10 and 11 (probably due to smaller sample at these waves). The effect of having only children is sometimes positive and sometimes negative (this may be due to the flexibility of care provided by children: more likely to provide short-term intensive care).

**TABLE VII-18:** Relative risk of receiving family care by family constellation (PSBH 1994-2002)

| | | FAMILY CONSTELLATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ***RC: Spouse, daughter(s), son(s)*** | **Only spouse** | | **Spouse & daughter(s)** | | **Spouse &son(s)** | | **Only children** | | **Chi²** |
| **WAVES** | | *% care* | RR | CI 95% | RR | CI 95% | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** | (n=1,008) | *42.55* | **0.12** | (0.21-0.07) | **0.65** | (0.73-0.58) | **0.64** | (0.72-0.57) | **1.04** | (1.03-1.05) | *** |
| **Wave 4** | (n=904) | *42.68* | **0.11** | (0.22-0.05) | **0.75** | (0.82-0.69) | **0.86** | (0.91-0.83) | **1.01** | (1.01-1.01) | *** |
| **Wave 5** | (n=823) | *42.06* | **0.12** | (0.25-0.06) | **0.75** | (0.83-0.68) | **0.77** | (0.84-0.70) | **1.02** | (1.01-1.03) | *** |
| **Wave 6** | (n=696) | *49.72* | **0.36** | (0.59-0.22) | **0.78** | (0.88-0.70) | **0.83** | (0.91-0.76) | **0.92** | (0.96-0.88) | *** |
| **Wave 7** | (n=616) | *43.67* | **0.24** | (0.48-0.12) | **0.73** | (0.85-0.63) | **0.92** | (0.96-0.88) | **0.91** | (0.95-0.86) | *** |
| **Wave 8** | (n=549) | *46.72* | **0.18** | (0.36-0.09) | **0.98** | (0.99-0.98) | **0.85** | (0.91-0.79) | **1.07** | (1.04-1.10) | *** |
| **Wave 9** | (n=496) | *45.67* | **0.15** | (0.29-0.07) | **0.84** | (0.90-0.80) | **0.88** | (0.92-0.84) | **1.24** | (1.15-1.34) | *** |
| **Wave 10** | (n=432) | *46.60* | **0.00** | (0.00-0.00) | **1.13** | (1.08-1.17) | **1.06** | (1.04-1.08) | **1.39** | (1.24-1.56) | *** |
| **Wave 11** | (n=384) | *58.76* | **0.00** | (0.00-0.00) | **1.23** | (1.15-1.32) | **1.21** | (1.13-1.28) | **1.52** | (1.32-1.75) | *** |
| **Last wave** | (n=999) | *53.33* | **0.28** | (0.40-0.20) | **1.17** | (1.12-1.22) | **1.19** | (1.13-1.24) | **1.33** | (1.23-1.45) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## C. Geographical proximity of the closest child

### *1. Relationship with family care*

The geographical proximity of non-cohabiting children is often used as an indicator of the availability of children for caring: children who live close to the elderly parent's place of living can more easily come regularly to provide care. However, one may think that the geographical distance is not really a problem in a small country like Belgium: even if the child lives in the other side of the country, he can still come and go back in a single day (the longer distance is about 300 kilometres). But, the geographical distance is also a proxy of the closeness of the parent-child relationship. In this case, he will be more likely to provide care than a sibling who has more distant relationships with his parents. The situation of cohabiting children should be treated separately. As seen in chapter V, the intergenerational cohabitation is not necessarily justified by the elderly care needs ('care cohabitation'). Children may also cohabit because they have not yet left the parental home or because they have themselves health or economic problems. Therefore, **a positive relationship is expected between the proximity of non-cohabitant children and the probability of receiving family care.** No hypotheses are made for the care aspects or their evolution.

### *2. Construction of the variable*

To account for the proximity of the children, the information computed on the carelines file (see chapter VI) was aggregated at the wave level to build a time-varying variable. At a given wave, the variable refers to the geographical proximity of the closest living child. Those who have no children are assimilated to those having their closest child living more than 49 Km away. This choice may seem too strict: having only child(ren) living 50 Km or more away is not the same as having no

children at all. Children may still provide some care and be present for their parents even when they live far away. The decision to group 'no child' and closest child living '>49 Km' is justified for 'technical reasons': later, in the multivariate analyses, if one wants to include simultaneously the family constellation and the closest child proximity variables in the regression, the latter variable cannot have a modality including only 'no child' because it would mean that 100% of the respondents having 'only spouse' (family constellation) would be in the modality 'no child' (closest child proximity). Forty-nine kilometres is chosen as cutting-point, because for each study wave, the number of elderly having their closest child in the further initial categories ('50-99 Km', '100 Km+', 'abroad') was very small.

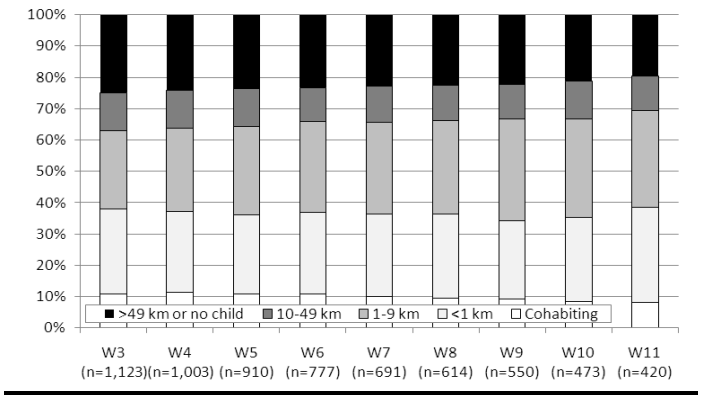
The variable *W-CLOSESTCHILD* (closest child proximity) as five modalities:

**0.** Cohabitant;
**1.** < 1 Km;
**2.** 1-9 Km;
**3.** 10-49 Km;
**4.** >49 Km/no child.

## *3. First description of the closest child proximity*

The missing data problems were solved at the carelines level (for each child at each wave) according to the rules given in chapter VI. It would be difficult to show the distribution of the variable before imputation. Therefore, as it was the case for the "spouse health", the variable will be distributed only after imputation over waves (graph VII-33).

**GRAPH VII-33:** Study sample by the closest child proximity over the study waves after imputation (PSBH 1994-2002)




*Note:* figures are in appendix table VII-34

At wave 3, 11% of the elderly respondents have a cohabiting child, 27% have their closest child living at less than 1 Km, for 25%, he lives at 1 to 9 kilometres away, for 12% at 10 to 49 kilometres away. Finally, 25% have no children living closer than the chosen threshold distance of 50 kilometres. There are no large differences in the distribution of the variable over waves: at the last wave the proportion of cohabiting children is slightly smaller (8%[40]) as well as the proportion of elderly having no children living closer than 11 kilometres (from 37% at wave 3 to 31% at wave 11) but the proportion of elderly having their closest child living at less than 10 kilometres away but not cohabiting is higher (from

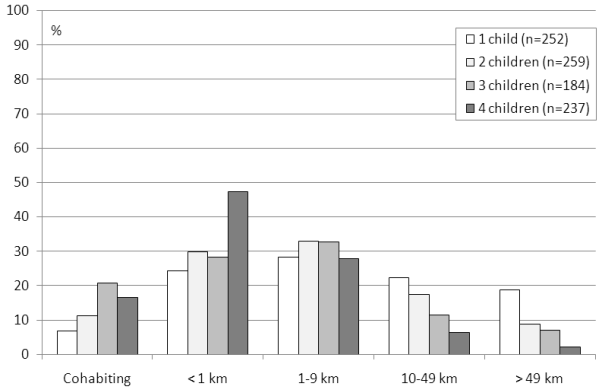
[40] This is likely because part of the cohabitants at wave 3 were young adults who have left the parental home during the panel. Indeed, 69% of the elderly respondent having a cohabiting child are included in the cohorts 1925-1929 and 1920-1924.

52% at wave 3 to 61% at wave 11). It seems that, as they were ageing, the elderly are more likely to have a child living close to them but less likely to have a cohabiting child. But, to have a better idea of the evolution over time, it is useful to look at the individual trajectories. There analyses shows that, among the 932 (who have at least one child), two third (69%) have a stable trajectory[41]: 97 (10% of the 932) have a cohabiting child during all their waves of presence, 211 (23%) have no cohabiting children but have always at least one child living at less than one kilometre distance. One hundred, seventy-seven elderly (19%) have always their closest child living at 1 to 9 kilometres distance, 83 (9%) at 10 to 49 kilometres distance and 74 (8%) have never had a child living closer than 50 kilometres away. The remaining third show instable trajectories: 72 (8%) have their closest child coming to live even closer to (including 5 where a child decides to cohabit with them); 83 (9%) have their most proximate child going further (including 16 where a child left the parental house during the panel) and 135 (15%) who have a mixed trajectory (the closest child coming closer and going further). It includes 2 who have a child leaving the parental house and 12 who have a child cohabiting temporarily with the elderly).

## *4. Validation*

The number of children was used to validate the consistency of closest child proximity. The analysis is only done on elderly respondents having children. It means that the last modality becomes '> 49 Km'. A positive relationship is expected between the number of children and the proximity of the closest child (see graph VII-34).

**GRAPH VII-34:** Closest child proximity distribution for number of children at wave 3 (PSBH 1994)




As expected, respondents having a numerous family (four children or more) are more likely to have their closest child living at less than 1 kilometre.

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures (proportion for all the study waves are given in appendix table VII-35.

Variation in closest child proximity distribution for number of children over waves (PSBH 1994-2002)

| NUMBER OF CHILDREN | CLOSEST CHILD PROXIMITY | | | | |
|---|---|---|---|---|---|
| | **Cohabiting** | **< 1 Km** | **1-9 Km** | **10-49 Km** | **> 49 Km** |
| **1 child (n=252)** | (4.21-7.79) | (22.08-31.69) | (28.14-34.74) | (16.57-25.11) | (10.53- |
| **2 children (n=259)** | (5.15-11.20) | (29.73-38.14) | (31.58-37.21) | (12.40-17.37) | (8.19- |
| **3 children (n=184)** | (14.67-22.02) | (21.69-29.81) | (32.61-48.00) | (8.79-14.46) | (1.33- |
| **4 children (n=237)** | (12.30-16.75) | (30.33-47.26) | (27.85-41.80) | (5.95-11.48) | (2.11- |

The second validation test is done on the entire sample. The reference modality is '>49 Km or no child' because elderly belonging to this category are supposed to be less likely to receive care. Table

[41] Note that the trajectory is computed on the proximity of the closest child which is an aggregated variable. If a child lives at 2 kilometers away at wave 3 (modality 2) and moved abroad at wave 4 (modality 4), while another child moved closer to the parent (at 5 kilometers away: modality 2), the variable 'closest child proximity' is equal to 2 at waves 3 and 4. In other words, changes in individual child proximity may be overlooked with this aggregated variable.

VII-19 shows that having at least one child living closer than 50 kilometres away is associated with a high risk of receiving family care. Now, it is difficult to establish a hierarchy of risks for the four modalities considered: the relative risks of the two middle modalities (<1Km and 1-9Km) are usually very close and often higher than for 'cohabiting' or '10-49 Km'. Respondents having their closest child living at 10-49 Km away have higher risks of receiving care than elderly having a cohabiting child. Note that the relative risks are higher for all the modalities at wave 10 and 11.

**TABLE VII-19:** Relative risk of receiving family care by closest child proximity(PSBH 1994-2002)

| | | | CLOSEST CHILD PROXIMITY | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *RC: >49 Km/no child* | Cohabiting | | <1 Km | | 1-9 Km | | 10-49 Km | | Chi² |
| **WAVES** | | *% care* | RR | CI 95% | RR | CI 95% | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** | (n=1,008) | *4.88* | **7.83** | (5.21-11.78) | **9.91** | (6.29-15.62) | **8.65** | (5.64-13.27) | **5.84** | (4.11-8.28) | *** |
| **Wave 4** | (n=904) | *6.25* | **5.43** | (3.76-7.82) | **7.81** | (5.01-12.19) | **7.28** | (4.74-11.18) | **5.82** | (3.98-8.52) | *** |
| **Wave 5** | (n=823) | *7.75* | **4.21** | (3.10-5.73) | **6.17** | (4.18-9.10) | **6.27** | (4.24-9.29) | **2.96** | (2.35-3.73) | *** |
| **Wave 6** | (n=696) | *19.00* | **2.41** | (1.82-3.20) | **2.74** | (1.98-3.78) | **2.59** | (1.91-3.50) | **1.71** | (1.44-2.03) | *** |
| **Wave 7** | (n=616) | *15.66* | **2.59** | (1.76-3.82) | **2.79** | (1.84-4.24) | **2.69** | (1.80-4.02) | **2.02** | (1.52-2.69) | *** |
| **Wave 8** | (n=549) | *9.46* | **4.19** | (2.82-6.23) | **5.96** | (3.64-9.76) | **5.40** | (3.39-8.61) | **4.35** | (2.90-6.54) | *** |
| **Wave 9** | (n=496) | *7.25* | **7.18** | (4.19-12.30) | **7.80** | (4.45-13.68) | **7.17** | (4.18-12.29) | **5.98** | (3.67-9.75) | *** |
| **Wave 10** | (n=432) | *3.39* | **12.54** | (6.77-23.20) | **19.05** | (9.30-39.03) | **16.43** | (8.31-32.48) | **15.01** | (7.76-29.02) | *** |
| **Wave 11** | (n=384) | *4.35* | **8.79** | (5.31-14.57) | **16.89** | (8.76-32.56) | **13.73** | (7.47-25.22) | **14.19** | (7.67-26.27) | *** |
| **Last wave** | (n=999) | *12.03* | **3.85** | (3.05-4.87) | **4.35** | (3.37-5.62) | **4.85** | (3.69-6.38) | **5.41** | (4.04-7.26) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## D. Economic resources

### *1. Relationship with family care*

The economic resources, usually measured by the household income, are sometimes used together with the occupational status and the education level to build an indicator of social class in cross-sectional studies (Broese van Groenou & Van Tilburg 2003). Working on an elderly sample with panel data lead to separate the economic resources from the two other components because, unlike the educational level and the last occupational status, the economic resources are likely to change at old age (e.g. the household income can change if the spouse died or if the elderly starts to cohabit with a child). Therefore, if education and last occupational status were considered as 'predisposing factors', the economic resources are considered as an 'enabling factor'. However, the expected relationships with family care are the same than for education and occupational status: **a lower probability of receiving family care and a higher probability of using high quality care services as a substitute for family care.**

### *2. Construction of the variable*

If the household income seems to be the most obvious measure of economic resource, it has two main limitations: the first is that it does not account for the household composition (Speare & Avery 1993). For instance, 3,000 € per month may allow one person to live quite comfortably but it might be difficult to make the two ends meet for a family of five persons. The second limitation is that there is often a large proportion of missing data (e.g. in Taylor & Lynch 2004) on this variable (people may found it difficult to evaluate the total household income or they may dislike answering money related questions).

I decided to use the 'ability to make the two ends meet' as **time-varying** variable to measure the economic resources. This variable is often used as a proxy of income (Gannon & Davin 2010). Contrarily to the income, it refers to a subjective evaluation and is therefore more likely to reflect the standard of living of the respondent. The question is asked in the adult questionnaire as follows:

*"Thinking of your household's total monthly income, is your household able to make ends meet with great difficulty (1), with difficulty (2), with some difficulty (3), fairly easily (4), easily (5) or very easily (6)?"* (W1H148).

For the analyses, the grouped variable, *W-ENDSMEET* (ability to make ends meet) has three modalities:

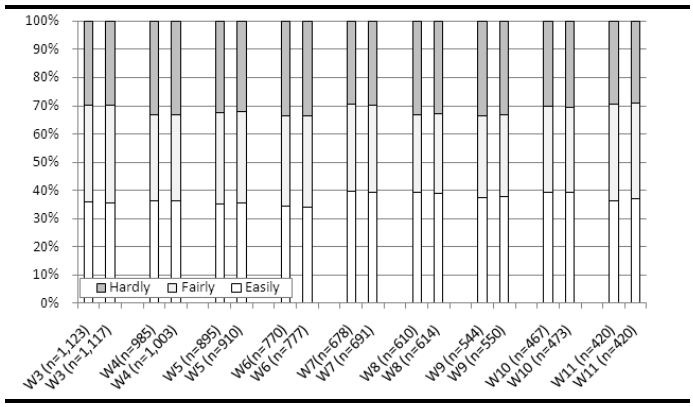
**1.** Easily (if W1H148=5, 6);
**2.** Fairly (if W1H148=4);
**3.** Hardly (if W1H148=1, 2, 3).

## *3. Imputation of the missing data and first description of the variable*

The missing data were solved by applying rule 2 first. The intermediate modality ('fairly') was imputed to the **66** elderly respondents having never answered to the question.

Graph VII-35 compares the distribution of the variable over waves, before and after imputation. No difference before-after waves are observed. There is about 40% of disabled at each wave. Slight variations in distribution are observed over waves but no clear pattern was detected.

**GRAPH VII-35:** Study sample by ability to make ends meet over the study waves, before and after imputation



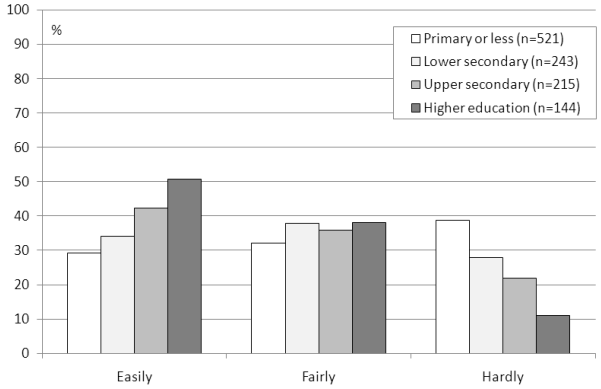

*Note:* figures are in appendix table VII-36

At wave 3, there is about a third of the study sample in each modality. These proportions are quite stable over time. But this does not mean that the elderly respondents have a stable individual trajectory: stability concerns only 36% of them (178 always hardly make the two ends meet, 82 always fairly and 142 always easily). The rest of the sample has an unstable trajectory (115 have more difficulties over time and 109 have less difficulties. Finally 497 elderly (44% of the sample) have a mixed trajectory with more difficult and less difficult periods.

## *4. Internal and association validity*

The education level (graph VII-36) and the partnership status (graph VII-37) were used for consistency validity. Higher education and elderly living in couple are expected to make the two ends meet more easily. Note that the relationship between education and ability to make ends meet may be weakened by the fact it is quite common for women of the study cohorts are to be lower educated and to be married to a higher educated men.

**GRAPH VII-36:** Ability to make ends meet distribution by education level at wave 3 (PSBH 1994)




As expected, most of the highest educated (51%) make the two ends meet easily while it is the case of only 29% of the lowest educated. At the opposite end, the lowest educated are more likely to have made ends meet hardly (39 against 11% of the highest educated).

Variation in ability to make ends meet distribution by education level over waves (PSBH 1994-2002)

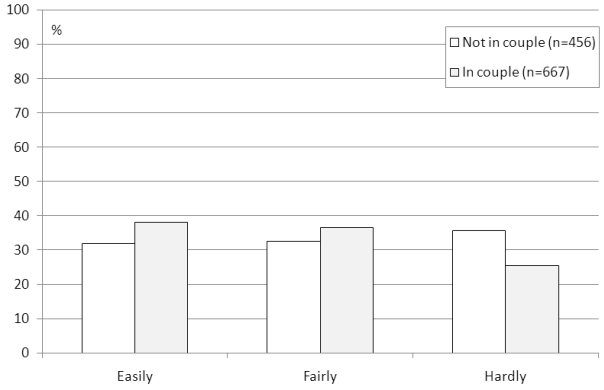
| | ABILITY TO MAKE ENDS MEET | | |
|---|---|---|---|
| **EDUCATION LEVEL** | **Easily** | **Fairly** | **Hardly** |
| **Primary or less** | (24.66-31.89) | (26.00-35.54) | (37.35-44.48) |
| **Lower secondary** | (26.55-37.69) | (26.92-38.79) | (27.98-35.59) |
| **Upper secondary** | (39.87-56.46) | (22.45-36.71) | (21.09-25.25) |
| **Higher education** | (50.69-60.80) | (22.67-38.19) | (11.11-17.44) |

*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are in appendix table VII-36.

**GRAPH VII-37:** Ability to make ends meet distribution by partnership status at wave 3 (PSBH 1994)

As expected, elderly not living in couple have more difficulties to make meet ends more easily (37% make it hardly against 25% of elderly living in couple).

(*Note:* the Chi² test is significant at 0.01% for all the waves. Detailed figures are given in appendix table VII-37.




Variation in ability to make ends meet distribution by partnership status over waves (PSBH 1994-2002)

| | ABILITY TO MAKE ENDS MEET | | |
|---|---|---|---|
| **PARTNERSHIP** | **Easily** | **Fairly** | **Hardly** |
| **Not in couple** | (28.72-36.60) | (26.44-32.46) | (34.92-42.53) |
| **In couple** | (36.60-45.56) | (27.19-36.83) | (21.08-31.12) |

For the second validation test, those who make ends meet 'easily' are chosen as reference category because they are supposed to be less likely to receive family care. Table VII-20 shows that those who hardly make ends meet are more likely to receive family care. The difference is between 'easily' and

'fairly' is less marked (and even in the opposite direction at wave 3) but still significant at all the waves.

**TABLE VII-20:** Relative risks of receiving family care by ability to make ends meet (PSBH 1994-2002)

| | | ABILITY TO MAKE ENDS MEET | | | | |
|---|---|---|---|---|---|---|
| | ***RC: Easily*** | **Fairly** | | **Hardly** | | **Chi²** |
| **WAVES** | *% care* | RR | CI 95% | RR | CI 95% | p value |
| **Wave 3** (n=1,008) | *32.51* | **0.94** | (0.97-0.92) | **1.40** | (1.20-1.64) | *** |
| **Wave 4** (n=904) | *29.82* | **1.15** | (1.09-1.21) | **1.66** | (1.37-2.01) | *** |
| **Wave 5** (n=823) | *27.18* | **1.29** | (1.18-1.42) | **1.82** | (1.47-2.25) | *** |
| **Wave 6** (n=696) | *34.02* | **1.23** | (1.12-1.34) | **1.61** | (1.31-1.98) | *** |
| **Wave 7** (n=616) | *28.63* | **1.37** | (1.18-1.59) | **1.68** | (1.31-2.15) | *** |
| **Wave 8** (n=549) | *34.05* | **1.49** | (1.28-1.73) | **1.62** | (1.35-1.96) | *** |
| **Wave 9** (n=496) | *39.02* | **1.20** | (1.10-1.30) | **1.38** | (1.19-1.61) | *** |
| **Wave 10** (n=432) | *36.47* | **1.51** | (1.26-1.82) | **1.65** | (1.32-2.06) | *** |
| **Wave 11** (n=384) | *46.48* | **1.26** | (1.09-1.47) | **1.40** | (1.13-1.74) | *** |
| **Last wave** (n=999) | *45.32* | **1.10** | (1.04-1.16) | **1.29** | (1.11-1.49) | *** |

*Note*: ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

## *CONCLUSION*

The purpose of this chapter was to present the variables selected to represent the care determinants, to correct them (in case of missing or inconsistent information) and to assess their validity. Variables were found to represent the main determinants identified in the systematic literature (chapter II) and in the Belgian studies (chapter IV). However, it the variable is available, it was not always 'ready-to-use'. The fact that some questions are not asked at all the study waves, that the responses modalities change from one wave to another, that elderly respondents may have been tired to answer again and again the same questions involved some correction, recoding and many imputations. The validation tests allowed seeing if, after correction, the analysis variable is still a valid indicator of the determinant (Is the analysis variable associated with receiving family care? Is the direction of the association consistent with the literature?). Table VII-22 summarises the main information for each analysis variable (name, modalities, imputation, expected relation with family care and variables used for the validation, derived variables).

Most of the analyses done in this chapter were carried out on each study wave (from wave 3 and wave 11) and sometimes on the 'last study wave' (which varies from one respondent to another). It allows seeing that the intensity of the relationship (measured by the relative risks) may slightly vary over time and be significant at one wave and not at another. However, **no linear evolution** over time was observed (effect increasing or decreasing wave after wave). And **no period effect** was identified (very different result at a given wave for one or several variables). It is true that the results of the two last waves (10 and 11) were more frequently non-significant, but this is due to the fact that the sample is much smaller at that time (about 500-400 respondents) and it results in small numbers for some modalities (e.g. in the older cohorts, in Brussels, etc.). Interesting is the fact that the effect of the predisposing factors on receiving family care tends to be weaker at the last study wave than at the first study wave. This can be interpreted as an **ageing effect**: during the panel, all the respondents are ageing and the socio-economic differences tend to reduce.

The consistency validation tests were satisfying in most cases. The two exceptions are the relationship between education level and the last occupational status (no relationship between self-employed and education level) and between birth cohort and health (oldest old healthier than the 1910-1914). In the two first cases, the creation of a combined variable should partly solve the problem and in the last case, it shows the presence of a **healthy selection of the oldest old**. This cannot be 'solved' but should be accounted for in the interpretation of the birth cohort effect.

**TABLE VII-21:** Summary information on the variable

| Variable name | Type of variable | Modalities (reference in bold) | # of imputed respondents | Expected relationship with family care | Variables used for validation | Derived variable |
|---|---|---|---|---|---|---|
| Elderly gender *(E-GENDER)* | TI | **0. Man**<br>1. Woman | 0 | - *Receiving family care:* Women more likely<br>- *Care aspects:* Women have more CG, are more likely to receive children care, man more likely to receive spousal care.<br>- *Care evolution:* Changes more frequent for women | - Birth cohort<br>- Marital status | No |
| Birth cohort *(E-COHORT)* | TI | **1. 1925-1929**<br>2. 1920-1924<br>3. 1915-1919<br>4. 1910-1914<br>5. Before 1910 | 0 | - *Receiving family care:* older cohorts more likely<br>- *Care aspects:* Older cohorts have more CG, are more likely to receive care for the IADL and ADL.<br>- *Care evolution:* short family care spells more frequent among younger and care aspect changes more frequent among older | - Disability<br>- Subjective health | No |
| Religiosity *E-RELIGION* | TI | **0. Non-religious**<br>1. Religious | 166 | - *Receiving family care:* religious people more likely | - Gender<br>- Region | No |
| Education level *(E-EDUCATION)* | TI | **1. Higher education**<br>2. Upper secondary<br>3. Lower secondary<br>4. Primary or less | 89 | - *Receiving family care:* Lower educated more likely<br>- *Care aspects:* Lower educated more likely to receive (intensive) children care and less likely to receive only care services than only family care. | - Gender<br>- Birth cohort | No |
| Last occupational status *(E-OCCUPATION)* | TI | 0. Never worked<br>1. Blue collar<br>**2. White collar**<br>3. Self-employed<br>4. Other | 20 | - *Receiving family care: '*Never worked' and 'blue collar' more likely.<br>- *Care aspects: '*Never worked' and 'blue collar' more likely to receive children care. | - Gender<br>- Education level | No |

**TABLE VII-21:** Summary information on the analysis variables (continued)

| Variable name | Type of variable | Modalities (reference in bold) | # of imputed respondents | Expected relationship with family care | Variables used for validation | Derived/combined variable |
|---|---|---|---|---|---|---|
| Region *(E-REGION)* | TI | 1. Flanders<br>**2. Wallonia**<br>3. Brussels | 0 | - *Receiving family care:* Flemish more likely, Brussels inhabitants less likely.<br>- *Care aspects:* Flemish have more CG, are more likely to receive care for the IADL and ADL. | - Urbanisation level<br>- Number of children | Place of living (*E-REGURB*), TI variable<br>1. Flemish city<br>2. Flemish town<br>3. Flemish countryside<br>4. Walloon city<br>5.Walloon town<br>6.Walloon countryside<br>**7. Brussels** |
| Urbanisation level *(E-URBANISATION)* | TI | **1. City**<br>2. Town<br>3. Countryside | 654 | - *Receiving family care:* elderly living in the countryside more likely | - Religiosity | |
| Subjective health *(W-SUBJECTIVEHEALTH)* | TV | **1. Good**<br>2. Fair<br>3. Bad | 43 | - *Receiving family care:* elderly declaring having a bad health status more likely | - Disability<br>- Recent hospitalisation | Health *(W-HEALTH),* TV variable<br>**0. No problem**<br>1. Subjective problem<br>2. Moderated disability<br>3. Severe disability |
| Disability *(W-DISABILITY)* | TV | **0. No**<br>1. Moderate<br>2. Severe | 67 | - *Receiving family care:* disabled elderly more likely<br>-*Care aspects:* disabled elderly more likely to receive mixed care, to receive both the ADL and IADL and of having many CG<br>- *Care evolution:* disabled elderly more likely to have a stable care trajectory or to experience increase in family care | - (Subjective health)<br>- Recent hospitalisation | |
| Recent hospitalisation *(W-HOSPITAL)* | TV | **0. No**<br>1. Yes | 57 | - *Receiving family care:* elderly recently hospitalised more likely | - (Subjective health)<br>- (Disability) | |
| Partnership status *(W-SPOUSE)* | TV | **0. Not in couple**<br>1. In couple | 0 | - *Receiving family care:* elderly living in couple more likely or less likely?<br>-*Care aspects:* elderly living in couple less likely to receive care from sons and from daughter and to have fewer GC.<br>- *Care evolution:* elderly living in couple are more likely to experience change between 'family care' and 'mixed care' than between other care combinations. | - Gender<br>- Marital status | Spouse health *(W-SPOUSEHEALTH),* TV variable<br>**0. Not in couple**<br>1. Good<br>2. Fair<br>3. Bad |

**TABLE VII-21:** Summary information on the analysis variables (end)

| Variable name | Type of variable | Modalities (reference in bold) | # of imputed respondents | Expected relationship with family care | Variables used for validation | Derived/combined variable |
|---|---|---|---|---|---|---|
| Number of children *(W-CHILDNUMBER)* | TI | **0. No child**<br>1. 1 child<br>2. 2+ children | Na | -*Receiving family care:* elderly having more children more likely<br>-*Care aspects:* elderly having more children are more likely to receive 'family care' or 'mixed care' then 'care services' and to have many CG.<br>- *Care evolution:* elderly having more children more likely to experience changes in care aspects but less likely to see family care ending. | - (Region) | **Number of daughters** *(W-DAUGHTERNUMBER), TI variable*<br>**0.** No daughter<br>1. 1 daughter<br>2. 2+ daughters<br>**Number of sons** *(W-SONNUMBER), TI variable*<br>**0. No son**<br>1. 1 son<br>2. 2+ sons<br>Family constellation *(W-FAMILY), TV variable (E-FAMILY), TI variable*<br>0. Family less<br>1. Only spouse<br>2. Spouse & daughter(s)<br>3. Spouse & son(s)<br>**4. Spouse & daughter(s) & son(s)**<br>5. Only children |
| Closest child proximity (*W-CLOSESTCHILD*) | TV | 0. Cohabiting<br>1. < 1 Km<br>2. 1-9 Km<br>3. 10-49 Km<br>**4. >49 Km/no child** | Na | - *Receiving family care:* elderly having children living nearby more likely. | - Number of children | |
| Ability to make ends meet *(W-ENDSMEET)* | TV | **1. Easily**<br>2. Fairly<br>3. Hardly | 66 | - *Receiving family care:* poorer elderly more likely | - Education level<br>- Living in couple | |

*Note*: TI: time-invarying, TV: time-varying. The consistency validation test can sometimes be used in the two directions: subjective health can be used to validate recent hospitalisation and the reverse is true. As the test was presented in the subjective health point, recent hospitalisation is mentioned as validation variable. Subjective health is also mentioned as validation variable for recent hospitalisation but brackets indicate that the analysis was done at another point.

# *INTER-PART II*

## OPERATIONALISATION OF THE HYPOTHESES

The 'theoretical' hypotheses were presented at the end of the contextual part (inter-part I). To test them on the PSBH data, they should be operationalised (translated into relationship between the PSBH variables). The characteristics of the PSBH and the independent and dependent variables were presented and discussed in the methodological part. All the elements are therefore available for the operationalisation. Like the theoretical scheme, the operational table is divided into **three parts** corresponding to the three main research questions: *'Who has ever received care?'* (ever approach); *'What are the characteristics of the received family care?'* (cross-sectional approach); *'How do the characteristics of received family care evolve over time?'* (longitudinal approach).

Within each part, the research question has been translated into **'operational variable(s)'** (column 1)[1]: in the 'ever approach', the determinants of care services use will be analysed first and the determinants of the care combination ('no care', 'care services', 'family care', 'both cares') afterwards[2]. Family care will be treated separately. In the 'cross-sectional approach', the care-giver types aspect is operationalised by three dependent variables: 'spousal care', 'daughter care' and 'son care' and the family care intensity is operationalised by the 'care-givers number' and the 'family care activities'. In the 'longitudinal approach', the evolution in care-giver types is operationalised through a unique variable, while the evolution of family care intensity is studied through the change in care-givers number and the change in activities.

One or more **theoretical hypotheses** are related to each operational variable[3] (column 2). The **expected relationships** (which will confirm the hypothesis) are specified in column 3. All the hypotheses mentioned in the theoretical scheme are present in the table, but some of them are already discarded at this stage (grey cell) because in some cases the operationalisation of the variables or the frequency of the event in the study sample make the hypothesis not 'testable' with the PSBH data. The exact reason is mentioned in column 4. Other limitations or potential moderating factors coming from the literature or to the use of the PSBH data are listed in this column. It might be that some of the hypotheses considered as 'testable' became 'non-testable' due to the 'at risk' sample definition for each analysis or other methodological choices made in the analyses part.

[1] In the theoretical scheme, the three main research questions were already translated into 'operationalisable' questions (the care characteristics were split into 'care intensity', 'care-giver types' and 'care combination'). These 'operationalisable' questions served as a basis for building the 'operationalised' care dependent variables in chapter VI.

[2] The separated analysis of 'care services use' is due to a question of sample definition (the family-less elderly can be included in the analysis on care services use but not in the analysis of care combination). This will be explained in chapter VIII.

[3] A same hypothesis may be related to more than one operational variable. For instance, the hierarchical (compensation) hypothesis is related to the care combination variable (for analysing the compensation between family and care services use) and to the three operational variables for the care-giver types - spousal care, daughter care and son care – for the compensation within the family.

**OPERATIONAL TABLE 1:** Operationalisation of the hypotheses to test in the 'ever approach'

| **'EVER' APPROACH** *('who has ever received care?')* | | | |
|---|---|---|---|
| **Operationalised dependent variable** | **Theoretical hypotheses** | **Operationalisation (expected relationship)** | **Moderating factors /limitation for the analyses** |
| Having ever received care services *[E-EVERCARESERVICES]* | Substitution hypothesis | - The family-less elderly are more likely to use care services (as they have no other potential care providers). | - No information on ADL care services=> IADL substitution can only be tested.<br>- Care services use is widespread (863/1,123=77%) and not much linked to health needs |
| Ever received (family) care *[E-EVERCOMBICARE]* | Predisposing hypothesis | - The model including only predisposing factors is significant as a whole.<br>Some predisposing factor(s) is/are significant in the full multivariate model. | |

**OPERATIONAL TABLE 2:** Operationalisation of the hypotheses to test in the 'cross-sectional approach'

| **'CROSS-SECTIONAL' APPROACH** *('What are the characteristics of the received family care?')* | | | |
|---|---|---|---|
| **Operationalised dependent variable** | **Theoretical hypotheses** | **Operationalisation (expected relationship)** | **Moderating factors /limitation for the analyses** |
| Care combination *[W-COMBICARE]* | Family solidarity hypothesis | Positive association between needs factors and 'family care' or 'mixed care' | - Information on care services use is only available for the IADL |
| | Task-specific hypothesis | - 'Technical' specialisation is more frequent among heavily dependent elderly or elderly having a chronic disease. | - Not testable because there is no information on ADL care services. |
| | Hierarchical hypothesis (between family and care services) | - Negative association between living 'in couple' and 'care-services' use or 'mixed care'. However, the relationship can be weakened or become positive when the spouse is unhealthy (no longer able to care/in need of care too).<br><br>-Number of children, having a daughter and having a child living nearby are positively associated with 'family care only' and negatively associated with 'formal care only'. | - As some couples are reluctant to use care services, a bad spousal health status may be a consequence of the 'choice' to assume alone the whole care load.<br>- Moderated by preferred care-orientation (religion, birth cohort, education level, place of living) |
| | | - Positive association between having 'only spouse' and 'care-services' use or 'mixed care'. | - Not testable because of small numbers |
| | Age and ageing hypothesis | - The initial proportion of elderly receiving (mixed) care is higher for the older birth cohorts (age effect), but increasing over time for all the birth cohorts (ageing effect). | Limited observation window |
| | Regional differences hypothesis | The Flemish are more likely to receive family care. The Brussels inhabitants are less likely to receive family care. | |
| Care from spouse *[W-SPOUSALCARE]* | Hierarchical hypothesis (between care-givers) | - Negative association with '2 care-givers +' | Under-declaration of spousal care |
| Care from daughter(s) *[W-DAUGHTERCARE]* | Hierarchical hypothesis (between care-givers) | - A positive association with 'unhealthy spouse' and a negative association with 'healthy spouse'<br>- A negative association with 'care from spouse'<br>- A positive association with $\geq$2 care-givers'<br>- A non significant association with 'ADL care' | |
| Care from son(s) *[W-SONCARE]* | Hierarchical hypothesis (between care-givers) | - A positive association with 'unhealthy spouse' and a negative association with 'healthy spouse'<br>- A negative association with 'care from spouse'<br>- A positive association with '$\geq$2 care-givers'<br>- A negative association with 'ADL care' | |
| Care-givers number *[W-CGNUMBER]* | Needs hypothesis | A positive association between needs factors and '$\geq$2 care-givers+' | |
| Family care activities *[W-CGACTIVITY]* | Needs hypothesis | A positive association between needs factors and 'ADL care' | |

**OPERATIONAL TABLE 3:** Operationalisation of the hypotheses to test in the 'longitudinal approach'

| **'LONGITUDINAL' APPROACH** *('How do the characteristics of the received family care evolve over time?')* | | | |
|---|---|---|---|
| **Operationalised dependent variable**[4] | **Theoretical hypotheses** | **Operationalisation (expected relationship)** | **Moderating factors /limitation for the analyses** |
| Changes in care combination | Substitution hypothesis | - The elderly who received spousal care and lost their spouse are more likely to make a transition to care services use than a transition to 'no care' | Not testable because of small numbers (only 60 elderly became widow(er) during the study waves). |
| | Adaptation hypothesis | - A positive association between the number of children and the stability of 'family care' and/or 'mixed care'.<br>- An increasing or a long-term disability is positively associated with an increase in care use (transition from no care to care or from family care to mixed care). | |
| Changes in care-givers type combination | Adaptation hypothesis | - No association with needs factors (changes are explained by the difficulties of the effective care-giver to continue to care in the same conditions).<br>- The changes are more likely to involve the children than the spouse. | |
| Changes in care-givers number | Adaptation hypothesis | - An increasing or a long-term disability is positively associated with an increase in care-givers number. | |
| | Substitution hypothesis | - A positive association between the transition from 'family care' to 'mixed care' and a decrease in the care-givers number. | Not testable because of small number of 'simultaneous' transitions in different care aspects. |
| | Supplementation hypothesis | - A negative association between care services use and a decrease in care-givers number. | |
| Change in care-givers activities | Supplementation hypothesis | - A negative association between care services use and less intensive activities (from ADL to IADL care only). | |
| | Adaptation hypothesis | - Increasing or long-term disabilities are positively associated with more intensive care activities (from IADL only to ADL care). | |

[4] The exact definition of the dependent variables will depend on the method used for the study of changes (see chapter X). For this reason, no variable names are mentioned and the hypotheses are formulated in terms of (a given) change or stability in the care characteristics.

# CHAPTER VIII

## EVER RECEIVED CARE

The three main research questions - Who is receiving family care? What are the characteristics of the received family care? How do the characteristics of received family care evolve over time? - were presented in the introduction. The contextual part allowed formulating hypotheses and situating the family care research questions in a theoretical framework (the Life Course approach) and within its geographical and historical context (the Belgian cohorts born in the beginning of the XX$^{th}$ century). This first part ended with a theoretical scheme structuring the various hypotheses to test. The methodological part aimed at presenting the PSBH and how the data file was prepared for the analyses. This second part ended with the operational scheme detailing how each hypothesis will be tested (what relationship is expected between which variables) and why some hypotheses cannot be tested with the PSBH data. The (third) analysis part will test the 'testable' hypotheses.

This part is divided into three chapters corresponding to the three approaches mentioned in the theoretical scheme: the present chapter presents the analyses referring to the 'ever' approach (Whether the elderly respondents have ever received care services and/or family care over the study waves?). Chapter IX will present the cross-sectional analyses on the care aspects (What are the characteristics of the received family care?) and chapter X, the longitudinal approach (How does family care evolve over time?)

Section 1 tries to answer the question 'Who has ever received care services?' for the entire study sample. Section 2 focuses on respondents having a family and deals with the question 'Who has ever received family care?'

## *SECTION 1. Who has ever received care services?*

The question on the use of care services does not directly refer to one of the three main research questions (dealing with family care). But, one of the objectives of the dissertation research was to start working on a general elderly sample. In this respect, the use of care services is an interesting question because it is the only one that can be treated on the entire elderly sample: everybody is 'at risk' of using care services. All the following questions (on family care) can only be answered for the sub-sample of respondents having a family (the 'family-members' or FM)[1]. From a social policy point of view, it is important to assess whether the care services can (partially) **substitute** family care, especially for the family-less elderly (or FL).

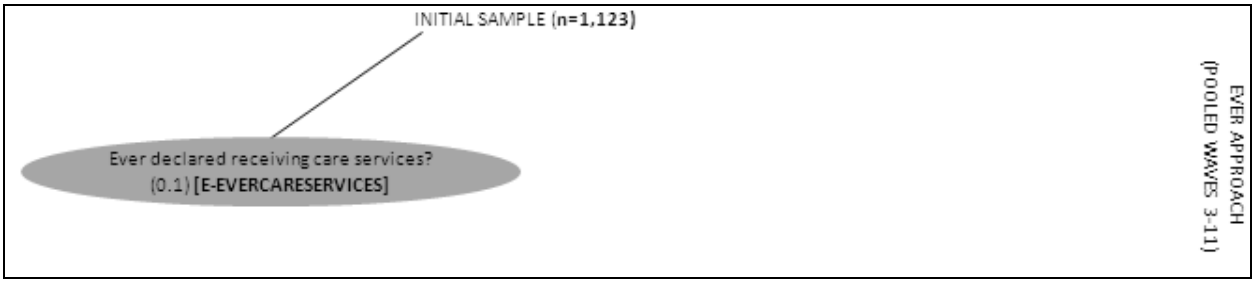
For each question, the same global structure is followed:

1. The question is situated in the 'sample scheme' and the characteristics of the elderly respondents who will be excluded from all the next analyses are given.
2. Multiple correspondence analysis (MCA) are done (whenever possible)[2] to give a picture of the analysis sample. Graph(s) is(are) displayed and commented.
3. Bivariate and multivariate logistic regression analyses are carried out to study the gross and the net effects of the independent variables. Results are displayed and a first global comment is made. Whenever possible[3], the mean predicted probability is computed for several profiles defined by the gender, region and cohort group of the elderly respondents.
4. The hypotheses related to the research questions are discussed, based on the interpretation of the regression results and/or on additional descriptive analyses.

### A. Localisation of the dependent variable in the sample scheme

The **'sample scheme'** follows the structure of the theoretical scheme. It will be progressively built over the analyses part (at each section, the treated question is added to the scheme). As the questions are getting more specific (dealing with a particular care aspect and then on its evolution), the corresponding 'at risk' study sub-sample becomes smaller accordingly. The scheme shows why and how several elderly respondents or waves are excluded at each step of the analyses.

**SCHEME VIII-1:** Localisation of the variable [*E-EVERCARESERVICES*] in the sample scheme




Scheme VIII-1 shows that the question 'having ever received (declared) care services' (coded **0.1** in the

[1] The family-less elderly should be excluded because they are not 'at risk' of receiving family care.
[2] In chapter X, the MCA will be replaced by a description of the most frequent care aspects trajectories.
[3] This will not be possible for the transition analyses presented in chapter X.

theoretical scheme) is treated on the entire sample **(1,123)** and is included in the **'ever approach'** (considering all the study waves together). The dependent variable is **'*E-EVERCARESERVICES*'.** No elderly are excluded from this analysis.

## B. Multiple correspondence analysis on the 1,123 elderly respondents

The methodological part gave some pieces of information on the characteristics of the study sample through the distribution of the main analysis variables (chapter V) and the bivariate analyses carried out in chapter VII for the validation of the independent variables. The MCA offers a first **multivariate** description of the sample (see frame VIII-1).

**FRAME VIII-1:** Multiple correspondence analysis[4]

The MCA is a kind of **factor analysis** adapted for qualitative variables and usually used for exploratory data analysis. An interesting outcome of this method is its ability to provide a **synthetic graphical representation** of the associations between several variables and their modalities.

The method, introduced by Benzecri (1973), is based on multiple cross-tabulations of the considered variables and the use of the $Chi^2$ test as measure of association. Alike factor analyses, MCA seeks to identify the main common 'dimensions' or 'factors' structuring hierarchically the associations between the considered variables. The extracted factors are standardised quantitative variables and are, by construction, independent of each other. The first dimension (factor) is the one which represents the largest share of the common 'inertia' (or variance) of the considered variables; the second dimension represents the largest share of the remaining common 'inertia' after the extraction of the first dimension; the third … and so on, alike principal component analysis.

For each modality (category) of the considered variables a 'coordinate' (or value) is calculated for each dimension. The 0 values correspond to the average profile of the sample over the all considered variables for each specific dimension. The higher its absolute value on a specific dimension, the more the modality contributes to define the dimension and the more the respondents having this specific characteristic differ from the average profile. Consequently, the lower the absolute value associated with a specific modality, the less it contributes to define the dimension and the more respondents having this characteristic are close to the average profile. Comparing the coordinates of all the modalities of the considered variables on a given dimension allows qualifying it (e.g. if the modality 'man', of the variable 'gender' has the highest negative value on dimension 1 and 'woman' the highest positive value on this dimension, one can qualify this dimension as a 'gender axis').

A common graphical representation shows how the variable modalities are situated on the two first dimensions[5]. The coordinates 0,0 are called the 'centroid' and represent the average profile of the population on the two first dimensions. The variables used to build the dimensions are usually called 'active' variables. They are to be distinguished from the 'illustrative' variables, which do not contribute to the construction of the dimensions, but can be projected on the maps.

Proximities between modalities are to be interpreted the following way: if two modalities of a same variable are very close, it means that the respondents having those characteristics are quite similar over all the other considered variables; if two modalities belonging to different variables are very close, then an important proportion of the respondents having one of the close characteristics has also the other one and *vice versa*.

[4] For more information on the method, see Clausen (1998) Lebart *et al.* (2006), Le Roux & Rouanet (2010). For an example of the method applied to an elderly sample, see Loriaux & Remy (2006).

[5] If necessary, other 'maps' can be presented, e.g. if the third dimension is considered as important, the modalities can be situated on a map crossing the first and the third dimensions or the second and the third.

The MCA will often confirm the bivariate associations previously observed, but it will also show clustering of characteristics: e.g. in the contextual part, we have shown that being a woman, very old and spouseless are often associated, meaning that these characteristics should be close to each other on a MCA map.

A MCA will be conducted on each analysis (sub) sample and will consider the 'candidate' variables for the regression analyses. Therefore, the MCA should allow identifying important changes in the structure of the sample from one analysis to another. Furthermore, the MCA may be useful for the interpretation of unexpected results which might be explained by 'proximities' (indicating potential multicollinearity problems) between some of the characteristics included in the regression models (e.g. if most of the oldest old are women, the respective effects of these two variables may be difficult to disentangle in the regression analysis).

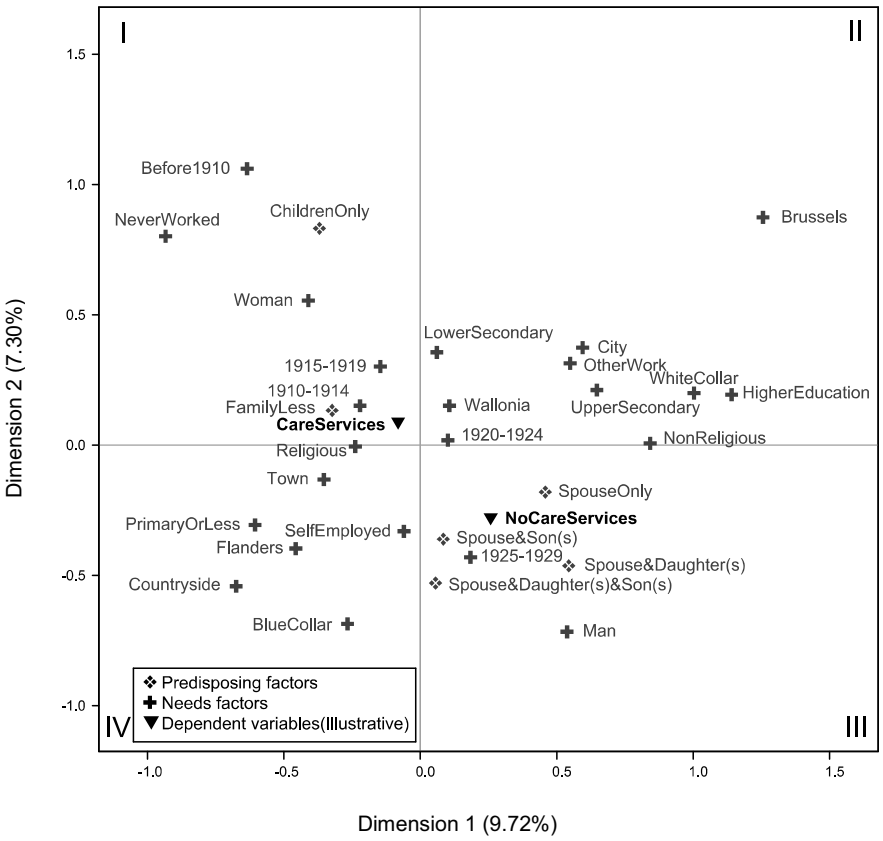
For the question 'ever received care services', a MCA is done on the 1,123 elderly respondents. As we are in the 'ever' approach, only the **time-invarying** variables can be used as determinants[6]: they are the predisposing factors and the time-invarying specification of the family constellation variable, *E-FAMILY*. It was decided not to use the combined variables in the MCA except for the family constellation. Indeed, by using the 'initial' variables (e.g. *E-URBAN* and *E-REGION* rather than their combination, which is the *E-LIVINGPLACE*, we can better show how these variables are associated (graph VIII-1).The dependent variable *E-EVERCARESERVICES* is treated as an illustrative variable.

The first dimension explains 9.72%[7] of the common variance and is mainly defined by **'cultural' variables**, opposing characteristics associated with family care orientation at the left side (living in countryside, being Flemish, lower educated or having never worked) to characteristics associated with non-family care orientation (Living in Brussels or in another city, being white collar, higher educated and non-religious). The second dimension explains 7.30% of the common variance and can be considered as a **gender axis** opposing women and associated characteristics (very old, never worked, spouseless/having only children) at the top, to men and associated characteristics (living in couple, being younger), at the bottom.

[6] It is not possible, for instance, to measure the effect of the health status on the fact of ever receiving care services, because the value of the variable changes over time. It is, of course, possible to choose the value at a given wave but it does not make much sense (how to interpret the effect of having moderate disability at wave 3 on ever receiving care services at any of the study waves?)

[7] This proportion seems rather small, but it is usual to find such results when analysing individual-level data on many active variables having several modalities. The total number of dimensions= total number of modalities – total number of variables. In graph VIII-1, 30 modalities belonging to 8 variables are 'active'. Therefore, the total inertia is divided into 30-8=22 independent dimensions which are hierarchically sorted according to the proportion of explained inertia. Therefore, having a first dimension explaining about 10% of the common variance is not 'so bad' (Lebart *et al.* 2006). In this case the first 'map' defined by the two first dimensions explains 18.02% of the total inertia.

**GRAPH VIII-1:** Multiple correspondence analysis on the 1,123 elderly respondents (PSBH 1994-2002)




Considering the four quadrants of the graph, starting with the upper left one, the position of the illustrative (dependent) variable *E-EVERCARESERVICES* can be interpreted the following way: although close to the centroid, the modality 'care services' is in the **quadrant I** indicating that older, lower educated and family-less women tend to be more likely to receive care services. The position of the modality 'no care services' (**quadrant III**) is clearer: as it is quite close to the elderly men living in couple and/or having children and to the younger cohorts, it means that they are less likely to receive care services.

## C. Logistic regression on 'having ever received care services'

All the dependent variables presented in chapter VI are qualitative. The most common and easiest method to analyze them is the logistic regression. According to the number of modalities (two or more) and the numbers of observations used by respondent (one or more), some modifications to the method will be made. But the general principles (frame VIII-2) remain the same.

**FRAME VIII-2:** Logistic regression (principles)[8]

The logistic regression is a type of regression especially fit to **qualitative dependent variables** ('binary/binomial' logistic regression for a dichotomous dependent variable, 'multinomial' for a nominal dependent variable and 'cumulative' or 'proportional' odds model for an ordinal dependent variable). There are many similarities between the OLS (ordinary least square) and the logistic regressions. Indeed, the logistic regression was created because using a qualitative dependent variable in an OLS multiple regression implies violating some of its basic assumptions (linearity of the relationship between independent and dependent variables, normality of the variable distributions, homoscedasticity …) (see Allison 1999a). Logistic regression allows measuring the effect of quantitative and qualitative (through dummies) independent variables (or predictors) on a qualitative dependent variable (such as the dichotomous variable 'having ever received care services'? Yes or not). The method applies the **maximum likelihood estimation** after having transformed the dependent into a **logit variable** (the natural log of the odds of the dependent when it occurs or not). It is common to convert the obtained beta coefficients (expressed in log odds) into odds ratios (OR) by taking the exponential function of the beta ($e^b$). For instance, in table VIII-1, in the bivariate regression, the OR of being a woman is equal to 1.77 (which is the result of $e^{0.571}$ with 0.571 being the log odds initially estimated by the model, not shown in the table). The **odds** is a non-negative number which compare the likelihood of an event $Y_1$ to the likelihood of another event $Y_2$ (or the absence of the event $Y_1$) for a given modality. For instance, the odds of having ever received care services (event $Y_1$) for women (the given modality) is equals to the proportion of women having ever received care services (81.33%) divided by the proportion of women having never received care services (18.67%). The **OR** will compare the odds of the event for each given modality to the odds of a selected reference category. In the example, OR for women= $odds_{care\ services}$ (woman)/$odds_{care\ services}$ (man, the reference category) = (81.33/18.67)/(71.08/28.92)=1.77. The OR is always a non-negative number. When its value is <1, it means that the event is less likely to occur in the given modality than in the reference category; when its value is >1, it means that the event is more likely to occur in the given modality that in the reference category. When its value =1, it means that there is no difference between the given modality and the reference category. In the example, we may say that 'women are more likely of having ever received care services than men' or that 'the odds of having ever received care services for women are 1.77 the odds of men' or that 'women are nearly two times more likely to have ever received care services than men'.

For each OR, it is possible to compute a confidence interval to assess whether or not, the effect is significant at 90%, 95% or 99%. But it is also possible (as it will be done here) to use the results of the $Chi^2$ test carried out for each beta (log odds) during the model estimation.

Concerning the global fit of the model, the logistic regression does not allow computing a $R^2$ like in OLS regression. The most common measure of model fit use is the -2 Log-Likelihood (-2LL). It tests the null hypothesis that all the beta coefficients are equal to zero or, in other words, it compares the fit of the model with predictors to the 'intercept only' model. If the two models differ significantly, the null hypothesis should be rejected and the model 'with predictors' should be preferred because the fit is better. The lower the value of the -2LL, the better the model fit[9]. To compare different models 'with predictors', other statistics derived from the -2LL can be used. For instance, the 'Akaike Information Criterion' (AIC) (Akaike 1973) allows comparing the fit of non-nested models. Like the -2LL, the AIC test the null hypothesis that all the beta coefficient are equal to zero and like the -2LL, a lower value of AIC means that the model fits better, but unlike the -2LL, the AIC accounts for the number of parameters estimated by the model (Singer & Willett 2003).

[8] Among the reference texts on the method: Menard (1995), Hosmer & Lemeshow (2000), Agresti (2002).

[9] There is not consensus on a 'rule of thumb' which would allow stating that the difference is rather large or rather small (Singer & Williet 2003). The Hosmer-Lemeshow statistic developed in the 80s (Hosmer & Lemeshow 2000) is sometimes used to identify a problem of 'lack of fit', but this statistic is often criticised for its lack of accuracy in detecting incorrect models (Allison 1999a; Agresti 2002). Several pseudo-$R^2$ were also developed (e.g. McKelvey & Zavoina 1975; Aldrich & Nelson 1984; Cox and Snell 1989; Nagelkerke 1991). However, they cannot be interpreted as an $R^2$ (in terms of part of the explained variance) and are not bounded to 0-1 like the $R^2$. They can even take negative values, leading to be very cautious when using and interpreting them (Allison 1999a; Snijders & Bosker 1999; Singer & Williet (2003). For this dissertation, it was decided not to use these measures, because none of them seems to reach consensus in the scientific community. The analysis of the goodness of fit will be thus restricted to the measure of the -2LL and AIC and of their significance level.

As the dependent variable 'having ever received care services' has two modalities: 0=no ('failure' or 'no event'), 1=yes ('success' or 'event'), a **binary logistic regression** will be carried out. Note that, at this stage, the presence of family care is not accounted for: respondents who have ever received care services (and family care) during the study waves are considered as 'care services receivers'. Respondents who have never received care (or have only received family care) during the study waves are considered as 'non care services receivers' (the reference category[10]). This might reduce the effect of some variables but this is the only way to carry out the analysis on the entire sample.

The variables included in the regression multivariate 'full[11]' model of 'having ever received care services' comprises all the predisposing factors (using the combined variables), the time-invarying version of the family constellation variable and the attrition status (*E-ATTRITOR*)[12].

## *1. Preliminary verifications*

Before carrying out a regression analysis, the sample size (1) and the absence of multicollinearity (2) are verified for each regression:

1. According to Peduzzi *et al.* (1996), each modality of the dependent variable should have at least **10 observations** for each modality in the model. A cross-tabulation of each independent variable with the dependent variable is done to verify if the rule is respected. The criterion is considered as a 'sample size' criterion because one may expect that in very large samples, the criterion of 10 observations will easily be met, while in smaller samples, the criterion serves as a warning signal, telling the researcher that a given event cannot be analysed because too few cases are observed.
2. As suggested by Ménard (1995) and Allison (1999a), a 'tolerance' measure is used to identify possible multicollinearity problems an OLS regression should be carried out including all the independent variables. "The tolerance is computed by regressing each variable on all the other explanatory variables, calculating the $R^2$, and then subtracting that from 1." (Allison 1999a: 50). According to Allison, a tolerance below **0.4** for one of the modalities of the variables introduced in the regression indicates the presence of multicollinearity.

The results of these two analyses are not shown but in case of problem, the concerned variables are mentioned and the chosen solution is presented.

In the present situation (regression on 'having ever received care services'), the 'oldest old' cohort (born before 1910) did not meet with the sample size criterion (only 6 of them did never receive care services). The taken decision is to regroup the two oldest cohorts into the modality 'before 1915' for all the next analyses[13].

[10] Binary logistic regressions were also carried out on a sub-sample (n=1,012) excluding respondents who **only** received family care (to compare those receiving care services and those receiving no care) and on the even more selected sub-sample (n=391) excluding respondents who have ever received family care (to compare those receiving **only** care services to those receiving no care). The results (not shown) were quite similar (same significant variables).

[11] Full indicates that the model includes all the independent variables. This adjective allows distinguishing it from other multivariate models which only include part of the independent variables (e.g. only time-invarying variables).

[12] This variable is introduced to control for the attrition status (see chapter V). It is a time-invarying variable having two modalities 'attritor' and 'non-attritor'. Following the general rule (the modality being the least 'at risk' of receiving family care is used as reference), the 'attritors' are chosen as reference: as they are observed for a shorter period, they are expected to have fewer opportunities to receive family care.

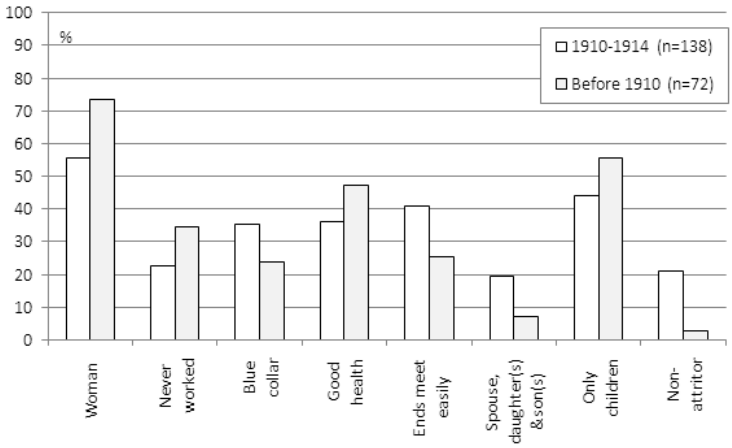
[13] Note that the decisions are usually cumulative: if a grouping or recoding is applied for one analysis, it will also be done for the next questions unless the preliminary verifications indicate that it is not possible.

Before doing that, it might be interesting to look at the specificities of the 72 respondents born before 1910 and to see if they are quite similar to the 1910-1914 with whom they will be regrouped. (frame VIII-3).

**FRAME VIII-3:** Zoom on the 72 oldest old

In chapter VII, it was noticed that respondents born before 1910 were **healthier** than the 1910-1914 cohorts; the highest proportion of **women** in the group was also mentioned (74% against 55% among the 1910-1914). In chapter V, we saw that the **attrition rate** was the highest is this cohort (97%). The other characteristics of the sample at wave 3 were distributed by cohort in the present chapter (see appendix table VIII-1). Graph VIII-2 shows only the characteristics for which a difference of 10% or more is observed between the birth cohorts '1910-1914' and the 'oldest old' at wave 3.

**GRAPH VIII-2 :** Main differences between the '1910-1915' and the 'oldest old' (PSBH 1994)

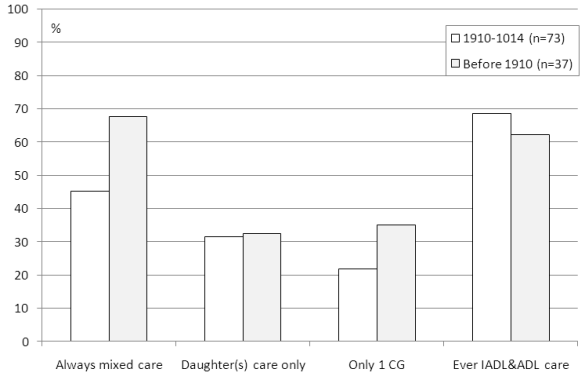



Alongside the gender, health status and attrition rate above-mentioned differences, the oldest old are less likely to make ends meet easily, to be blue collar and to have spouse, daughter(s) and son(s). They are more likely to have only children and to have never worked.

Among the 57 oldest old who are 'family-members', 37 have received both family and care services over the study waves, 17 only received care services and 3 have never received any care. None of them received family care only. Among the 37 'family care-receivers', the most frequent observed characteristics are: receiving mixed care at all the study waves (n=25), having received IADL&ADL care at least once (n=23), having only one care-giver at the same time (n=13), receiving only care from daughter(s) (n=12). Graph VIII-3 compares the frequencies of these characteristics between the 37 'oldest old' and the 73 '1910-1914' care-receivers.

We can see that, the proportion of family care-receivers who are only cared by daughter(s) is similar in both cohorts. The oldest old are slightly less likely to have received care for the IADL&ADL: this is consistent with their 'health' selection. They seems to be more likely to combine care services with one care-giver (higher proportion of 'always mixed care' and of 'only 1 care-giver (CG)') while the 1910-1915 are more likely to have multiple care-givers and less likely to receive always mixed care (figures are in appendix VIII-2).

**GRAPH VIII-3**: Comparison of the frequencies of some care characteristics between the oldest old and the '1910-1914' (PSBH 1994-2002)



The presence of large differences between the two cohorts on some characteristics increases the heterogeneity in the regrouped category 'born before 1915' (which will also be named 'the very old'). However, the oldest old have a higher attrition rate and, therefore, their proportion among the very old decreases over time: from 34% at wave 3 to 6% at wave 11 (detailed figures in appendix table VIII-3). Therefore, the 'very old' modality is getting closer to the '1910-1914' over time.

Concerning the second verification, a multicollinearity problem was identified between gender and the last occupational status (97% of the 'never worked' are women). Therefore, it was decided to suppress the last occupational status for the multivariate analyses. The education level will serve as sole measure of the socio-economic background. A multicollinearity test was performed again (without the last occupational status). The results showed that one of the education modalities had a tolerance lower than 0.4. This indicates again a multicollinearity problem. It was solved by recoding the education level into a dichotomous variable: ('Primary or less'=1, 'secondary or more'=0). The cutting point decision was based on the variable distribution: 46.39% of the 1,123 elderly have no more than a primary school diploma. The test was repeated with the dichotomous education variable and it did not show any multicollinearity problem. The detailed education variable and the last occupational status will continue to be used for descriptive purpose in the next MCA.

## *2. Binary logistic regression analysis*

The results of the bivariate and multivariate regressions are displayed in table VIII-1. The OR provided by the bivariate regression are also called 'crude OR' because they are obtained without controlling for other important or confounding variables. In contrast, the term of 'adjusted OR' or simply 'OR' usually refers to the OR obtained in a multivariate model.

The first column gives the variable names and their modalities, the reference category[14] (rc) and the number of observations (here: respondents) for each of them. The second column gives the proportion of respondents 'having ever received care services' for each modality of the predictors. The third column gives the results of the bivariate regression carried out for each independent variable: odds ratios 'OR' and significance level 'sig' for each parameter and the 'Akaike Information Criterion' (AIC) for the model. The fourth column gives the results of the 'full' multivariate model. Note that the model fit information is displayed at the bottom of the table. Both the AIC and the -2 Log-Likelihood (-2LL) are given. The first is used for comparison with other models with predictors, and the second is used for the comparison with the 'intercept only' model.

[14] The choice of the reference category is explained in chapter VII: the general principle is to take the modality which is, according to the literature, the least 'at risk' of receiving family care (men, spouseless, healthier, etc.).

**TABLE VIII-1:** Binary logistic regressions on 'having ever received care services' [*E-EVERCARESERVICES*] (PSBH 1994-2002 pooled sample, n=1,123)

| PREDICTORS | % Care services | BIVARIATE REGRESSIONS OR | MULTIVARIATE 'FULL' MODEL OR |
|---|---|---|---|
| **Gender** | | AIC: 1,203.12 | |
| *rc: Man (n=491)* | 71.08 | | |
| Woman (n=632) | 81.33 | **1.77 *** | 1.27 |
| **Birth cohort** | | AIC: 1,167.37 | |
| *rc: 1925-1929 (n=378)* | 66.67 | | |
| 1920-1924 (n=346) | 74.86 | **1.49 ** | **1.47 ** |
| 1915-1919 (n=189) | 86.24 | **3.14 *** | **2.92 *** |
| Before 1915 (n=210) | 91.00 | **4.50 *** | **4.41 *** |
| **Religiosity** | | AIC: 1,213.96 | |
| *rc: Non-religious (n=251)* | 71.31 | | |
| Religious (n=872) | 78.44 | **1.46 ** | 1.30 |
| **Education** | | AIC: 1,219.33 | |
| *rc: Secondary or more (n=602)* | 76.74 | | |
| Primary or less (n=521) | 76.97 | 1.01 | 0.80 |
| **Living place** | | AIC: 1,219.08 | |
| Flemish city (n=160) | 73.75 | 1.15 | 1.20 |
| Flemish town (n=181) | 80.11 | **1.65 * | **1.86 ** |
| Flemish countryside (n=169) | 77.51 | 1.41 | **1.64 * |
| Walloon city (n=208) | 74.04 | 1.17 | 1.45 |
| Walloon town (n=153) | 79.74 | **1.61 * | **1.72 * |
| Walloon countryside (n=104) | 84.62 | **2.25 ** | **2.75 *** |
| *rc: Brussels (n=148)* | 70.95 | | |
| **Family constellation** | | AIC: 1,157.82 | |
| Family-less (n=115) | 88.70 | **3.16 *** | **2.70 *** |
| Only spouse (n=76) | 68.42 | 0.87 | 0.88 |
| Spouse & daughter(s) (n=194) | 69.07 | 0.90 | 0.98 |
| Spouse & son(s) (n=125) | 62.40 | **0.67 * | **0.67 * |
| *rc: spouse, daughter(s) &son(s) (n=276)* | 71.38 | | |
| Only children (n=337) | 89.02 | **3.21 *** | **2.41 *** |
| **Attrition status** | | AIC: 1,212.07 | |
| *rc: Attritor (n=703)* | 74.25 | | |
| Non-attritor (n=420) | 81.19 | **1.50 *** | 1.20 |
| **MODEL INFORMATION** | | | |
| **Intercept only**: -2LL=1,215.33; AIC= 1,217.33; **Multivariate model**: -2LL=1,076.97; AIC= 1,114.97 | | | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

Three quarters of the elderly respondents (863/1,123=**77%**) have used care services at least once over the study waves.

All the **bivariate** regressions have at least one significant parameter but the model having the best fit are the family constellation (AIC=1,157.82) and the birth cohort (AIC=1,167.37). It indicates that these variables better explain the use of care services than the others (without control).

The full model has a -2LL of 1,076.97 which is much lower than the -2LL of the **'intercept only' model** (1,215.33). Only four variables are **still significant** in this model: the birth cohort, the place of living, the family constellation and the attrition status.

As expected, the **older** the respondent, the more likely he is to have ever used care services. This is probably an 'age' (or 'ageing' effect) rather than a cohort effect: as they become older, the likelihood of needing care is increasing. The null hypothesis of the absence of an ageing effect could be rejected by the analysis of care services use at the wave level: for all the birth cohorts, the proportion of care services use is higher at their last study wave than at the first study wave because they are all ageing during the panel (see figures in appendix table VIII-4).

Against expectations[15], elderly living in a **city** are less likely to have ever used care services than elderly living in towns or in the countryside. Indeed, the Walloon elderly living in the countryside are the most likely (OR=2.25) to have ever received care services (while a higher level of use of services was expected in Flanders where care services are better developed). Several interpretation tracks can be proposed:

- First, the elderly living in the countryside or in small towns may have closer relationships with their neighbourhood than in the city (more anonymous). Therefore, rural elderly may be more likely to receive non-family informal care (included in the care services). Evidence in favour of this interpretation can be found when the 'place of living' and 'unpaid/paid care services' variables are cross-tabulated (not shown): significant differences are only observed for unpaid services. In other words, rural elderly are significantly more likely to use unpaid (usually informal) care services, but not significantly more likely to use paid (usually formal) care services.
- Second, the rural elderly may be less likely to have a child living nearby (and available for caring) especially in Wallonia where the countryside is usually more distant from cities than in Flanders. This interpretation track seems quite unlikely given the results of the cross-tabulations between the place of living and the proximity of the closest child variable: the rural elderly are as likely to have a child cohabiting or living very close to them than the urban elderly.
- Third, it should be noticed that formal care services are quite well developed in the Belgian countryside. Coordination services specialised in rural at-home care (*Aide à Domicile en Milieu Rural*- ADMR in Wallonia and *Landelijke Thuiszorg*-LTZ in Flanders) are developing both in the Walloon and Flanders regions. If they remain more developed and diversified in urban areas, there are some aspects which may complicate their actual use (professionals helpers might have more difficulties or reluctance to visit elderly people living in suburbs known as 'insecure' or in crowded places where no car park is available[16]. In addition, language problems can occur for Dutch speaking elderly living in Brussels who have more difficulties to find Dutch speaking professionals (Deboosere *et al.* 2007).

As for the **family constellation** variable, it was expected that the family-less elderly would be more likely to have ever used care services than all the family-member constellations. Although, they are significantly more likely (OR=2.70) to use care services than the respondents having a spouse, daughter(s) and son(s) (rc), they are not the only ones. Respondents having only children are nearly as

[15] It was expected that respondents living in the city would be more 'non-family oriented' and more likely to use care services (which are usually better developed in urban areas). So far, we cannot see if the urban elderly are 'non-family oriented' because the regression did not account for the presence of family care used but we can already state that urban elderly are less likely to use care services in general.

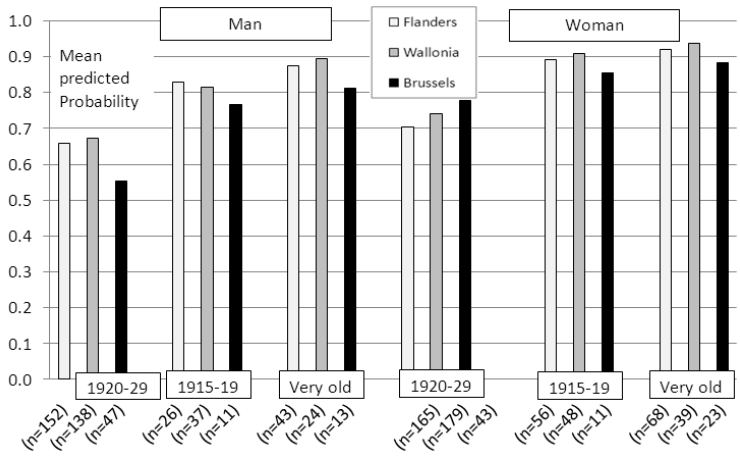
[16] These difficulties were mentioned by social workers of at-home care services coordination I worked with in Brussels when I did my graduate thesis on at-home formal care services use (Masuy 2006).

likely to use care services (OR=2.41). Therefore, it seems that care services use is rather determined by the fact of having a spouse or not ('family-less' and having 'only children' have in common to be spouseless constellations), rather than having a family or not. Whatever the type or the numbers of care services concerned (cross-tabulations not shown), the spouseless are always the most frequent users. This suggests that care services are used as a substitute for spousal care (see point D).

Finally, as it was expected, **non-attritors** are more likely to have ever used care services.

To conclude this general comment on the regression analysis, the means of the predicted probability of 'having ever received care services' was computed for the 18 profiles (all the combinations of gender, region and cohort groups: 1920-1929, 1915-1919, the very old). This will be done at the end of the regression presentation and serves as a *fil rouge*. The three variables used for the profiles are key socio-demographic determinants of care: they allow having an idea of the cultural differences (through gender and regional differences) and of the cohort or ageing effect. The profiles approach complements the analysis of the OR by comparing the predicted probability of receiving care (or a specific care aspect) by subgroups of respondents sharing the same socio-demographic characteristics. Graph VIII-4 shows that men born between 1920 and 1929 living in Brussels are the least likely to 'have ever received care services' (mean predicted probability=0.56) and very old women living in Wallonia are the most likely (0.94). Brussels inhabitants are less likely to have ever used care services whatever the gender and the cohort group. The graph also highlights an age or cohort effect for both genders and shows a small gender difference (women being more likely to use care services) for all cohorts groups and regions.

**GRAPH VIII-4:** Mean predicted probability of having ever received care services by gender, region and cohort group (PSBH 1994-2002, n=1,123)




*Note:* Probabilities are computed on the full binary logistic model, controlling for religiosity, education level, family constellation and attrition status. Figures are in appendix table VIII-5.

## D. Hypothesis to test: care services substitution for the IADL

The main hypothesis for the use of care services concerns its substitutability to family care. From a social policy point of view, it is important to investigate whether care services can allow family-less elderly to stay longer at-home. The PSBH only allows testing the substitutability for IADL care (as no information on ADL care services is provided in the data). The multivariate regression analysis has already shown that spouseless elderly were more likely to have ever received care services than elderly living in couple. Indeed, the IADL are usually part of the household tasks division. If one of the spouses cannot longer assume his share of the IADL tasks (e.g. the husband was 'in charge' of doing the shopping), it is quite likely that the other spouse will try to assume it. If we consider only the partnership status, without making a difference between the various family constellations, 89% of the spouseless elderly have ever used care services against 69% of the elderly living in couple. Spouseless elderly are living alone in most cases and cannot delegate the IADL tasks that become too heavy for them. Children care, if any, even from close living children is not always a solution , as children usually have 'competing' roles (their job, own children, spouse, family-in-law, etc.): the use of care services is often chosen to alleviate or to substitute for children care.

To test the substitution hypothesis, the effect of the family constellation has to be completed by taking the health status of the respondents into account: **if the distribution of health among family-members receiving only care services is quite similar to the distribution of health of those (family-members) receiving only IADL family care, we may conclude that there is evidence of substitution for IADL care.**

It is also interesting to compare the health distribution of family-less and family-members who only use care services. **If the health status of the family-less elderly is globally better (whatever they use care services or not) than it is for family-members, this suggests that the family-less elderly of the study sample are health selected (the family-less with a poorer health status having already moved to an institution). *On the contrary,* if there are no (large) health differences between family-less and family-members elderly and if the health status of the family-less elderly using care services is poorer than the one of those (family-less) receiving no care and quite similar to the health status of family-member elderly receiving care services and/or family care, then there is evidence of substitutability: use of care service is associated with the health status whatever the family constellation.**

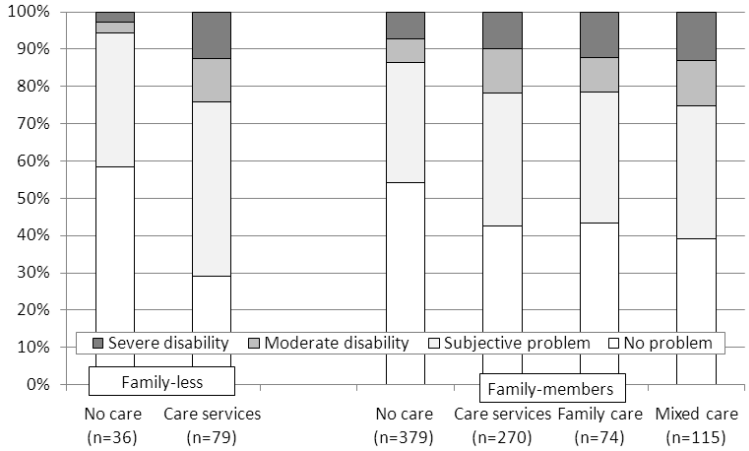
As the health status variable is a time-varying variable, the analysis should be done at the **wave level** using the *W-CARESERVICES* variable. Furthermore, as information on care services only concerns the **IADL,** the analysis will be restricted to waves where the elderly receive no care or IADL care only. This wave sub-sample refers to situations where the elderly are healthier than those receiving ADL family care: considering all the study waves (n=6,561), 43.18% of the waves refer to situations where the elderly have 'moderate' or 'severe' disability while this is the case for only 29.54% of the waves of the sub-sample (the 5,395 study waves with elderly receiving no care or IADL care only).[17]

Graph VIII-5 shows the distribution of health by family-membership and care combination at wave 3. The table below gives the variation of the health distribution over waves for each group (exactly how it was done for the validation in chapter VII).

[17] Note that the time-invarying family constellation variable can still be used. It implies that respondents having no children and losing their spouse during the study waves are included in the family-members group.

The substitution hypothesis is supported by the graphs: the health status of family-members elderly receiving only care services is quite similar to those receiving only family care. Among the family-less, those receiving care services have a poorer health than those receiving no care and quite similar (regarding the proportion of disabled)[18] to the one of the family-members elderly receiving care services and/or family care. Note that the over waves variation in health status by care combination is higher[19] among the family-less but it is usually not significant due to small numbers (see figures in appendix table VIII-6).

**GRAPH VIII-5:** Health by IADL care combination and family membership at wave 3 among elderly receiving 'no care' or 'IADL care only' (PSBH 1994, n=953)



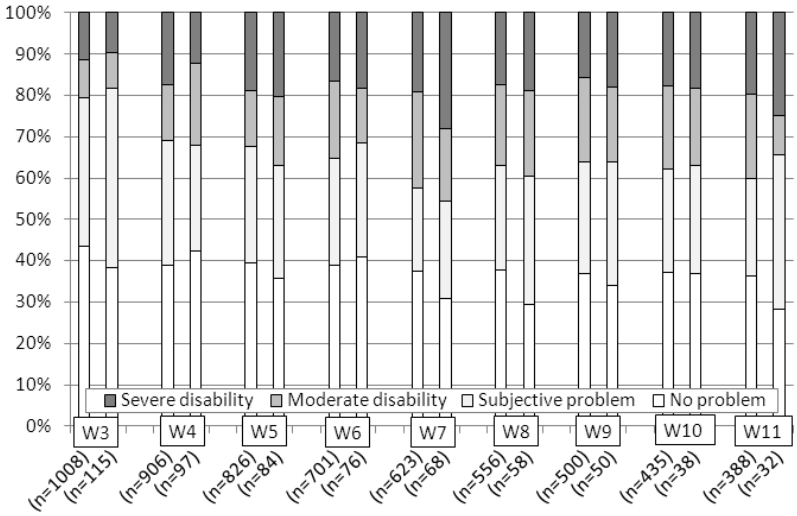

Variation of health by IADL care combination and family membership over study waves (PSBH 1994-2002)

| | CARE COMBINATION BY FAMILY MEMBERSHIP | | | | | |
|---|---|---|---|---|---|---|
| **HEALTH** | **FL: No care** | **FL: Care services** | **FM: No care** | **FM: Care services** | **FM: Family care** | **FM: Mixed care** |
| **No problem** | (41.67- | (19.23-36.54) | (49.64- | (34.97-47.32) | (30.56-50.00) | (21.98-39.13) |
| **Subjective problem** | (17.24- | (23.08-46.84) | (23.81- | (15.10-35.56) | (18.52-41.67) | (22.35-39.13) |
| **Moderate disability** | (0.00- | (11.39-21.74) | (6.60-17.00) | (11.85-26.56) | (9.46-21.05) | (13.04-27.59) |
| **Severe disability** | (0.00- | (12.66-32.69) | (4.32-9.90) | (10.00-20.35) | (5.26-25.93) | (13.04-27.59) |

To see if there is a (higher) health selection among the family-less elderly (which will show a limitation of the substitution hypothesis), we will compare their health status to the one of family-members at each wave. If the difference is always present or progressively appears over waves in the sense that the proportion of healthy family-less become relatively higher over waves or at the late waves, we will consider that there is a health selection of the family-less. In graph VIII-6, the left bar of each pair represents the family-less and the right bar the family-members. If there are slight health differences between the two groups, they are never significant[20]. No clear trend is observed over waves, therefore we cannot conclude to a strong health selection of the family-less. **This is no evidence against a possible substitution of care services to IADL family care.**

[18] Note that the proportion of respondents having no health problem and receiving care is higher among family-members. This may show that care can be provided even if there are no (real) needs.
[19] This may be explained by the fact that family-members receiving ADL family care (which is associated with a poorer or an instable health) are excluded from the analyses while all the family-less are included.
[20] A Chi² test was done on each study wave between health and family membership (family-less/family-member). None of the results were significant.

**GRAPH VIII-6:** Health by family membership over the study waves
(PSBH 1994-2002)




*Note:* In each pair of bars, the left represents the family-less, the right represents the family-members.

## *SECTION 2. Who has ever received family care?*

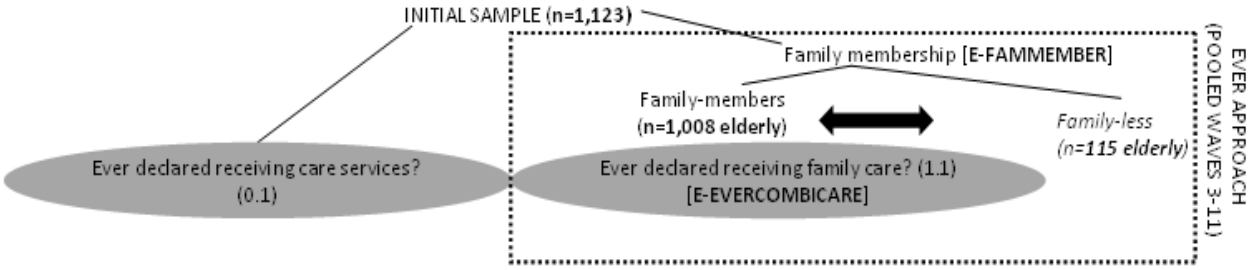
The second question concerns ever received family care. The purpose here is to assess whether or not there are **predisposing factors making some elderly respondents more likely to ever receive family care.** The literature has shown the importance of the needs on the likelihood of receiving care but we also saw that respondents may have different care 'orientations' (preferring receiving family, community or non-family care). These orientations are likely to be time-invarying and to influence the care combination at any moment. It was hypothesised that younger cohorts, white collars, higher educated, living in city and being non-religious were characteristics associated with 'non-family' orientation and thus to a lower likelihood of having ever received family care, that the Flemish were more likely to be 'community oriented' and thus more likely to have ever received family care and/or care services and that older cohorts, blue collars, lower educated, living in the countryside and being religious are characteristics associated with family orientation and thus to receiving only family care. As it was shown in the previous question, the family constellation[21] has an important effect on ever receiving care. It may be expected that respondents living in couple are more likely to declare having received family care only (or no care in case of under-declaration of family care) and that respondents having only children are more likely to receive care services or mixed care (as it is shown in the previous question).

[21] This variable is an enabling but not predisposing factor. Its effect on 'having ever received family care' will not be considered to test the hypothesis.

## A. Localisation of the dependent variable in the sample scheme and excluded observations

To study the question on 'having ever received family care', the 115 elderly family-less respondents were excluded (italicised in scheme VIII-2) as they are not 'at risk' of receiving family care[22]. The analysis will thus be done on the 1,008 family-members elderly.
Rather than using a dichotomous variable ('having ever received family care'?: yes or no), it was decided to use the **multinomial variable *E-EVERCOMBICARE*** ('ever received care') which also accounts for the presence of care services (see presentation in chapter VI). This will allow seeing if respondents who have ever received both family care and care services (both cares) are more similar to respondents having only received family care or to those having only received care services.

**SCHEME VIII-2:** Localisation of the variable [*E-EVERCOMBICARE*] in the sample scheme



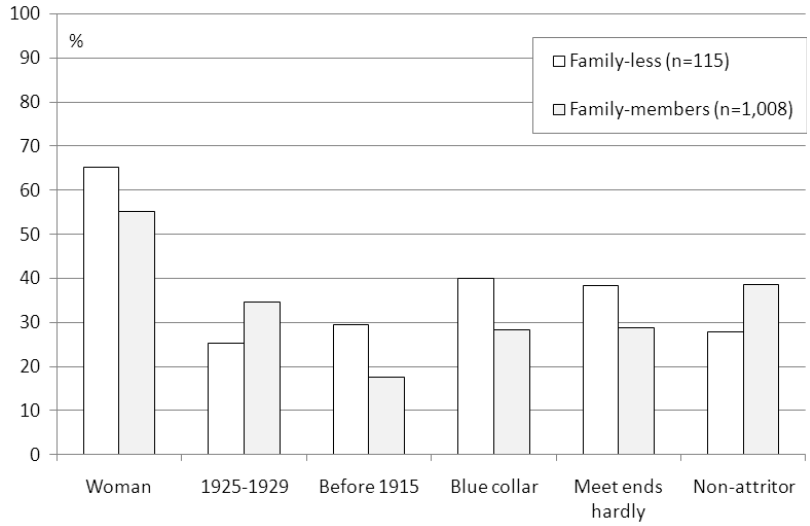

Before starting the analyses on family care, it might be useful to make a short description of the excluded sub-sample, which concerns the family-less elderly (frame VIII-2).

**FRAME VIII-2:** Zoom on the 115 family-less elderly

From the study of having ever received care, we have already learnt that the family-less elderly do not have a very specific socio-demographic profile (they were close to the centroid on graph VIII-2). As they are slightly on the left, the proportion of respondents having a low socio-economic status is probably higher than the average situation of the family-less. Their proportion of users of care services was higher than among the respondents having a spouse, but quite similar to respondents having only children. The characteristics of the sample at wave 3 were distributed by family constellation (appendix table VIII-7). Graph VIII-7 focuses on the characteristics where family-less elderly differ from the family-members elderly by 10% or more.

[22] The analysis sample is always restricted to the population being 'at risk' of the studied 'success' (here: receiving family care).

**GRAPH VIII-7 :** Main differences between the family-less and the family-members elderly (PSBH 1994)

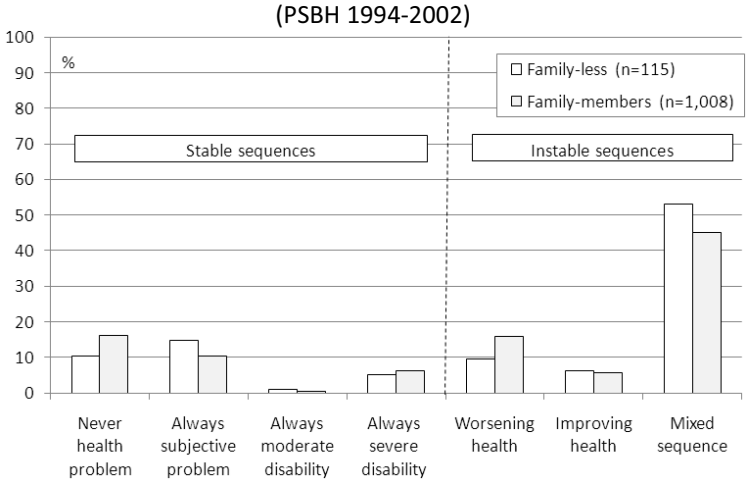



Except from the ability to make ends meet (harder for the family-less), the main differences concern predisposing factors: higher proportion of women, of very old, blue collars and attritors among the family-less is observed.

Although no health differences appear at the first wave, it might be interesting to compare the health trajectories. As the family-less elderly have no potential care-givers, one may expect that they will stay healthier over the panel (because in case of important health problems, they would be more likely to move to an institution and thus leave the panel).

Graph VIII-8 shows that the family-less elderly are slightly less likely to never have had health problems. However, they are also less likely to experience a worsening of their health over time or to have a 'mixed' sequence (with both improving and worsening health spells). Concerning the hospitalisation sequence (not shown), the family-less are more likely to have never being hospitalised during the panel (50% against 41%, $Chi^2$=0.077). In short, family-less elderly seem to have less often acute or long-term health problems during the panel.

**GRAPH VIII-8:** Health sequence of family-less and family-members (PSBH 1994-2002)

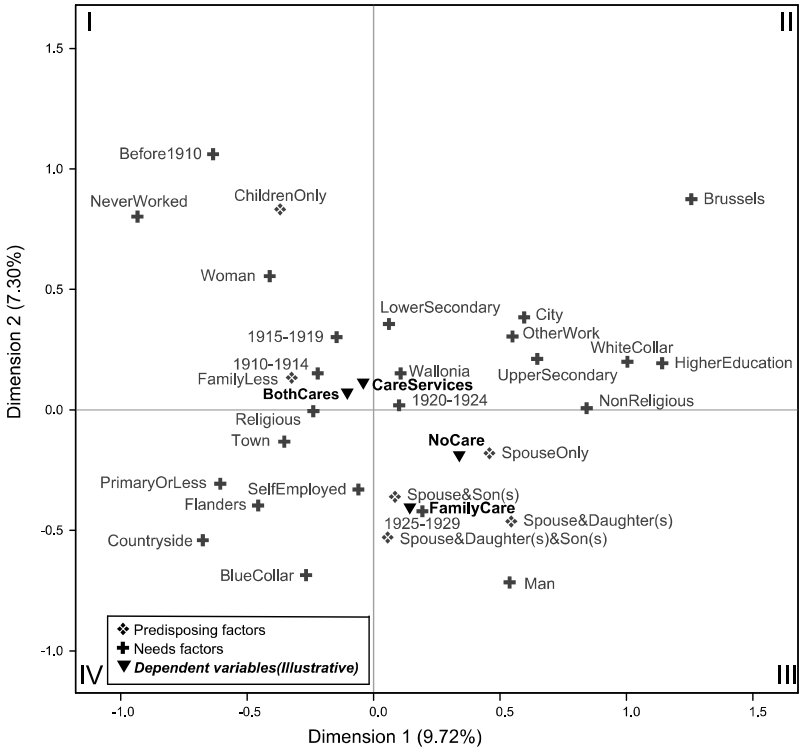


## B. Multiple correspondence analysis on the 1,008 family-members elderly

The MCA on the 1,008 family-member elderly graph VIII-9, considers the same active variables as for the previous question (graph VIII-1). The dependent variable *E-EVERCOMBICARE* is added as illustrative variable.

The exclusion of the family-less does not change much the global structure of the sample: as in graph VIII-1, the first dimension (contributing to 10.31% of the overall inertia) is mainly defined by **'cultural' aspects and socio-economic variables** (religiosity, urbanisation level, education and last occupational status) and the second dimension (7.60%) is defined by **gender and characteristics associated with it for the study cohorts.**

**GRAPH VIII-9:** Multiple correspondence analysis on the 1,008 family-members elderly (1994-2002)




The 'localisation' of the dependent variable modalities is noteworthy: globally, the four modalities are quite close to the centroid, showing that none on these situations is exceptional or specific to a particular group. As expected, 'both cares' is located in the **quadrant I** (upper left), in which the older spouseless women are hosted. 'Care services' is located in **quadrant II**, which is mainly hosted by white collars, the higher educated and the elderly living in cities. 'No care' is clearly situated in **quadrant III** where younger men living in couple are found. Most interesting is the localisation of 'family care' which is closer to 'no care' than to the two other 'care combinations'. Being located in the same quadrant, this means that the respondents having received only family care have characteristics which are quite similar

to those receiving no care. It shows that the family is the first source of elderly care (as younger elderly are more likely to receive only family care while older elderly are more likely to receive care services or both cares). This also highlights the opposition between having a spouse (bottom quadrants) and receiving care services (top quadrants). But, the MCA is only a descriptive tool, and our observations are limited to the two first dimensions. It does not tell whether the apparently close characteristics are significantly associated. A multinomial logistic regression will allow identifying the characteristics significantly associated with each care combination.

## C. Logistic regression on 'ever received care'

### *1. Preliminary verifications*

The sample size and multicollinearity checks were performed.

Three variables (living place, socio-economic status and family constellation) failed the sample size test:

For the living place variable, the 'Walloon countryside' is a problematic modality: only two respondents have only received family care (while a minimum of 10 cases is recommended). It means that a choice should be made between the two initial variables (region and urbanisation) used to build the living place variable: one will be included in this regression, while the other will no longer be controlled for. The decision was to keep the **region** variable: from a policy point of view, it is very important to identify and to understand regional differences. Bivariate association $Chi^2$ test (not shown) between *E-EVERCOMBICARE* and the two candidate variables (*E-URBAN* and *E-REGION)* support this choice showing that there is a significant association between having ever received family care only and the region.

As for the family constellation variable, it is the 'only spouse' modality which does not meet the sample size criterion for the 'family care' response modality: only two respondents (of a total of 76) having only a spouse declared to have only received family care over the study waves. This small proportion seems to contradict the literature which shows that the spouse is the first and often the sole care provider, but under-declaration of care is probably more frequent in this specific family constellation[23]. To replace the combined variable *E-FAMILY* in the regressions, it was decided to use three dummy variables, each corresponding to one aspect of the family composition that is highlighted as a significant predictor of family care use in the literature: living in couple, having a daughter, having many children (2+)[24,25].

[23] Another reason for under-declaration of care in this specific family constellation is that the information on the care provided by children could not be used to impute spousal care (as it was sometimes done for respondents having both spouse and children) (see chapter VI).

[24] The number of children could not be included in the regression at the same time as the family constellation variable (perfect multicollinearity between 'Spouse, daughter(s) & son(s) and 2+children). If only two initial variables of the family constellation are kept (having a spouse, having daughter(s)), the multicollinearity problem disappears and the number of children can be controlled for.

[25] Most of the family constellations can be reconstituted by looking at a given combination of the three variables (table VIII-2). Only the last combination 'having spouse, daughter and 2+ children' may refer to two family constellations ('Spouse & daughters' or 'Spouse, daughter(s) and son(s)').

**TABLE VIII-2:** Correspondence between combination of family composition aspects and the family constellation variable

| VARIABLES | RESPONSE COMBINATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Family composition** | **1 son** | **1 daughter** | **2+ sons** | **2+ daughters/ Daughter(s) &son(s)** | **Only spouse** | **Spouse & 1 daughter** | **Spouse & 1 son** | **Spouse & 2+ sons** | **Spouse, Daughter(s) & Son(s)/ Spouse & Daughter(s)** |
| Correspondence to the family constellation variable (*E-FAMILY*) | 5=Only children | | | | 1=Only spouse | 2=Spouse & daughter | 3=Spouse & Son(s) | | 4=Spouse, daughter(s) & Son(s)/ 2=Spouse & Daughter(s) |
| Ever[26] in couple (*E-COUPLE*) | No | No | No | No | Yes | Yes | Yes | Yes | Yes |
| Having daughter(s) (*E-DAUGHTER NUMBER>0*) | No | Yes | No | Yes | No | Yes | No | No | Yes |
| Having 2+ children (*E-CHILD NUMBER>1*) | No | No | Yes | Yes | No | No | No | Yes | Yes |

A multicollinearity test was performed on the 'full' multivariate regression including region, education, the three dummy variables of family constellation, the other predisposing variables (gender, birth cohort, and religiosity) and the attrition status. No multicollinearity problem was identified.

## *2. Multinomial logistic regression analysis*

As the dependent variable has four response modalities, a **multinomial** logistic regression should be carried out (frame VIII-3).

**FRAME VIII-3:** Multinomial logistic regression

The principles of the multinomial logistic regression are the same as those of the binary logistic regression (see frame VIII-2), but instead of computing the odds-ratio of being in $Y_1$ rather than in $Y_0$, it simultaneously computes *k* binary logistic regressions (OR of being in $Y_1$ rather than in $Y_0$, OR of being in $Y_2$ rather than in $Y_0$, … OR of being in $Y_k$ rather than in $Y_0$, where *k*= number of responses modalities -1). In the present situation, if 'No care' is chosen as reference category, three binary logistic regressions will be computed simultaneously ('care services' *versus* 'no care', 'family care' *versus* 'no care', 'both cares' *versus* 'no care').

However, with 'no care' as reference category, the multinomial regression will not allow identifying significant differences between 'family care' and 'care services' for instance. Therefore, Allison (1999a) advises to repeat the multinomial regressions *k* times by changing the reference category each time in order to estimate all the possible comparisons. In this situation, the multinomial regression is repeated with 'care services' and with 'family care' as reference category. At the end, it gives a regression with six different 'parts' (or partial binary regressions) comparing six specific combinations of response modalities: 'care services' *versus* 'no care', 'family care' *versus* 'no care', 'both cares' *versus* 'no care', 'family care' *versus* 'care services', 'both cares' *versus* 'care services', 'both cares' *versus* 'family care'.

[26]Remember that in the time-invarying version of 'living in couple' (*E-COUPLE*), respondents who have ever lived in couple during any study wave take 1 and respondents who have never lived in couple during the study waves take 0.

The multinomial regression allows both **specific comparisons** (assessing if a characteristic has a significant effect on being in one response modality rather than in another) and **global comparisons** (are some response modalities

more/less/equally likely for respondents having a given characteristic?). For instance, if we look at the OR of respondents born before 1915 (the 'very old') in the table VIII-3c: one can first interpret each result separately: the OR of 3.74 tells that the very old are more likely to receive care services rather than no care compared to the elderly born between 1925 and 1929 (reference category) and controlling for the other variables included in the model. They are also more likely to have both cares than no care (OR=4.56) or family care (OR=8.23) but less likely to receive family care than care services (OR=0.15). The results can be interpreted more globally: the very old are more likely to receive both cares or only care services, than receiving no care or family care only. How to reach this conclusion? A significant OR>1 in 'care services *versus* No care' (OR=3.74) and in 'both cares' *versus* no care' (OR=4.56) indicates that the very old are more likely to receive care services or both cares than no care. OR<1 in 'family care *versus* care services' (0.15) and OR>1 in 'both cares *versus* family care' (OR=8.23) indicates that the very old are more likely to receive care services or both cares rather than family care. The non-significant OR in 'care services *versus* both cares' (OR=1.22) indicates that the very old are as likely to use both cares or care services. Finally, the non-significant OR in 'family care *versus* no care' indicates that very old are not more likely to receive family care or no care at all. In short, being very old has a positive effect on the use of care services but no effect on the use of family care.

Most of the 1,008 family-members (n= 617) have ever received family care over the study waves (among them, 506 have also ever used care services), 23% (n=255) did only receive care services and 12% (n=136) did not receive any care.

All the **bivariate** regressions (table VIII-3a) have at least one significant parameter, but sometimes, the significant effect is restricted to some specific regressions (e.g. 'Flanders' and 'primary or less' have only a significant and positive effect on receiving both cares rather than care services only). Likewise the previous question ('having ever received care services), it is one of the family composition variables (partnership status) having the best bivariate fit (AIC= 2,388.27) and just after comes the birth cohort (AIC: 2,399.64).

**TABLE VIII-3A:** Multinomial logistic regression on 'ever received care' [*E-EVERCOMBICARE*] (n=1,008): Proportion and bivariate regressions

| | % | | | | BIVARIATE REGRESSIONS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No care | Care services | Family care | Both cares | Services/ *No* | Family/ *No* | Both/ *No* | Family/ *Services* | Both/ *Services* | Both/ *Family* |
| **PREDICTORS** | | | | | OR | OR | OR | OR | OR | OR |
| **Gender** | | | | | AIC: 2,425.97 | | | | | |
| *Rc: Man (n=451)* | 17.29 | 25.50 | 13.30 | 43.90 | | | | | | |
| Woman (n=557) | 10.41 | 25.13 | 9.16 | 55.30 | **1.64** ** | 1.14 | **2.09** *** | 0.70 | 1.28 | **1.83** *** |
| **Birth cohort** | | | | | AIC: 2,399.64 | | | | | |
| *Rc: 1925-1929 (n=349)* | 18.34 | 22.92 | 16.33 | 42.41 | | | | | | |
| 1920-1924 (n=318) | 14.78 | 23.27 | 11.95 | 50.00 | 1.26 | 0.91 | **1.46** * | 0.72 | 1.16 | **1.61** ** |
| 1915-1919 (n=165) | 8.48 | 27.88 | 6.67 | 56.97 | **2.63** *** | 0.88 | **2.90** *** | **0.34** *** | 1.11 | **3.29** *** |
| Before 1915 (n=176) | 6.25 | 31.25 | 2.84 | 59.66 | **4.00** *** | 0.51 | **4.13** *** | **0.13** *** | 1.03 | **8.09** *** |
| **Religiosity** | | | | | AIC: 2,438.09 | | | | | |
| *Rc: Non-religious (n=226)* | 18.14 | 25.22 | 12.39 | 44.25 | | | | | | |
| Religious (n=782) | 12.15 | 25.32 | 10.61 | 51.92 | **1.50** * | 1.28 | **1.75** *** | 0.85 | 1.17 | 1.37 |
| **Education** | | | | | AIC: 2,439.85 | | | | | |
| *Rc: Secondary or more (n=549)* | 13.48 | 28.05 | 10.75 | 47.72 | | | | | | |
| Primary or less (n=459) | 13.51 | 22.00 | 11.33 | 53.16 | 0.78 | 1.05 | 1.11 | 1.34 | **1.42** ** | 1.06 |
| **Region** | | | | | AIC: 2,432.87 | | | | | |
| Flanders (n=454) | 11.89 | 21.59 | 12.33 | 54.19 | 0.82 | 1.22 | 1.17 | 1.49 | **1.43** ** | 0.96 |
| *Rc: Wallonia (n=421)* | 12.59 | 27.79 | 10.69 | 48.93 | | | | | | |
| Brussels (n=133) | 21.80 | 30.08 | 7.52 | 40.60 | 0.63 | **0.41** ** | **0.48** *** | 0.65 | 0.77 | 1.18 |
| **Partnership status** | | | | | AIC: 2,388.27 | | | | | |
| *Rc: Never in couple (n=337)* | 5.34 | 28.19 | 5.64 | 60.83 | | | | | | |
| Ever in couple (n=671) | 17.59 | 23.85 | 13.71 | 44.86 | **0.26** *** | 0.74 | **0.22** *** | **2.88** *** | 0.87 | **0.30** *** |
| **Number of children** | | | | | AIC: 2,419.10 | | | | | |
| *Rc: 0-1 child (n=318)* | 19.51 | 29.88 | 8.23 | 42.38 | | | | | | |
| 2+ children (n=680) | 10.59 | 23.09 | 12.35 | 53.97 | **1.42** * | **2.77** *** | **2.35** *** | **1.94** *** | **1.65** *** | 0.85 |
| **Number of daughters** | | | | | AIC: 2,414.78 | | | | | |
| *rc: 0 daughter (n=280)* | 20.00 | 32.14 | 7.86 | 40.00 | | | | | | |
| 1+ daughter(s) (n=728) | 10.99 | 22.66 | 12.23 | 54.12 | 1.28 | **2.83** *** | **2.46** *** | **2.21** *** | **1.92** *** | 0.87 |
| **Attrition status** | | | | | AIC: 2,422.056 | | | | | |
| *Rc: Attritor (n=620)* | 15.65 | 28.23 | 11.77 | 44.35 | | | | | | |
| Non-attritor (n=388) | 10.05 | 20.62 | 9.79 | 59.54 | 1.14 | 1.29 | **2.09** *** | 1.14 | **1.84** *** | **1.614** ** |

To test the predisposing factors hypothesis, two multivariate models were carried out: the first (table VIII-3b) only includes the predisposing factors; the second (table VIII-3c) includes all the time-invarying variables (namely, the predisposing factors and the time-invarying family composition dummy variables). The attrition status is controlled for in both models. The analysis of the multivariate models in this point is restricted to global trends and the analysis of the effect of family composition dummies and the effect of attrition status in the multivariate full model. The effect of predisposing factors and the comparison of predicted probability profiles (which are based on predisposing factors) will be discussed in point 4 as these results will serve to test the predisposing factors hypothesis.

**TABLE VIII-3B:** Multinomial logistic regression on 'ever received care' [*E-EVERCOMBICARE*] (n=1,008): multivariate 'predisposing factors' model

| | MULTIVARIATE 'PREDISPOSING FACTORS' MODEL | | | | | |
|---|---|---|---|---|---|---|
| | **Services/*No*** | **Family/*No*** | **Both/*No*** | **Family/*Services*** | **Both/*Services*** | **Both/*Family*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | | | | | | |
| *rc: Man (n=451)* | | | | | | |
| Woman (n=557) | **1.51** * | 1.10 | **1.83** *** | 0.73 | 1.21 | 1.66 ** |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (n=349)* | | | | | | |
| 1920-1924 (n=318) | **1.51** * | 0.90 | **1.52** * | 0.72 | 1.20 | **1.68** ** |
| 1915-1919 (n=165) | 1.26 | 0.91 | **3.32** *** | **0.32** *** | 1.17 | **3.65** *** |
| Before 1915 (n=176) | **2.83** *** | 0.54 | **5.71** *** | **0.11** *** | 1.19 | **10.51** *** |
| **Religiosity** | | | | | | |
| *rc: Non-religious (n=226)* | | | | | | |
| Religious (n=782) | **4.79** *** | 1.12 | 1.47 | 0.82 | 1.07 | 1.31 |
| **Education** | | | | | | |
| *rc: Secondary or more (n=549)* | | | | | | |
| Primary or less (n=459) | 1.37 | 0.91 | 0.85 | 1.46 | **1.36** * | 0.93 |
| **Region** | | | | | | |
| Flanders (n=454) | **0.62** ** | 1.24 | 1.03 | **1.57** * | 1.29 | 0.83 |
| *rc: Wallonia (n=421)* | | | | | | |
| Brussels (n=133) | 0.79 | **0.41** ** | **0.45** *** | 0.74 | 0.81 | 1.09 |
| **Attrition status** | | | | | | |
| *rc: Attritor (n=620)* | | | | | | |
| Non-attritor (n=388) | **0.56** * | 1.24 | 2.76 *** | 0.875 | 1.95 *** | 2.23 *** |
| **MODEL INFORMATION** | | | | | | |
| **'Intercept only' model**: -2LL=2,433.04; AIC: 2,439.04; **Multivariate 'predisposing factors' model**: -2LL=2,299.29; AIC=2,359.29 | | | | | | |

**TABLE VIII-3C:** Logistic regression on 'ever received care' [*E-EVERCOMBICARE*] (n=1,008): multivariate 'full' model

| | MULTIVARIATE 'FULL' MODEL | | | | | |
|---|---|---|---|---|---|---|
| | **Services/*No*** OR | **Family/*No*** OR | **Both/*No*** OR | **Family/*Services*** OR | **Both/*Services*** OR | **Both/*Family*** OR |
| **Gender** | | | | | | |
| *rc: Man (n=451)* | | | | | | |
| Woman (n=557) | 1.23 | 1.11 | **1.48 *** | 0.90 | 1.21 | 1.34 |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (n=349)* | | | | | | |
| 1920-1924 (n=318) | 1.20 | 0.98 | **1.52 *** | 0.82 | 1.27 | **1.55 *** |
| 1915-1919 (n=165) | **2.43 **** | 1.03 | **3.14 ***** | **0.42 **** | 1.29 | **3.06 ***** |
| Before 1915 (n=176) | **3.74 ***** | 0.56 | **4.56 ***** | **0.15 ***** | 1.22 | **8.23 ***** |
| **Religiosity** | | | | | | |
| *rc: Non-religious (n=226)* | | | | | | |
| Religious (n=782) | 1.40 | 1.01 | 1.41 | 0.72 | 1.00 | 1.39 |
| **Education** | | | | | | |
| *rc: Secondary or more (n=549)* | | | | | | |
| Primary or less (n=459) | **0.61 **** | 0.94 | 0.85 | **1.53 *** | **1.40 **** | 0.91 |
| **Region** | | | | | | |
| Flanders (n=454) | 0.86 | 1.29 | 1.10 | 1.50 | 1.28 | 0.85 |
| *rc: Wallonia (n=421)* | | | | | | |
| Brussels (n=133) | **0.52 **** | **0.38 **** | **0.41 ***** | 0.72 | 0.78 | 1.09 |
| **Partnership status** | | | | | | |
| *rc: Never in couple (n=337)* | | | | | | |
| Ever in couple (n=671) | **0.35 ***** | 0.75 | **0.34 ***** | **2.17 **** | 0.98 | **0.45 ***** |
| **Number of children** | | | | | | |
| *rc: 0-1 child (n=318)* | | | | | | |
| 2+ children (n=680) | 1.28 | **2.01 **** | **1.72 **** | 1.57 | 1.34 | 0.86 |
| **Number of daughters** | | | | | | |
| *rc: 0 daughter (n=280)* | | | | | | |
| 1+ daughter(s) (n=728) | 1.17 | **2.24 **** | **2.05 ***** | **1.91 **** | **1.75 ***** | 0.91 |
| **Attrition status** | | | | | | |
| *rc: Attritor (n=620)* | | | | | | |
| Non-attritor (n=388) | 1.40 | 1.20 | **2.67 ***** | 0.86 | **1.94 ***** | **2.24 ***** |
| **MODEL INFORMATION** | | | | | | |
| **'Intercept only' model**: -2LL=2,433.04; AIC: 2,439.04; **Multivariate 'full' model**: -2LL=2,235.53; AIC=2,313.53 | | | | | | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

A visible **opposition**: the MCA opposed respondents receiving **no care and family care only** (usually younger) to respondents **receiving both cares or care services only** (usually older). This shows that, among family members, **receiving care services or not is more discriminatory than receiving family care or not[27].** This opposition is visible in the regression results too: there are few significant variables in the regressions comparing family care and no care and the one comparing care services and both cares. Note that the birth cohort is non-significant in both cases (showing that there are no significant cohort

[27] If having ever received family care was more discriminating, the opposition would have been between 'mixed care' and 'family care' on the one hand, and between 'no care' or 'care services' on the other hand.

differences between respondents receiving no care or family care only and between respondents receiving care services or both cares).

The effect of the family composition dummies is particularly interesting as the three dummies do not always play in the same direction and may have a significant effect on different parts of the regression.

The **negative effect of having ever lived in couple on care services** observed in the first operational question is still visible here: respondents having ever lived in couple are more likely to receive family care than care services (OR=2.17), less likely to receive care services than no care (OR=0.35) and to receive both cares than family care (OR=0.45) compared to respondents having never lived in couple during the study waves. The partnership status does not influence the fact of receiving family care or no care, while the two other family composition dummies do: having a daughter or having two children or more is positively associated with receiving family care rather than no care (OR are respectively of 2.05 and 1.72). Indeed, **having a daughter has mainly an effect on receiving family care**: it is positively associated with receiving family or both cares rather than no care (respective OR=2.24 and 2.05) or than care services (OR=1.91 and 1.75). But having a daughter does not seem to influence the use of care services (OR of 'care services *versus* no care' and OR of 'both cares *versus* family care' are not significant). The **number of children only influences (positively) the fact of receiving family care (only or with care services) rather than receiving no care.** In the bivariate regression, having 2+ children increases the likelihood of receiving family care (only or combined to care services) in all the parts of the regression (only 'family care' versus 'both cares' is not significant). It is also associated with a higher likelihood of receiving care services only rather than no care. However, in the full model, only the OR comparing 'family care' or 'both cares' to 'no care' are still significant. This is probably due to the control for having a daughter: once controlling for a daughter, the effect of the number of children weakens.

Finally, as it may be expected, **attritors are less likely to have ever received care, especially both cares: mixed care** (receiving family care and care services at the same time) is usually associated with intensive care which occurs at a later phase of the care trajectory. Attritors are observed during a shorter time and therefore during a smaller part of their potential care trajectory. This also explains why receiving both cares sequentially (receiving both family care and care services but at different study waves) is less frequently observed among the attritors.

## D. Hypothesis to test: predisposing factors effect

The hypothesis to test here is to assess if there are predisposing factors making some elderly respondents more likely to receive family care than others. The following observations allow rejecting the null hypothesis that the provided family care is not influenced by time-invarying characteristics:

First, the fit of the 'predisposing factors' model (-2LL=2,299.29) is much better (lower) than the fit of the 'intercept only' model' (-2LL= 2,433.04). This shows that only accounting for predisposing factors already contributes significantly to explain the variation in the ever received care combination. Introducing the family composition dummies (in the full model), still improves the model fit (-2LL=2,235.53[28]) but, except for religiosity (which loses its significance in the full model), all the predisposing factors continue to have

[28] The -2LL can be used because the two compared models are nested.

a significant effect in the full model[29]. This shows the relative strong impact of these factors on the ever received care combination.

Second, the predictive probabilities computed on the full models (graph VIII-10a to VIII-10d) highlight birth cohorts, gender and regional differences in ever received care: for each given cohort group of a given region, women are more likely to have ever received both cares, and to a lesser extent, care services only. No clear gender differences are observed for 'no care' or 'family care'. The graphs clearly show the cohort effect: for both gender and in each region, the older are more likely to have ever received both cares. Finally, the region effect opposes Brussels to the two other regions. Remember that when studying the determinants of having ever received care services, it was quite difficult to explain why care services were less often used in Brussels (while the contrary was expected). Here, the regional particularity of Brussels goes in the expected direction: Brussels inhabitants are more likely to only use care services (and to a lesser extent, to have never received care)[30]. This profile analysis shows that these three major predisposing factors (gender, cohort and region) influence the ever received care. This is in line with the 'predisposing factors' hypotheses.

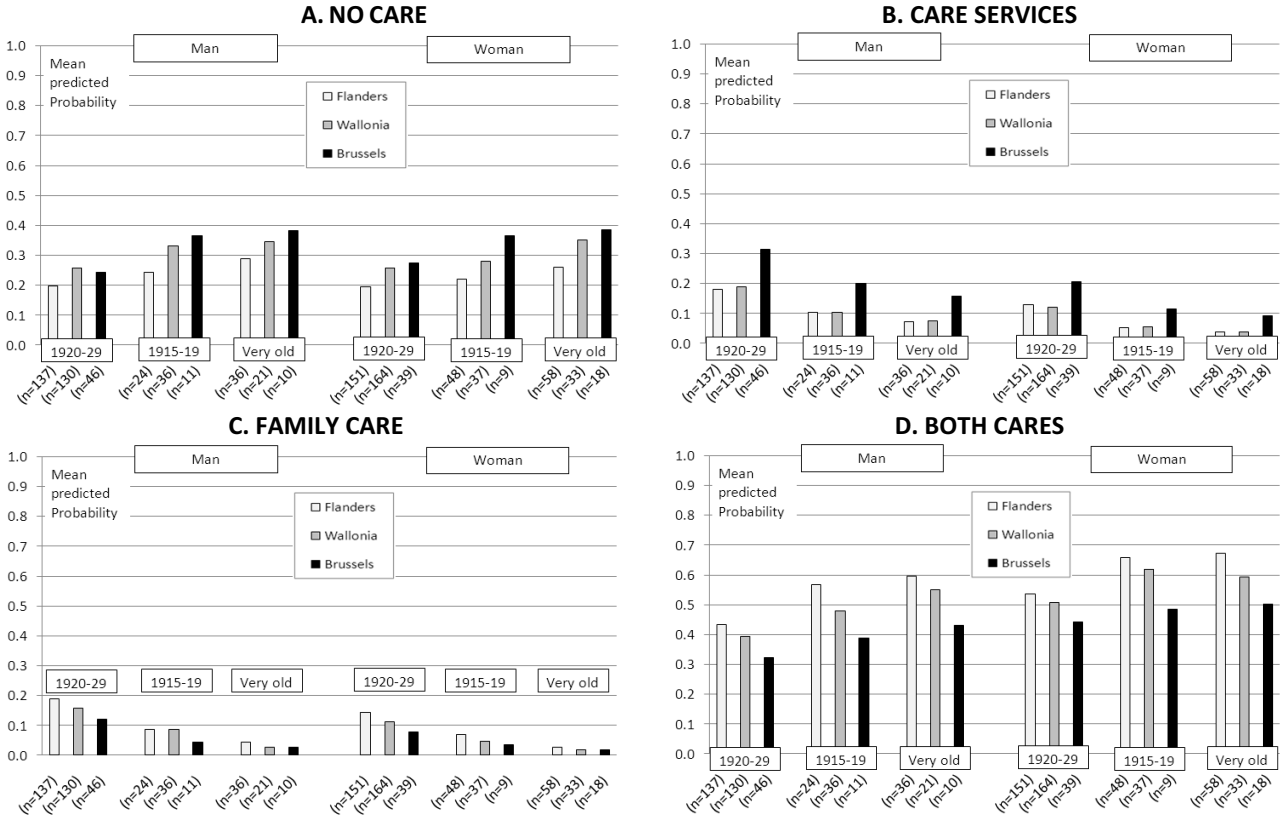
Third, the analysis of the full model results allows identifying what are the predisposing factors influencing significantly the ever received care when controlling for other factors. As observed in the profile analysis, **women** are more likely to receive both cares than men do. This difference is only significant when the reference category is 'no care'. The **cohort** effect is large, linear (the older the cohort the higher the difference with the reference category) and spread (influences nearly all the parts of the regression): the older cohorts are more likely to have ever received both family care and care services or only care services than having only family care or than having never received care at all. As expected, the **lower educated respondents (who often have a lower socio-economic status) seem to be more 'family-oriented'**: they are more likely to have ever received both cares (OR=1.40) or family care only (OR=1.53) rather than care services only compared to the higher educated respondents. They are also less likely to receive only care services rather than no care (OR=0.61). This is probably due to the fact that the higher educated are more likely to have a private cleaning lady to help them with the housework even if they do not have health problems, while the lower educated may not afford to pay for a private cleaning lady and will only receive social professional care if they meet the needs eligibility criteria. Finally, significant regional differences are observed between Brussels and Wallonia: Brussels inhabitants are significantly less likely to receive any kind of care (the OR is always lower than 1 when the reference category is 'no care')[31]. No significant differences between Wallonia and Flanders are observed so far.

[29] The family composition dummies are the only variables that can be added to the full model. It is not possible, for instance, to include needs factors or ability to make ends meet (as these variables are only available as time-varying variables) and to see if controlling for those variables, the predisposing factors have still a significant effect.

[30] This is a piece of evidence that the definition of the sample (all elderly versus family-members) and the response modalities (care services yes/no versus ever received care) influence the effect of the independent variable.

[31] The higher mean predicted probability of receiving care services only for Brussels inhabitants shown in the profiles graphs is not observed in the OR results. This is probably due to the small number of respondents in the Brussels' profiles and to the use of an aggregated measure (the mean predicted probability).

**GRAPH VIII-10:** Mean predicted probability of ever received care by gender, region and cohort group (PSBH 1994-2002, n=1,008)




*Note:* Probabilities are computed on the full multinomial logistic model, controlling for religiosity, education, family composition and attrition status. Figures are in appendix table VIII-8

## *CONCLUSION*

The first chapter of the analyses part allowed explaining the kind of multivariate analyses which will be developed in this analyses part and how the results presentation will be structured. The 'ever' approach analyses were presented and all the null hypotheses could be rejected: the analyses of 'having ever received care services' shows that there is a partial substitution (for IADL spousal care). The data do not allow testing for ADL care substitution. The analysis on 'ever received care' carried out on the family-members shows that having ever received care services is more discriminatory than having ever received family care. It also highlights the important effect of specific predisposing factors on the received care (gender, birth cohort, education level and region). In addition, the analyses shows that the family composition variables influence the ever received care: having daughter(s) increases the likelihood of having ever received family care, having a spouse decreases the likelihood of having ever received care services and having more than one child increases the likelihood of receiving family care rather than no care. Some regional differences were already observed at this stage, in the analysis of 'having ever received care services', the results went against expectations (with a higher likelihood of receiving care services in Walloon countryside) and several hypotheses were formulated to explain the results. The analysis of care combination showed that Brussels inhabitants were less likely to receive care in general and family care in particular. This is consistent with the literature. No differences were observed between Wallonia and Flanders but they will probably appear later on, when considering specific aspects of the received family care.

The tricky part of this chapter is not related to the analyses (which are quite simple) but to the lack of literature on family care adopting a similar point of view: first, the 'ever' approach is not common in the care literature. In general researchers work either on cross-sectional data, analysing the care received at the moment of the interview or in a very recent past or they even work on longitudinal data, analysing the changes in care over time. I did not find any study looking at the care 'ever' received during a long period of time. A second particularity of this chapter are the multivariate analyses on care services use carried out on a representative sample of the general Belgian elderly population. Such studies are not frequent as most of the Belgian quantitative analyses on care focus on a region and/or work on a non-representative sample (see chapter IV).

# CHAPTER IX

## FAMILY CARE ASPECTS

The previous chapter analysed the determinants of having ever received family care, without considering the care aspects. The results show that both the predisposing factors and the family constellation influence the likelihood of having ever received family care during the study waves. The present chapter goes further by studying specific care aspects and their determinants. As the care aspects can vary from one wave to another, they must be analysed at the wave level (cross-sectional approach). This approach allows including time-varying characteristics such as the health and the wealth statuses.

This chapter will contribute to answer the questions: *Who is receiving care?* And *What are the characteristics of the received family care?* The analyses should allow testing the hierarchical compensation, the needs, the ageing, the regional differences and the family solidarity hypotheses.

The chapter is divided into four sections. The first explains the methodological choices made for the cross-sectional approach. The three other sections correspond to the three care aspects presented in chapter VI. Section 2 studies the determinants of the care combination. Section 3 looks at the care provided by spouse, daughter(s) or son(s). Section 4 analyses the determinants of family care intensity: care-givers number and care activities. The analyses are presented following the structure explained in chapter VIII.

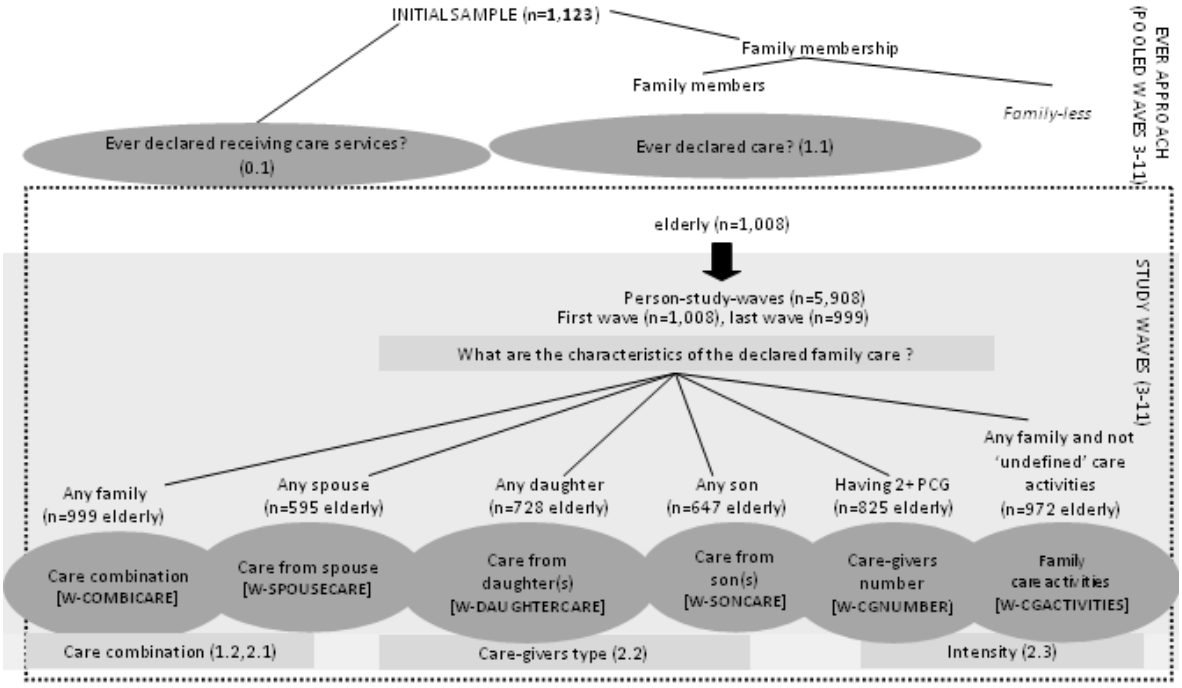
## *SECTION 1. Wave level analysis methodology*

After having compared family-members according to the type of care they have ever received over the study waves (family care and/or care services), one can go further by studying **what are the determinants of the various family care aspects**? This is the second main research question.

As care aspects can change over time and are likely to be very influenced by time-varying characteristics (such as the health and wealth statuses), they would be studied at the wave level.

The 1,008 elderly family-members totalise together 5,908[1] 'person-study waves' during which they are 'at-risk' of receiving family care (scheme IX-1). The term 'person-study-waves', means that a same elderly respondent (person) can be observed over several waves (study waves)[2]. For a given analysis, an elderly contributes to a number of person-study-waves that equals the number of study waves he is 'at-risk' of the event. For instance, for the analysis of family care combination, the 'at-risk' sub-sample is composed of the family-member elderly respondents. Therefore, if a non-attritor elderly is childless and looses his spouse between waves 7 and 8, then, even if his last wave is the 11th (or the 9th study wave=2002), he will only contribute to five person-study-waves for the care combination analysis, because he is only 'at-risk' at waves 3, 4, 5, 6, 7.

**SCHEME IX-1:** Localisation of dependent care aspects variable in the sample scheme




[1] Indeed, they totalised 5,934 person-study-waves but 35 of these waves (belonging to nine different elderly) have been removed from the analyses because they refer to the situation when the elderly has lost his sole potential care-giver and is there no longer 'at risk' of receiving family care (childless elderly who have lost their spouse during the study waves).

[2] It is a synonym of 'person-period' which is the term commonly used in discrete-time event history. Here, it was decided to use 'person-study-waves' to remind that the longitudinal analyses are restricted to waves 1994 to 2002 of the PSBH data.

There are various ways to analyse **the care aspects observed during the person-study-waves.** Four of them are discussed here.

1. Carrying out **a regression on all the 'at-risk' waves together** controlling for the non-independence of the observations (waves) concerning the same elderly[3]. The advantage of this solution is that all the available information is used in a unique regression. The disadvantage is that all the waves are 'mixed' and it is therefore not possible to test the ageing hypothesis (seeing if respondents are more likely to receive care at the end of the panel than at the beginning when they were younger).

2. Carrying out **separate regressions on each wave.** The advantage is that this would solve the non-independence problem (for each wave, a respondent has only one observation) and would allow studying the ageing hypothesis (comparing the proportion of the various care combinations or other aspects over waves). Alongside the lack of parsimony (nine regressions to compare), the main disadvantage is that smaller sample size at the late waves due to attrition (e.g. the regression on spousal care at wave 11 should be carried out on a sub-sample of 111 elderly.) may jeopardise the validity or the comparability of the results.

3. The easiest would have been to carry out the analysis on the **first study wave** only: all the respondents are present (no small numbers problem) and observed at the same time (neither anachronisms, nor between-waves comparison problems). But this option has two main disadvantages: first, it uses only a very small part of the available information (it does not account for the panel aspect of the data); second, it considers the wave where the respondents are probably the least likely to receive care (as they are younger).

4. In this chapter, a fourth solution is chosen: it consists in doing **two separate regressions**: one on the first study wave (1994) and one on the last study wave (the last study wave varies between individuals)[4]. The main advantages are that: (1) it solves the problem of small sample size due to attrition (because, if not all the respondents are in the panel until wave 11, all of them have a 'last study wave'); (2) there is no problem of non-independence to solve (elderly may not have more than one observation for each regression, the regression sample size equals to the number of elderly being 'at risk' at the given wave); (3) it allows testing the ageing hypothesis comparing the proportion of care-receivers and the significant variables; (4) parsimony (only two regressions). However, this solution has four main limitations: (1) the ageing effect can only be studied at the aggregated level of the sample (not at the individual level): a same proportion of daughter care at both waves does not mean that the same elderly receives daughter care at both waves (a care trajectory analysis would be needed to answer this question). But, a higher proportion of daughter care at the last wave compared to the first study wave can be interpreted as an evidence of an ageing effect: respondents are older and thus more likely to need and receive care; (2) it does not consider all the available information but looks at the situation of a given elderly at two moments in time; (3) doing a regression on the 'last study

[3] The number of person-study-waves of an elderly varies from one (if he leaves the panel after the first study wave) to nine (if he stays in the panel until the end). When multiple observations (here: waves) referring to a same subject (here: the elderly respondent) are included in the same regression, we cannot longer assume that all the observations are independent. The non-independence of within-subject observations violates one of the assumptions of the logistic regression. However, there are specific tools to solve this problem. One of those will be presented in chapter X (where the 'all waves together' option should be chosen.

[4] I have never found this 'solution' in the literature. I have imagined it because it seems to me the good way to account for the longitudinal aspect of the data (comparing waves and trying to study the ageing effect) in a parsimonious and understandable way.

wave' is somehow an 'anachronism' because the considered waves may differ from one elderly to another. It is however a reasonable option if we assume that the dependent variable (family care aspect) is more influenced by the individual timing (when the elderly leave the panel) than by the calendar timing (a given panel year); (4) the time lapse (number of study waves) between the first and the last waves varies from one respondent to another. For the non-attritors, eight years have passed between the two waves, but this time is shorter for attritors. These differences are due to the decision for working on an unbalanced panel[5] and lead to be more cautious when interpreting the between-waves differences for two reasons. First, the 'ageing process' is not observed during the same period of time; Second, the between-waves differences may be under or over-estimated (one can think that differences will be larger for respondents who stay longer in the panel, or in other words, that there is a positive relationship between the number of study waves and the size of the differences). Some descriptive analyses were done to assess the potential 'unbalanced panel effect' on the results interpretation (see frame IX-1).

**FRAME IX-1:** Assessing the 'unbalanced panel effect'

Above all, it is important to acknowledge the secondary 'status' of the between-waves comparison in the analyses. The purpose of this chapter is to study the determinants of some care aspects (care combination, care-givers types, numbers and activities) at a given wave. The decision to carry out the analyses on the first and the last waves was mainly justified by practical reasons, but also because it introduces a notion of time and allows identifying a kind of 'ageing effect'. The first-last waves comparisons will be very general (comparing the frequency of the study care aspect and the independent variables having a significant effect).

***Can we interpret the between-waves differences as an 'ageing effect'?***

Although the length of the observation of the 'ageing process' (the fact that the elderly are getting older over waves and becoming more likely to need care) varies across respondents, I do think that the differences between the first and the last waves can partially be considered as an ageing effect. This interpretation is 'acceptable' for the study sample, providing that one agree with the fact that the ageing process intensifies with age (in other words, that the health decline due to ageing is usually steeper between 84 to 85 years of age than between 65 and 66). Therefore, to interpret the first-last waves differences as an 'ageing effect', one would need to observe the younger birth cohorts for a longer period (as the process is slower) while a shorter period would be enough for the older cohorts (who are already aged 85+ at the first study wave). It was already shown in chapter VII (graph VII-4b), that the older cohorts tend to leave the panel earlier and that the younger cohorts are more likely to stay longer. Graph IX-1 is based on the sub-sample of the 999 family-members elderly who will be considered in the next analysis. It proposes another way of representing the relationship between birth cohorts and study waves number of observation: it gives the mean age of the birth cohort at the first and at the last study wave. It clearly shows that the younger cohorts are observed longer than the older cohorts, and therefore the first-last waves differences can be partially interpreted as an 'ageing effect'. If it had be the opposite – that the younger cohorts had left the panel earlier (maybe because they are more active and have less time to spend answering a questionnaire) – then it would have been misleading to interpret the first-last waves differences as an 'ageing effect' for the younger cohorts.

[5] This decision was taken in chapter V. The attrition is one of the main issues when working with panel data. There are two options. The first is to use unbalanced data which allows considering all the waves of the elderly respondents for the analysis. The alternative is to use balanced data which means working on a sub-sample of respondents having the same number of waves (usually the non-attritors). The 'unbalanced' option has the advantage to consider all the available information and to avoid working on a selected sample but imply to be more cautious when interpreting between-waves comparisons as those presented in this chapter.

**GRAPH IX-1:** Mean age of the birth cohorts at the first and the last study wave (PSBH 1994-2002, n= 999)




*Note:* For each cohort group, the two mean ages are joined up by a line to form an arrow, representing the 'ageing process'.

Mean age and (standard deviation) by birth cohort at the first and the last study wave

| | COHORT | | | | |
|---|---|---|---|---|---|
| **WAVE** | **Before 1910** | **1910-1914** | **1915-1919** | **1920-1924** | **1925-1929** |
| **First study wave** | 89.07 (3.00) | 81.45 (1.27) | 76.81 (1.52) | 71.91 (1.48) | 66.90 (1.46) |
| **Last study wave** | 91.47 (3.43) | 85.30 (3.12) | 81.58 (3.18) | 76.97 (3.53) | 72.43 (3.01) |

So, if one cannot claim that the number of study waves does not influence the results, it seems reasonable to assume that controlling for the attrition status is a sufficient and parsimonious way of accounting for the 'unbalanced effect' on the results. It is not possible to say if working on an unbalanced panel will lead to under- or over-estimate the first-last wave differences because it depends on the definition of the 'balanced observations' used for the comparison. But, if the considered 'balanced observations' are the one of the respondents having exactly 9 study waves (the non-attritors), one can think that the 'unbalanced data' under-estimate the differences. However, it is important to remember that the first-last waves' comparison will never consider the size of the effect[6].

***Is the number of study waves likely to influence the results of the analyses made in this chapter?***

As it was done for the previous analyses (chapter VIII), the attrition status is controlled for in the multivariate regression models. This indicates whether those who remain in the panel until its end have a behaviour regarding the dependent variable that significantly differs from the respondents who left the panel earlier (whatever the number of study waves they are observed: it can varies from 1 to 8). A first concern is about the potential relationship between the number of study waves and the reason of attrition. This was analysed in chapter V (graph V-6) for the whole sample of the 1,123 elderly. It was shown that the main attrition reason was 'refusal' and that the distribution of the various reasons remains quite stable over waves. A second concern is about the

[6] Although the study sample and the independent variables included in the models are the same, the size of the effect of a given variable cannot be compared, mainly because the intercepts differ across the two regressions (Allison 1999b; Mood 2010).

potential influence of the number of waves on the regressions results and especially on the analysis carried out at the last wave. To assess if the number of waves has a stronger or a different effect than the variable 'attrition status', two separated multivariate models were tested, the first controlling for the attrition status (dichotomous variable 1= non-attritor, rc= attritor) and the second (not shown) for the 'number of study waves' (quantitative variable which can take the values 1,2,3,4,5,6,7,8,9) to the 'attrition status' variable. The coefficient and the significance level of the two variables were very similar. Choosing one or the other did not influence the coefficients, nor the significance level of the other independent variables. The 'attrition status' variable was preferred for its parsimony and also because of the difficulty to find an adequate variable specification for 'number of study waves'[7].

The first studied care aspect (first ellipse on the left-side of scheme IX-1) is the care combination observed at the first and the last study wave ('no care', 'care services', 'family care', 'mixed care'). This analysis has a specific status as it allows answering two questions: by comparing those who are receiving either family or mixed care to those receiving only care services or no care at the given wave, it answers the more general question 'who is receiving family care' (code 1.2[8]); by comparing those receiving family care to those receiving mixed care, it partially answers the question on care aspects (the fact of receiving care services in complement to family care or not is one of the family care aspects, code 2.3 on the scheme).

The analysis of care combination is carried out on the **999** family-members elderly who have family (spouse and/or children) both at their first and at their last study wave[9]: **having a same sample at both waves is necessary to compare the regression results and to test the ageing hypothesis.**

The same rationale is applied to the other care aspects: the analysis is carried out on the specific sub-sample of the elderly being 'at risk' of the study characteristic. The 'care-giver types' aspect is analysed through three variables ('care from spouse' restricted to the **595** elderly having a spouse at both waves[10], 'care from daughter(s)' restricted to the **728** elderly having at least one daughter and 'care from son(s)' restricted to the **647** elderly having at least one son); the 'care intensity' aspect is analysed through two variables ('care-givers number' restricted to the **825** respondents having at least two potential care-givers and the 'family care activities' restricted to the **972** respondents having a family and being not in the category 'undefined care activities').

The exclusion criterion varies from one analysis to another. As there are no elderly who are definitely excluded at this stage of the analyses (except from the nine becoming family-less, see footnote 9), no systematic descriptive analysis of the 'excluded sub-sample' is made. However, it might be interesting to gain some insights into the elderly who had a changing partnership trajectory for two reasons: first, because the change may be a cause for being excluded from some analyses[11]; second, because in most

[7] If the variable is introduced as a quantitative variable, one has to assume a linear relationship between the log-odds of this variable and the log-odds of the dependent variable. This assumption is not realistic with the PSBH study sample, given the fact that short-term attritors were imputed (see chapter V) and that the care variables were necessarily imputed at waves 7 and 9 (see chapter VI). The alternative is to consider the 'number of study waves' as a qualitative variable and to create 8 dummies to introduce in the model. This solution is not parsimonious at all and would give too much importance to a variable which is only used as a control.

[8] The codes come from the theoretical scheme.

[9] The difference between 1,008 and 999 refers to the 9 childless elderly becoming widowed during the study waves.

[10] Respondents having no spouse are not 'at-risk' of receiving spousal care.

cases (60 over 76) the change consists in a **transition to widowhood,** which is particularly interesting in the study of family care (frame IX-2).

**FRAME IX-2:** Zoom on the 76 elderly experiencing a partnership transition

Among the 1,008 family-member elderly, 76 experienced a change in partnership: four started a new union, 72 exit a union (due to the death of the spouse in 60 cases or to a separation, divorce or institutionalisation in the remaining cases) and two elderly have a 'mixed' partnership trajectory: they live in couple at their first and last waves (and can therefore be included in the analysis of spousal care) but they had a 'not in couple' spell during the study waves.

The most interesting transition is 'exiting a union' which is quite common at old ages.

The number of widowhood events observed during the study waves is relatively small (n=60). This is because several elderly respondents have already made this transition before 1995[12] (380 (323) of the 1,123 (1,008) elderly are 'widowed' at the first study wave). This is also due to the fact that widowhood can only be observed for elderly who continue to answer the questionnaire after having lost their spouse (an analysis of the contact sheet shows that 30 elderly respondents have left the study after the death of their spouse and 6 after his institutionalisation). These elderly are not included.

Among the 72 elderly, 51 have ever received family care during their study waves (18 have ever received spousal care). The transition to 'not in couple' was accompanied[13] by a decrease in effective care-givers number for 15 elderly (always referring to situation where the spouse was providing care before 'leaving') and by an increase in care-givers number (necessarily the children) in nine cases. Fifteen elderly kept the same number of care-givers before and after the transition and 33 elderly did not receive family care at that time. Only nine elderly started to use care services after the transition while they did not use them just before. Finally, among the 25 receiving family care before and after the transition, six show a decrease in caring activities intensity and five an increase.

The analysis of the care combination and of the other care aspects will be done following the same analysis structure as the one proposed in chapter VIII, with two exceptions:

1. The first part of the sections: in chapter VIII, it consisted in the localisation of the question in the scheme and the description of the excluded observations. Here, this analysis is done once for all the questions in the present section. The first part of each section will thus consist in descriptive analyses of the dependent variable(s) at the first and at the last study waves (univariate and bivariate association with other care aspects).
2. For parsimony reasons, only a selection of results is displayed in the text, the remaining results are put in appendices.

[11] In order to work on similar samples at the first and last waves, the elderly who are not in the same partnership status were excluded from the analysis of spousal care. Likewise, elderly having only one child and losing their spouse during the study waves were excluded from the study of care-givers number because they do not meet the criterion of having two or more potential care-givers at both waves.

[12] The 1995 questionnaire corresponds to the second study wave which is the first wave where a transition can be recorded.

[13] The results are based on the comparison of the characteristics of care at the wave before and at the wave after the transition.

## *SECTION 2. What are the main determinants of the care combination?*

The analysis of the care combination should contribute to test if family care is positively associated with the presence of (severe) health needs (family solidarity hypothesis), if the use of care services in complement to family care is influenced by the family composition (hierarchical compensation hypothesis), if there are regional differences in the care combinations and if there is an ageing effect.

# A. Description

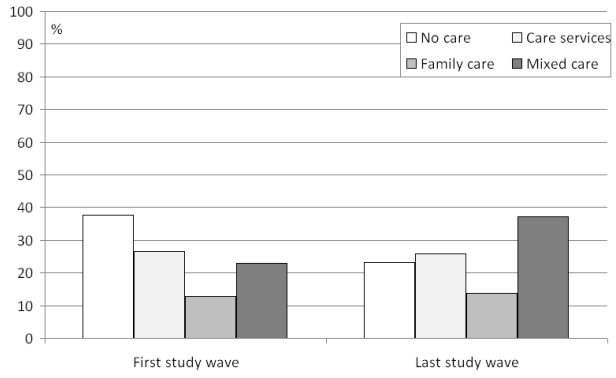
### *1. Half of the elderly received at least once mixed care*

The first way to describe the care combination variable is to look at its distribution (graph IX-2).

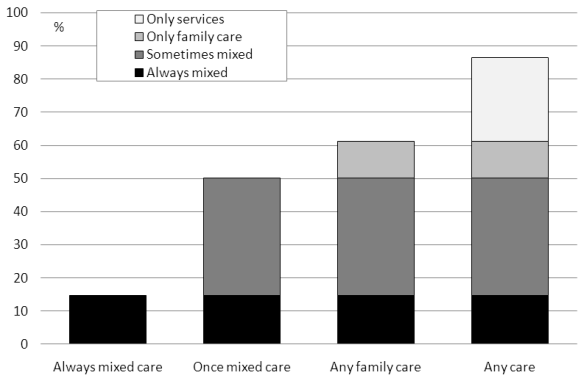
An 'ageing effect' seems to appear: at the first study wave, the most common situation (37.64%) is to receive no care, while at the last study wave (when the elderly are usually older), receiving both family care and care services (37.24%) become the most common situations. The proportion is even higher (42.19%) among the non-attritors (appendix-table IX-4). Although, one cannot draw conclusions in terms of 'remaining at home' (the elderly may leave the study and still live at home), the higher proportion of mixed care observed for the non-attritors at the last wave suggests that receiving both family and care services may have a protective effect (all the non-attritors are still living at home in 2002, when the panel ends). The distribution of care combination over study waves is available in appendix table IX-1.

The graph shows the distribution of care combination in a same population at two moments in time: it does not tell whether a respondent receiving mixed care at the first study wave still receives it at the last study wave. Although, the study of care changes and trajectories will only be treated in chapter X, it might be interesting to know if it is frequent to receive mixed care at least once and how many people have received care during all their study waves (graph IX-3, figures in appendix table IX-2).

**GRAPH IX-2:** Care combination at the first and the last study waves (PSBH 1994-2002, n=999)




**GRAPH IX-3:** Having received both family care and care services at the same time over the study waves (PSBH 1994-2002, n=999)



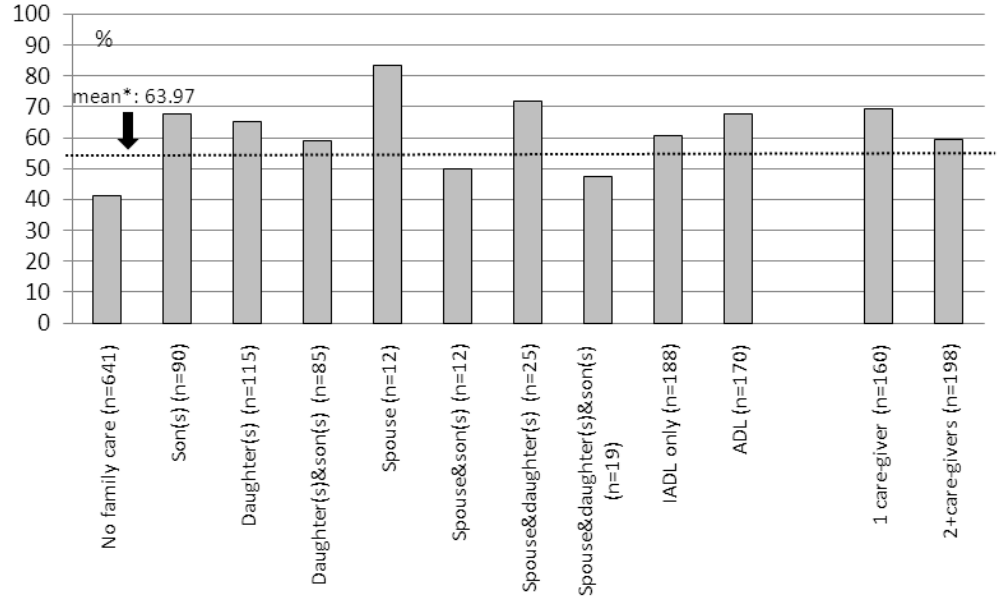

We can see that only a sixth (14.71%) of the 999 'at risk' elderly have always received mixed care, but, **half of the elderly have received at least once mixed care**. Receiving at least once mixed care but not always is the most common situation (35.44%). Only 11.11% of the elderly received family care, but

never at the same time as care services, and 25.23% received only care services. It means that 86.94% of the elderly received care at least once. This high percentage was already observed in chapter VIII when studying the "ever received care".

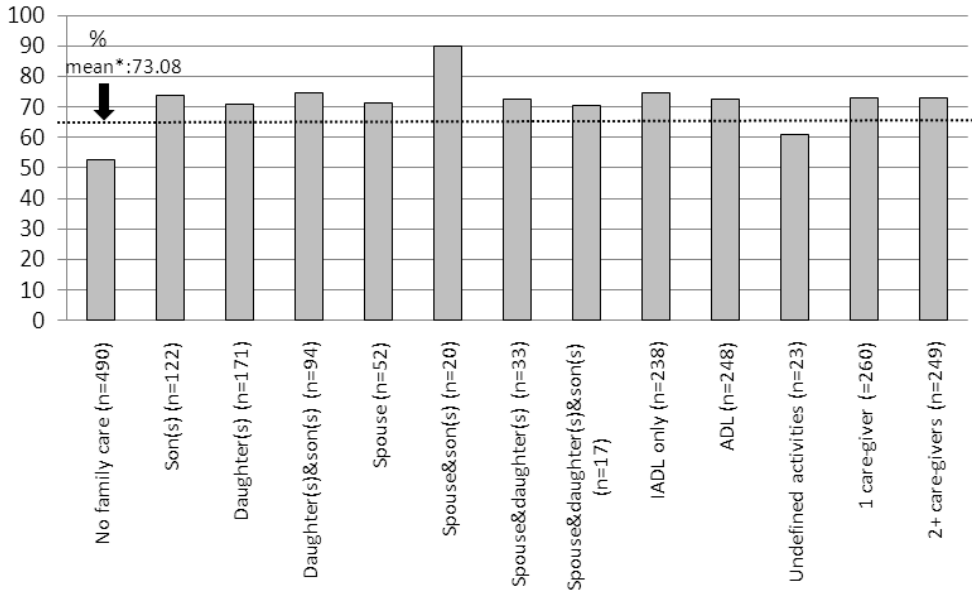
## *2. Care services used to complement family care*

A second way of describing the care combination is to measure its association with the other care aspects (is it more frequent to be in a mixed care combination when the spouse is the only care-giver? Or when IADL and ADL care are already provided by the family and that complementary care services could alleviate the family care load?...). The following graphs show the proportion of care services used at the first (graph IX-4a) and the last study wave (graph IX-4b) by other care aspects (figures in appendix table IX-3). Those receiving no family care (first bar 'no family care'), correspond to the percentage of respondents receiving only care services. All the other situations (bars), refer to the percentage of respondents receiving mixed care. The mean frequency of care services use at the first and the last wave serves as a reference to consider the relative position of the care configuration (always over/under the mean).

**GRAPH IX-4A:** Care services use (%) at the first study wave according to the other care aspects (PSBH 1994, n=999)



**GRAPH IX-4B:** Care services use (%) at the last study wave according to the other care aspects (PSBH 1994-2002, n=999)




*Note:* Although the analysis sample is the same at both waves, the number of elderly in a given care configuration can change. This is why the 'n' is given for each configuration at both waves. Note that the category 'undefined' care activities is missing at the first study wave because the category comes from the imputation of care through the variable on extra care provided by household members, which is not available at the first study wave (see chapter VI).
(*)The (overall) means are computed excluding the elderly receiving 'no care'.

The overall mean is higher at the last study wave (73.08% against 63.97% at the first study wave) and the differences are smaller, showing that receiving mixed care at the last wave is less 'particular' than at the first wave. Evidence in line with the complementary hypothesis is found: there is a lower percentage of care services use among the elderly receiving no family care. **It is more likely to use care services when family care is already provided than using it alone**[14]. Elderly receiving care from their spouse, daughter(s) and son(s) are also more likely to use care services. This is probably because there are enough family care-givers (at least 3) to assume the whole care responsibility. But no strong conclusion can be drawn because only a small number of elderly are is such a situation.

## B. Multiple correspondence analysis on the 999 elderly 'at risk' of receiving family care

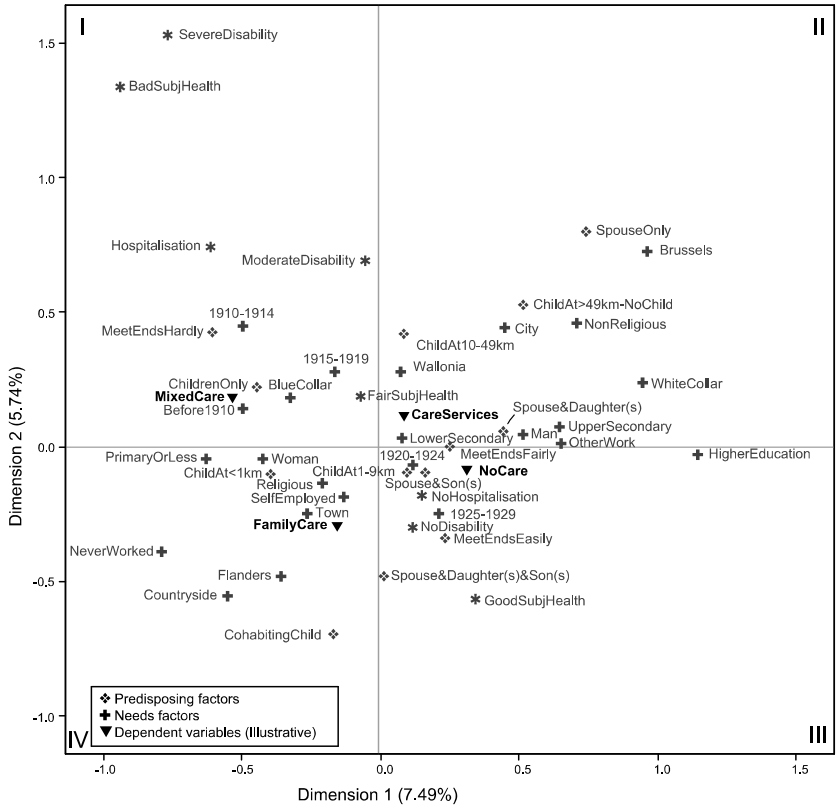
The first purpose of the multiple correspondence analysis is to describe the analysis sample and see how the selection criteria (see section 1) may lead to work on a sub-sample whose structure may differ from the one of the initial study sample of the 1,123 elderly. The second purpose is to do a first multivariate analysis including all the candidate independent variables as 'active variables' and the dependent variable (*W-COMBICARE*) as 'illustrative'. Compared to the previous question (ever received care), the analysis sample has not changed much (only nine elderly have been excluded). The main change from

[14] Of course, no conclusion on care articulation can be done before having controlled for the health status.

the analyses of chapter VIII is the inclusion of the time-varying variable (needs factors, ability to make ends meet, proximity of the closest child, and the time-varying version of the family constellation). For parsimony reasons, only the results of the analysis done at the first wave are displayed in the text (graph IX-5).

Alike the two previous questions, the first dimension (explaining here 7.49% of the inertia) is mainly determined by **socio-economic characteristics** opposing low statuses (difficulties to make ends meet, primary school diploma or less, never worked) on the left side to high statuses (higher education, white collar) on the right side. The urbanisation and religiosity variables are quite well represented in this dimension. Indeed the horizontal axis opposes characteristics associated with 'family care orientation' (left) to characteristics associated with 'non family care orientation' (right). The second axis (explaining 5.74% of the inertia) is not longer determined by the gender (like in the two previous questions) but by the **health status**: worse statuses have a positive value on the vertical axis (bad subjective health, severe disability and, to a certain extent, recent hospitalisation) when better statuses have a negative value (good health status and no disability). Each care combination is located in a different quadrant: 'mixed care' in the first quadrant, the one of the 'older and sick'; 'care services' in the quadrant II, the quadrant of the 'autonomous' (those who have no (close living) children available to care and/or have characteristics -living in Brussels or another city, being not religious – associated with a more autonomous lifestyle); 'no care' is in third quadrant, the one of the 'healthy young': there is no care because there are no care needs; finally, 'family care' is in the quadrant of the 'family prone' where more traditional characteristics are clustered (religious, living in the countryside and close living child(ren)). Note that 'cohabiting child' is the modality having the highest negative value on the 'health status' dimension, showing that cohabitation is more frequent among young (and healthy elderly): children may cohabitate either because they have not yet left the parental home or because they come from a more 'tradition' and 'family-oriented' family (as this modality is in the fourth quadrant). The analyses done at the last wave show similar results (see appendix graph IX-1).

**GRAPH IX-5:** Multiple correspondence analysis on the 999 elderly 'at risk' of all the care combinations, first study wave (PSBH 1994)




*Note*: one of the candidate variables ('spousal health') is not included in the multiple correspondence analysis as it is perfectly collinear with some modalities of the family constellation variable.

## C. Logistic regressions on the 'care combination'

### *1. Preliminary verifications*

All the variables included in the multiple correspondence analysis are candidate to be included in the regression. The decisions made earlier are still applied: favouring region to urbanisation level, and education ('primary or less'/'secondary or more') to the last occupational status, regrouping the two older cohorts, using family composition dummies. The two preliminary verifications are still made but the decisions are more difficult to take because some variables may fail the test at one of the two waves only. The sample size criterion might be softened for comparison purpose or in order to keep very important variables in the analysis. For instance, in the present situation (care combination), the 'very old' modality does not meet the criterion at the first wave. Only 9 cases (<10) received 'family care'. Regrouping the 'very old' with the next **cohort** would reduce (again) the inter-cohort variability and also increase the intra-cohort variability (as the older cohort group would include elderly born from 1900 to 1919). The decision is to keep the variable unchanged but to interpret only the coefficient of the modality 'very old' at the last wave (where the sample size criterion is met). Two others variables fail the sample size test at the first study wave: *W-SPOUSALHEALTH*[15] and *W-CLOSESTCHILD*. In these cases, regrouping appeared to be a reasonable option: spouse declaring a 'bad' or a 'fair' health status were regrouped and the proximity variable became a three-modalities variable[16]: 0: cohabiting child, 1: closest child living at less than 10 Km, 2: no child living at less than 10 Km.
The multicollinearity test (not shown) performed on all the independent variables after above-mentioned regrouping did not detect any problem.

### *2. Multinomial logistic regression analysis*

Alike the analysis of 'ever received care', the dependent variable has more than two modalities : at a given wave, the respondent may either receive 'no care', 'care services', 'family care' or 'mixed care'. Therefore, a multinomial logistic regression should be performed. The results of the multivariate full model at the first and at the last waves are displayed in table IX-1a and IX-1b. The distribution of the care combination by characteristics and bivariate results are in the appendix tables IX-4, 5a and 5b.

[15] This variable is preferred to the partnership variable, because it is more informative (accounting for the fact of living in couple or not and for the health status of the spouse).
[16] The regrouping is based on the proportion of respondents receiving family care or mixed care in each proximity modality and on the cell numbers.

**TABLE IX-1A:** Multivariate multinomial logistic regression on 'care combination' [*W-COMBICARE*] at the first study wave (PSBH 1994, n=999)

| | MULTIVARIATE FULL MODEL (first study wave) | | | | | |
|---|---|---|---|---|---|---|
| | **Services/*No*** | **Family/*No*** | **Mixed/*No*** | **Family/*Services*** | **Mixed/*Services*** | **Mixed/*Family*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | | | | | | |
| *rc: Man (n=449)* | | | | | | |
| Woman (n=550) | 1.27 | **1.68** ** | **1.72** ** | 1.33 | 1.36 | 1.03 |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (n=347)* | | | | | | |
| 1920-1924 (n=317) | 1.03 | 0.94 | **2.27** *** | 0.91 | **2.21** *** | **2.42** *** |
| 1915-1919 (n=162) | **2.24** *** | 1.14 | **4.03** *** | **0.51** * | **1.80** * | **3.53** *** |
| Before 1915 (n=173) | **2.88** *** | 0.75 | **6.20** *** | **0.26** *** | **2.16** ** | **8.33** *** |
| **Religiosity** | | | | | | |
| *rc: Non-religious (n=224)* | | | | | | |
| Religious (n=775) | 1.09 | 0.83 | 1.26 | 0.76 | 1.16 | 1.52 |
| **Education** | | | | | | |
| *rc: Secondary or more (n=544)* | | | | | | |
| Primary or less (n=455) | **0.53** *** | 0.78 | **0.70** * | 1.47 | 1.31 | 0.89 |
| **Region** | | | | | | |
| Flanders (n=449) | 1.12 | **1.89** ** | **1.87** *** | **1.69** ** | **1.67** ** | 0.99 |
| *rc: Wallonia (n=419)* | | | | | | |
| Brussels (n=131) | 0.70 | 0.67 | **0.48** ** | 0.96 | 0.69 | 0.72 |
| **Health** | | | | | | |
| *rc: No problem (n=434)* | | | | | | |
| Subjective problem (n=360) | 1.26 | **1.59** * | **1.73** ** | 1.26 | 1.37 | 1.09 |
| Moderate disability (n=95) | **2.23** ** | **2.39** ** | **2.76** *** | 1.07 | 1.23 | 1.16 |
| Severe disability (n=112) | 1.64 | **2.63** ** | **3.92** *** | 1.60 | **2.39** ** | 1.49 |
| **Recent hospitalisation** | | | | | | |
| *rc: No (n=807)* | | | | | | |
| Yes (n=192) | 1.15 | 1.32 | 1.33 | 1.15 | 1.15 Ns | 1.00 |
| **Ability to make ends meet** | | | | | | |
| *rc: Easily (n=363)* | | | | | | |
| Fairly (n=351) | **0.69** * | **0.57** ** | 0.94 | 0.82 | 1.35 Ns | **1.66** * |
| Hardly (n=285) | 0.71 | 1.20 | 1.35 | **1.68** * | **1.89** ** | 1.13 |
| **Spousal health** | | | | | | |
| *rc: Not in couple (n=341)* | | | | | | |
| Good (n=313) | **0.35** *** | 0.95 | **0.16** *** | **2.72** *** | **0.46** *** | **0.17** *** |
| Fair or bad (n=345) | **0.38** *** | 1.05 | **0.51** *** | **2.73** *** | 1.32 | **0.49** ** |
| **Number of children** | | | | | | |
| *rc: 0-1 child (n=319)* | | | | | | |
| 2+ children (n=680) | 1.06 | 1.40 | 0.96 | 1.31 | 0.90 | 0.69 |
| **Number of daughters** | | | | | | |
| *rc: 0 daughter (n=271)* | | | | | | |
| 1+ daughter(s) (n=728) | 1.19 | 1.57 | **1.66** ** | 1.32 | 1.40 | 1.06 |
| **Closest child proximity** | | | | | | |
| Cohabiting (n=123) | 0.87 | **8.61** *** | 1.29 | **9.84** *** | 1.48 | **0.15** *** |
| <10 Km (n=584) | 1.03 | **5.85** *** | **3.87** *** | **5.68** *** | **3.76** *** | 0.66 |
| *rc: 10 Km+/no child (n=292)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (n=615)* | | | | | | |
| Non-attritor (n=384) | **0.60** *** | 0.74 | **0.69** * | 1.23 | 1.15 | 0.94 |
| **MODEL INFORMATION** | | | | | | |
| **Intercept only' model**: -2LL=2,640.91; **Multivariate full model**: -2LL=2,230.67; AIC=2,362.67 | | | | | | |

**TABLE IX-1B:** Multivariate multinomial logistic regression on 'care combination' [*W-COMBICARE*] at the last study wave (PSBH 1994-2002, n=999)

| | MULTIVARIATE 'FULL' MODEL (last study wave) | | | | | |
|---|---|---|---|---|---|---|
| | Services/*No* | Family/*No* | Mixed/*No* | Family/*Services* | Mixed/*Services* | Mixed/*Family* |
| **PREDICTORS** | **OR** | **OR** | **OR** | **OR** | **OR** | **OR** |
| **Gender** | | | | | | |
| *rc: Man (n=449)* | | | | | | |
| Woman (n=550) | 1.31 | 1.36 | **1.65 **** | 1.04 | 1.27 | 1.22 |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (n=347)* | | | | | | |
| 1920-1924 (n=317) | 1.00 | 0.87 | 1.34 | 0.87 | 1.30 | **1.55 *** |
| 1915-1919 (n=162) | **1.93 **** | 0.76 | **2.34 ***** | **0.39 **** | 1.20 | **3.07 ***** |
| Before 1915 (n=173) | **4.60 ***** | 1.25 | **6.17 ***** | **0.27 ***** | 1.34 | **4.93 ***** |
| **Religiosity** | | | | | | |
| *rc: Non-religious (n=224)* | | | | | | |
| Religious (n=775) | 1.45 | 1.26 | **1.61 **** | 0.87 | 1.11 | 1.28 |
| **Education** | | | | | | |
| *rc: Secondary or more (n=544)* | | | | | | |
| Primary or less (n=455) | **0.39 ***** | 0.71 | **0.55 ***** | **1.81 **** | **1.39 *** | 0.77 |
| **Region** | | | | | | |
| Flanders (n=449) | **1.50 *** | **1.69 **** | **1.82 ***** | 1.13 | 1.2 | 1.08 |
| *rc: Wallonia (n=419)* | | | | | | |
| Brussels (n=131) | 0.62 | **0.41 **** | **0.51 **** | 0.66 | 0.8 | 1.24 |
| **Health** | | | | | | |
| *rc: No problem (n=310)* | | | | | | |
| Subjective problem (n=293) | 1.45 | 1.31 | **2.32 ***** | 0.90 | **1.60 *** | **1.77 *** |
| Moderate disability (n=166) | **2.70 ***** | **4.18 ***** | **8.44 ***** | 1.55 | **3.10 ***** | **2.02 **** |
| Severe disability (n=230) | **2.58 ***** | **3.57 ***** | **8.47 ***** | 1.38 | **3.30 ***** | **2.37 ***** |
| **Recent hospitalisation** | | | | | | |
| *rc: No (n=729)* | | | | | | |
| Yes (n=270) | 1.50 | 1.33 | **1.88 ***** | 0.89 | 1.26 | 1.41 |
| **Ability to make ends meet** | | | | | | |
| *rc: Easily (n=342)* | | | | | | |
| Fairly (n=349) | 0.71 | 1.06 | 0.82 | 1.50 | 1.20 | 0.78 |
| Hardly (n=308) | 0.73 | 1.46 | 0.84 | **2.00 **** | 1.15 | **0.57 **** |
| **Spousal health** | | | | | | |
| *rc: Not in couple (n=400)* | | | | | | |
| Good (n=246) | **0.21 ***** | **0.57 *** | **0.17 ***** | **2.75 ***** | 0.80 | **0.30 ***** |
| Fair or bad (n=353) | **0.34 ***** | 0.70 | **0.51 **** | **2.08 **** | **1.52 *** | 0.73 |
| **Number of children** | | | | | | |
| *rc: 0-1 child (n=319)* | | | | | | |
| 2+ children (n=680) | 1.15 | 0.87 | 1.19 | 0.75 | 1.03 | 1.37 |
| **Number of daughters** | | | | | | |
| *rc: 0 daughter (n=271)* | | | | | | |
| 1+ daughter(s) (n=728) | 0.97 | **1.79 *** | 1.24 | **1.85 **** | 1.28 | 0.69 |
| **Closest child proximity** | | | | | | |
| Cohabiting (n=108) | **0.28 ***** | 1.87 | 0.58 | **6.78 ***** | **2.12 **** | **0.31 ***** |
| <10 Km (n=605) | 1.06 | **3.42 ***** | **4.30 ***** | **3.23 ***** | **4.06 ***** | 1.26 |
| *10 Km+/no child (n=286)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (n=615)* | | | | | | |
| Non-attritor (n=384) | 0.95 | 1.02 | **1.66 **** | 1.08 | **1.75 ***** | **1.62 **** |
| **MODEL INFORMATION** | | | | | | |
| **Intercept only' model**: -2LL=2,655.13; **Multivariate full model**: -2LL=2,228.03; AIC=2,360.03 | | | | | | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

As it was already visible through the MCA, the more opposed care combinations are 'no care' and 'mixed care'. The model fits are very similar (AIC=2,362.67 at the first study wave and 2,360.03 at the last): it shows that the efficiency of the included independent variables in explaining the care combination is similar at both waves. The interpretation of the results will be restricted to test the formulated hypotheses.

## D. Hypotheses to test

### *1. Ageing hypothesis*

A first evidence of the ageing effect is the fact that the **proportion of elderly receiving mixed care is higher at the last study wave** than at the first wave as seen in graph IX-2. Another piece of evidence is the positive and progressive relationship between cohort and use of mixed care at both waves: **the older they are, the most likely they receive mixed care.** The cohorts 1920-1924, 1915-1919 and the 'very old' (before 1915) are more likely to receive 'mixed care' than the 1925-1929 cohorts. Then, they are more likely to received '**care services'** (significant OR >1 in 'care services' *versus* 'no care' and significant OR<1 in 'family care' *versus* 'care services'). Finally, as the cohort dummies are not significant in the regression part 'family care' versus 'no care', these two combinations share the third rank for the older cohorts: they are the least likely care combinations. A last observation which goes in the direction of the ageing hypothesis is the **lower effect of cohort dummies at the last study wave** compared to the first study wave: the odds of the cohort 1915-1919 is lower in regression parts having 'no care' as reference category, showing that all the analysis sample is ageing and that differences between groups become smaller. If the odds of 'the very old' remain high, it is probably because they are more selected since the beginning (they probably benefit from an adequate care configuration allowing them to remain at home at a very old age). At the last wave, the relationship between cohort and receiving 'mixed care' rather than 'care services' is no longer significant, **it is mainly the health status which makes the difference** (elderly having any disability problems have three times the odds of receiving care rather than care services, compared to the elderly having no health problems). At the first study wave, the cohort was significant and only severe health problems make a difference.

### *2. Family solidarity hypothesis*

The hypothesis is that the nuclear family is the first and the main source of elderly care. Therefore, a **positive relationship between the presence of care needs and family care** (family care only or in combination with care services) is expected. The two variables used to measure needs are the combined 'health status' variable and 'recent hospitalisation'. The null hypothesis is the absence of a positive relationship between elderly health needs and the presence of family care (it might be that the family is not willing or unable to care and that the elderly has to use care services only and even to manage it on his own).

For the first variable, the null hypothesis can be rejected: at both waves, the elderly having health problems are more likely to receive family care or mixed care than no care at all. At the first wave, no significant difference is found between receiving only family care or mixed care, but at the last wave, the elderly having more severe health problems are more likely to receive mixed care than family care only. This difference may reflect the ageing process: the older the respondent is, the more likely he will be to

use care services[17] (the positive relationship between cohorts and care services use is observed at both waves), and at the last wave, the respondents are older than at the first wave. The health needs do not seem to influence the preference for an exclusive use of family care rather than for care services (neither in the multivariate nor in the bivariate analysis). It is rather **the availability of family care-givers** - (healthy) spouse, daughter and/or close living children – **which will determine this choice** (see hierarchical compensation hypothesis).

For the second need variable, hospitalisation, the null hypothesis cannot be rejected: having being hospitalised recently does not influence much family care (the effect is only significant for receiving mixed care rather than no care at the last wave). A possible explanation is that post-hospitalisation care often consists in short-term and specialised medical acts performed by a nurse. As no information on this type of care was available in the PSBH data, it cannot be accounted for in the analysis.

### *3. Hierarchical compensation hypothesis*

According to the hierarchical compensation hypothesis, the care services are used in complement to family care when the spouse and children are no (longer) able to assume the whole care responsibility. If this is true, several relationships can be expected.
**First**, **a negative relationship between living in couple and receiving care services (only or mixed) is expected.** However, this relationship may be weakened or even reversed if the spouse has a bad health status.

The analyses show that: the elderly living in couple are more likely to receive no care or only family care at both waves, the effect is always stronger when the spouse is healthy (OR further from 1). Nevertheless, an ageing effect (for the elderly and his spouse) can be observed: at the last wave, the elderly having an unhealthy spouse are more likely to receive mixed care than care services only, while the elderly having a healthy spouse are still less likely to receive mixed care rather than family care only. Elderly having an unhealthy spouse are as likely as the spouseless elderly to receive mixed care rather than family care only.

**Second, having two children or more, at least a daughter or having a child living nearby are expected to be negatively associated with the use of 'care services' and positively with receiving 'family care'**: when there are children, they are likely to provide care in substitution or in complement to the spousal care. No particular relationship is expected with 'mixed care' because the literature has shown that children are not averse to the use of care services if it could alleviate their own care responsibility and allow them to assume their competing roles, if any.

The analyses results ask for a nuanced interpretation. In the multivariate model, the number of children is neither significant at the first, nor at the last study wave and having a daughter has only a positive effect on receiving 'mixed care' rather than 'no care' at the first study wave, and on receiving 'family

[17] An interesting observation on the relationship between health and use of care services is the following: at the first study wave (when the elderly are generally younger), those having a moderate disability are more likely to use care services than no care at all (OR= 2.23) compared to the elderly having no health problem. This is no longer true for the elderly having severe disability at this wave (who are only more likely to receive mixed care). At the last study wave, all the elderly having health problems (whatever the level) are more likely to use care services, rather than receiving no care. This between-waves difference can be interpreted as if, at the first study wave, using only care services may be sufficient because the disability is moderated and the ageing progress less 'advanced'. This is also true in the bivariate results (where the relationship between moderate disability and care combination is less determined than it is for the other levels of health problems).

care' rather than 'no care' or than 'care services' at the last study wave. In the bivariate analyses, these two variables have a significant and positive effect on receiving family care (only or mixed) on all the parts of the regression. In addition, having two children or more was negatively associated with receiving mixed care rather than family care only: when there are enough children to share the care responsibility, care services are not necessary. Indeed, when controlling at the same time for the children's number, gender and proximity of children weaken the effect of those variables in the multivariate regression.

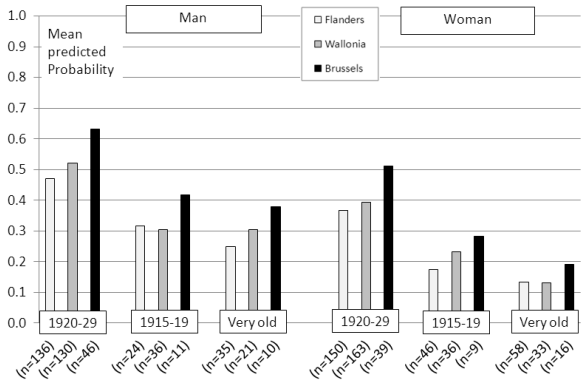
Due to small numbers, the proximity variable was recoded and the two modalities included in the regression correspond to two different realities: elderly having a 'cohabiting child' are usually younger, healthier and thus, less likely to receive care[18]. Having a child living nearby (less than 10 Km) is not related to a particular life-stage but usually testifies of a close relationship with this/those child/ren and thus of a higher likelihood of receiving children care. Therefore, it is not surprising that the effect of the proximity dummy 'cohabiting (child)' differs between the first and the last study wave. Elderly having a cohabiting child are more likely to be in a 'family care' combination than in any other one, but at the first study wave, there are no significant differences between receiving care services, mixed care and no care, while at the last wave (probably due to ageing), receiving 'mixed care' or 'no care[19]' is more likely than receiving only 'care services' for this group (the elderly having a cohabiting child). Elderly having their closest child living at less than 10 Km are more likely to receive family care (only or mixed) than 'no care' or 'care services'. This last observation, made at both waves, is consistent with the hierarchical compensation hypothesis: care services are less frequently used when children are available[20].

### *4. Regional differences hypothesis*

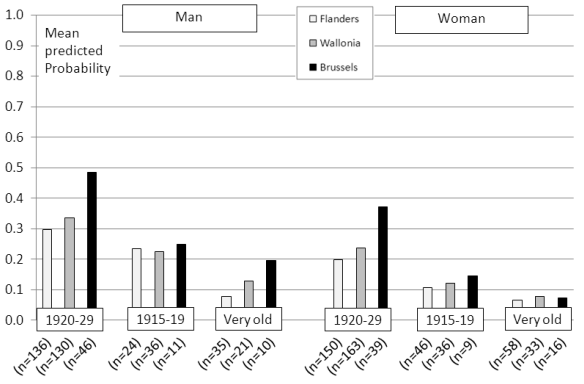
The last hypothesis to test concerns the presence of regional differences: the Flemish would be more likely to receive family care and the Brussels inhabitants less likely. The results of the analysis are interesting because they change according to the considered wave: at the first wave, the Flemish is more likely to receive family care (only or mixed) than no care or to use care services compared to the Walloons. At the last wave, there are no longer significant differences between the three 'effective' care combinations (receiving care services, family care or mixed care), but the Flemish are more likely to receive any type of care rather than no care. As for the Brussels inhabitants, they are less likely to receive mixed care than no care at both waves and also less likely to receive family care rather than no care at the last wave. All these observations are in line with the above-mentioned hypothesis. The graphs IX-6a to IX-6d illustrate this: the mean predicted probability of receiving no care is higher for the Brussels inhabitants at both waves and for each gender and age combination, while the probability of receiving only family care is higher in Flanders. The figures for the four care combinations are given in appendix tables IX-6a and IX-6b.

[18] In chapter VII, we saw that adult children still living with their parent is more frequent than 'care cohabitation'.
[19] This may correspond to an 'undeclared' family care situation. Cohabitant children are sometimes assimilate to spouse (Tennstedt *et al.* 1993) in the sense that they are more likely than non-cohabiting child to consider some activities as task division rather than as care activities.
[20] It should not be forgotten that the geographical proximity is a 'proxy' measure of children care availability.

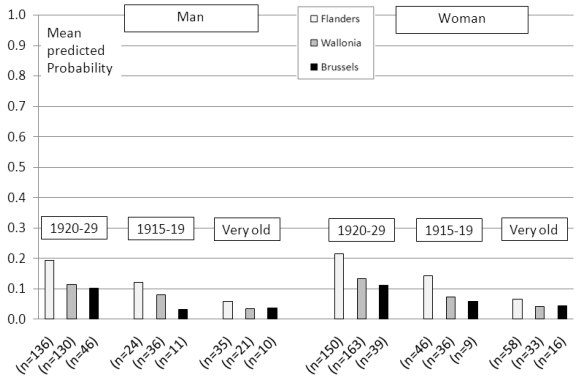
**GRAPH IX-6A:** Mean predicted probability of receiving no care at the first study wave by gender, region and cohort group (PSBH 1994, n=999)




**GRAPH IX-6B:** Mean predicted probability of receiving no care at the last study wave by gender, region and cohort group (PSBH 1994-2002, n=999)




**GRAPH IX-6C:** Mean predicted probability receiving family care at the first study wave by gender, region and cohort group (PSBH 1994, n=999)




**GRAPH IX-6D:** Mean predicted probability receiving family care at the last study wave by gender, region and cohort group (PSBH 1994, n=999)




## *SECTION 3. Who receives care from the spouse? From the daughter(s)? From the son(s)?*

So far, we have considered the relationship between the family constellation or the family composition aspects and care. Controlling for the cohort, 'well-surrounded' elderly (having spouse and children) were more likely to receive family care. However, **it does not mean that all his 'potential' care-givers will 'effectively' provide care.** Among the 128 elderly having a spouse, daughter(s) and son(s) and receiving family care at the last wave, only 13% (n=17) declared receiving care from each of them. In most cases, they declared only care from daughter(s) and son(s) (30%). This example is maybe not the best because of the under-declaration of spousal care. But the same is observed for elderly having two or more daughters/sons and receiving care at the last wave: they are more likely to receive daughter/son care

than those having only one daughter or one son (84%[21] against 78% for daughter care and 77% against 66% for son care), but they will not necessarily receive care from all their daughters or sons: 58% of the elderly having two or more sons and receiving son care are cared by only one son, and 46% of the elderly having two or more daughters and receiving daughter care are cared by only one daughter. Therefore, if the family constellation ('potential' care-givers) does not fully determine the 'effective' care-giver type(s) combination, further analysis should be done to identify the determinants of spousal, daughter and son care and to see how the care decisions of one type of care-giver is influenced by the others. The above results already show that daughters are more likely to be involved in the care configuration (84% compared to 77%), but multivariate analyses are needed to test the hierarchical compensation hypothesis between the family care-givers: the spouse is the first to provide care, children (especially daughters) are the second choice care-givers when the needs became too heavy for the spouse or when the spouse is no longer available for caring.

The three care-giver types will be treated in parallel at each analysis step.

# A. Description

## *1. Children care is more frequently 'declared' without gender differences*

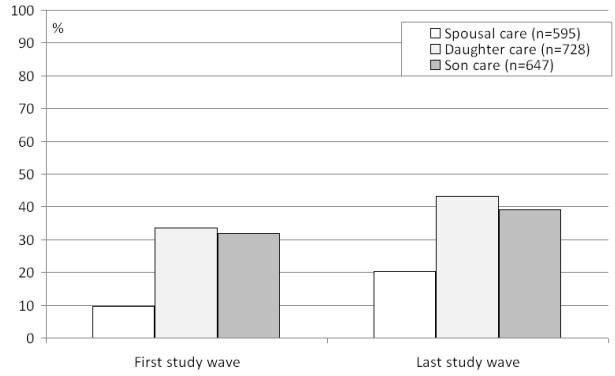
Graph IX-7 gives the proportion of spousal, daughter and son care observed at the first and the last study waves in the respective 'at risk' samples[22] (the proportions observed at each study wave are in appendix table IX-7 to IX-9). Elderly having a spouse (n=595) are less likely to 'declare'[23] spousal care than elderly having a daughter/son are likely to 'declare' daughter/son care and this is true at both waves. There is nearly no difference between daughters and sons: the elderly having a son are nearly as likely to 'declare' son care as elderly having a daughter are likely to 'declare' daughter care. These observations are consistent with the literature: spousal care is often under-declared and only small gender differences in children care are observed when the simple fact of caring or not is considered: sons and daughters are both supportive to their elderly parents but in a different way. Gender differences are expected to appear when other aspects of family care will be considered. Comparing the proportions at both waves, there is an increase in the frequency of the three types of care (ageing process), but it is more marked in spousal care (9.75% at the first study wave against 20.34% at the last). This larger difference may be explained by a better declaration of spousal care at the last wave: the care load has become heavier and is therefore more 'visible' and therefore recognised as 'care'.

Another way of looking at the care provided by spouse, daughters and sons is to consider all the elderly receiving care at the first and at the last study waves and to see what are the most frequent care-giver types combinations (graph IX-8, figures in appendix tables IX-10). This approach confirms what was observed in graph IX-6: most of the elderly declared receiving only children care (80.00%[24] at the first study wave and 76.04% at the last). Daughters are more often involved in care (in 68.15% of the cases at the first study wave and in 61.89% at the last study wave) than sons are (57.54% and 49.71%).

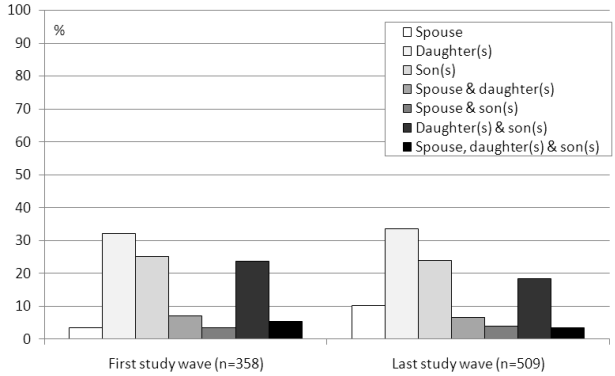
[21] Proportion of elderly having two or more daughters and receiving care from their daughter(s) at the last wave (computed on the 401 elderly having daughters and receiving family care at the last wave).
[22] Elderly may be included in more than one 'at-risk' sample (e.g. those having spouse and daughter(s) are 'at-risk' of spousal care and 'at-risk' of daughter care).
[23] The term 'declared' is used rather than 'received', to emphasise that the information available in the PSBH refers only to the 'declared' care and not to the effectively received care. As an under-declaration of spousal care is highly suspected, it is important to remember this 'declaration bias'.
[24] It is the sum of proportions of 'daughter(s)', 'son(s)', 'daughter(s) & son(s)'.

Interestingly, the distribution of the care-giver type's combinations is quite similar at both waves, except for the increased proportion of 'spousal care' only (from 3.35% to 10.22%).

**GRAPH IX-7:** Spousal, daughter and son care 'declared' at the first and the last study waves (PSBH 1994-2002)




**GRAPH IX-8:** Care-giver types combinations at the first and the last study waves (PSBH 1994-2002)

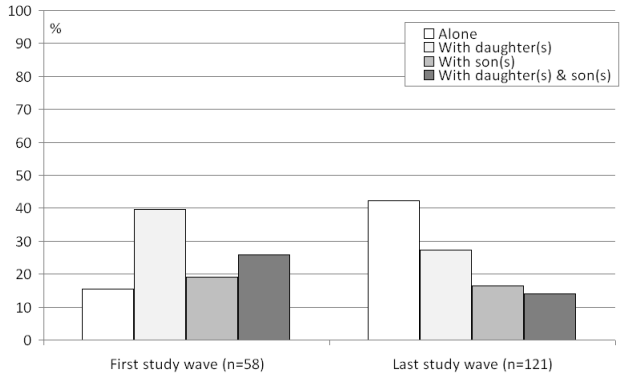



To compare the propensity of the spouse, daughters and sons to be the sole care-giver, the analysis should be done separately for each care-giver type (see graphs IX-9a to IX-9c, figures in appendix table IX-11 to IX-13). Here, 100% correspond to the number of elderly receiving care from a given type of care-giver at a given wave. There are only 58 elderly receiving spousal care at the first study wave but this number doubles at the last study wave. It clearly appears that an elderly is more likely to receive care from daughters only[25] than from daughters and other types of care-givers. Receiving care from sons is less frequent and when it occurs, the son(s) are nearly as likely to be the sole care-giver(s) (third bar=25.14% of care-givers type observed at the first study wave and 23.97% at the last study wave) as sharing care with their sisters (sixth bar= 23.74% at the first study wave and 18.47% at the last study wave). Spouses who declare providing care at the first study wave are more likely to care with other care-givers (sum of the fourth, the fifth and the seventh bars=15.64%) than alone (first bar=3.35%). The difference is much lower at the last study wave (13.75% against 10.22%).

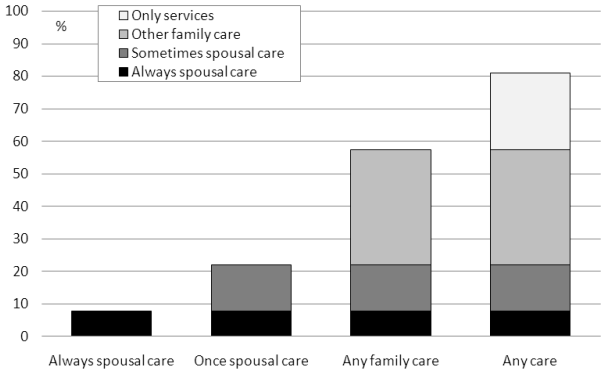
A last univariate description of the care-giver types consists in measuring the proportion of elderly 'at risk' of a given care-giving type who have 'always', or 'at least once', received care from this type of care-giver (graphs IX-10a to IX-10c, figures in appendix table IX-14). This is the same kind of graph than the one done on the care combination: 100% correspond to the number of elderly 'at risk' (all the study waves are considered). We can see that only 7.73% of elderly living in couple always receive spousal care but the proportion is tripled (22.02%) if one considers having received spousal care at least once over the study waves. Interestingly, a third (35.29%) of the elderly having a spouse receives only children care ('other family care'). The proportion is higher than for the two other types of care-givers probably because of the under-declaration of spousal care. Receiving always daughter or son care is more frequent (respectively 28.84% and 18.86% of the risk groups) and elderly having daughter(s) or son(s) will usually 'declare' receiving care from them at least once (55.36% of the elderly having a daughter will receive daughter care and 53.48% of the elderly having a son will receive son care).

[25] 'Only' means 'with no other type of care-giver'. In one case over four, 'daughter(s) alone', there is more than one daughter caring. Similar proportion is observed for 'son(s) alone' (37.33% at the first study wave and 28.83% at the last study wave).

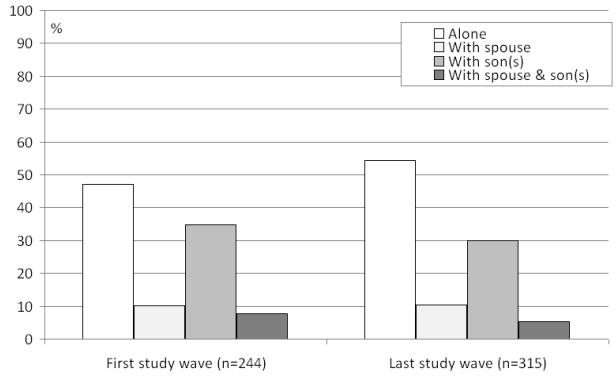
**GRAPH IX-9A:** Care-giver types combinations including spouse at the first and the last study waves (PSBH 1994-2002)



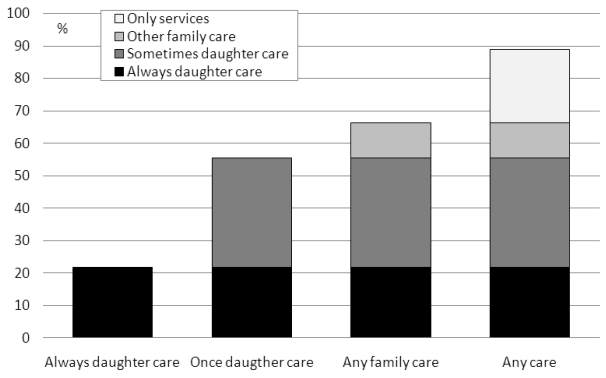

**GRAPH IX-10A:** Having received spousal care over the study waves (PSBH 1994-2002, n=595)



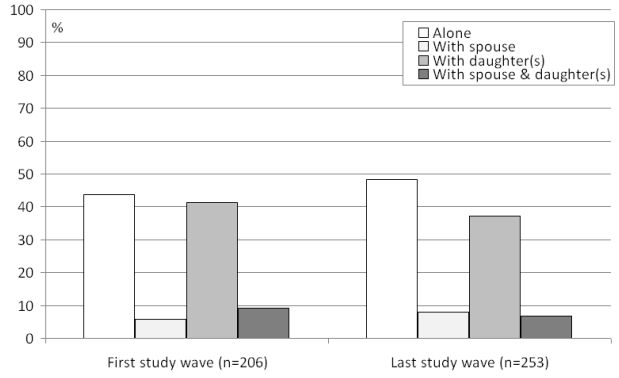

**GRAPH IX-9B:** Care-giver types combinations including daughter(s) at the first and the last study waves (PSBH 1994-2002)



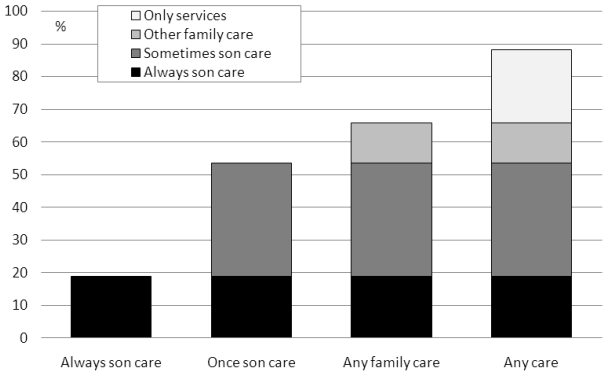

**GRAPH IX-10B:** Having received daughter care over the study waves (PSBH 1994-2002, n=728)




**GRAPH IX-9C:** Care-giver types combinations including son(s) at the first and the last study waves (PSBH 1994-2002)




**GRAPH IX-10C:** Having received son care over the study waves (PSBH 1994-2002, n=647)



### *2. Spousal care is declared when the care intensity is higher*

In the previous descriptive analyses, the lower proportion of spousal care compared to daughter(s) and son(s) was interpreted as an under-declaration of spousal care. The idea behind is that spousal care tends to be declared only when intensive care is provided or when there are other care providers (care services or children care). In both situations, care becomes more visible: in the first situation, because the 'help' becomes too heavy to be only considered as a 'natural' task division; in the second situation, because the presence of other care providers who are recognised as such may lead the spouse to recognise himself as care provider too. To test this, one should assess if the 'declared' spousal care refers more frequently to an 'intense' or a 'shared' care situation than the declared daughter or son care. It consists in comparing the percentage of 'IADL&ADL' care, 'care services', '2+ care-givers' among those receiving care from spouse, daughter(s) or son(s) at the first and the last study waves, (figures in appendix table IX-15).

The main difference between spousal care and children care lies in the proportion of 'IADL&ADL' care. At both waves, spousal care is more frequently declared in a situation of intensive care 'IADL&ADL' (41.38% of the elderly receiving spousal care at the first study wave received IADL&ADL care and 45.45% at the last study wave), than it is the case for daughter care (34.84% and 40.00%) or son care (32.04% and 39.53%). For the number of care-givers, graphs IX-8a to IX-8c have already shown that the spouses were more likely to share the care responsibility with children but only at the first study wave. As for the use of care services, no differences are observed between spousal care and children care (around 61-62% at the first study wave and between 72 and 75% at the last study wave). However, this absence of difference can also be considered as an evidence of the under-declaration of spousal care: in the care combination analysis and in the 'ever' approach analyses, living in couple was clearly associated with a lower likelihood of using care services; and now, when considering 'declared' care, no difference is found in the use of care services by spouse or child care-givers, while the literature suggests that spousal care-givers are less likely to use care services in complement than children care-givers. A possible explanation is that the declaration of spousal care occurs in particular conditions (when the couple already accepts to use care services and is led to 'recognise' the care situation).

## B. Multiple correspondence analysis and specific sub-samples

The next analysis step is the MCA: six[26] separated analyses were done (see appendix graphs IX-2a to IX-4b)[27]. Like for the care combination, the first dimension is mainly defined by the socio-economic characteristics of the elderly (opposing 'Brussels', 'higher education', 'non-religious' and 'white collar' to 'countryside', 'primary or less', 'never worked' and 'meet ends hardly') and the second dimension is defined by the health status (opposing 'severe disability' and 'bad subjective health' to 'no disability' and 'good health status'). The dependent variable (spousal, daughter or son care) was put as illustrative: in the six graphs, the 'no … care' is very close to the centroid and the '…care' modality slightly decentred to the 'low socio-economic status' axis side. This is consistent with the idea that the elderly having a low socio-economic status are more likely to receive family care. Concerning the relationship with health

[26] One MCA is done for each care-giver type at the first and at the last study wave.

[27] The graphs are not displayed for parsimony reasons but also because the trends appear less clearly on the graph than they were for the care combination. This is probably because two of the independent variables (family constellation and proximity of the closest child) are partly determined by the sub-sample definition. For instance, the sub-sample 'at-risk' of spousal care includes only four family constellations ('spouse only', 'spouse & daughter(s)', 'spouse & son') and the proportion of elderly having their closest child living at more than 49 Km or having no child is higher in this sub-sample (as having a child is not required).

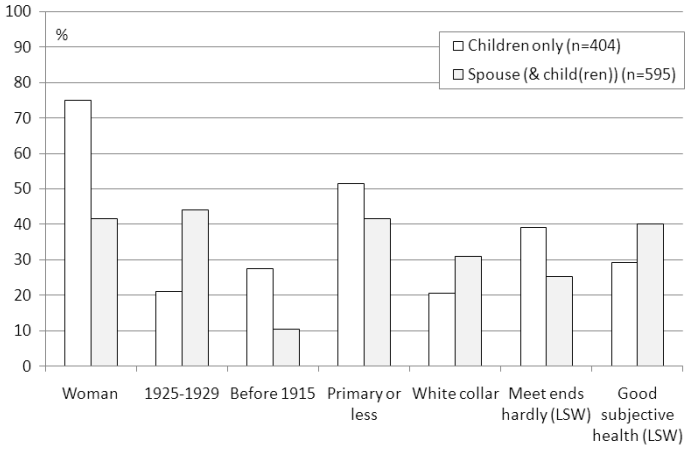
needs: whatever the care-giver type, receiving care seems not to be related to the health status at the first wave (the '…care' is on the health axis) but at the last wave, the modality is on the 'poor health' side of the health status axis).

To complement the MCA and assess whether the sub-samples represent specific characteristics which may influence the results of the regression analysis, a comparison of the characteristics of included and excluded elderly was done for the three sub-samples. The first, comparing the spouseless elderly ('only children'[28] constellation) and the elderly living in couple shows interesting results (see frame IX-3).

Graph IX-11 shows the characteristics at the first or at the last study wave for which the difference in proportions is >10% between the 'only children' elderly and those having a spouse[29].

**FRAME IX-3:** Zoom on the 404 elderly having only children

**GRAPH IX-11:** Main differences between elderly having 'only children' and those having a spouse (PSBH 1994-2002)




As it was already mentioned in chapter VIII, when comparing the 'family-less' with the other family constellation, the elderly having no spouse are usually older women, low educated and having difficulties to make ends meets. On the graph, we can also see that the elderly having only children have a poorer health status at their last wave. This may be linked to a higher proportion of very olds in the sub-population, (figures in appendix table IX-16).

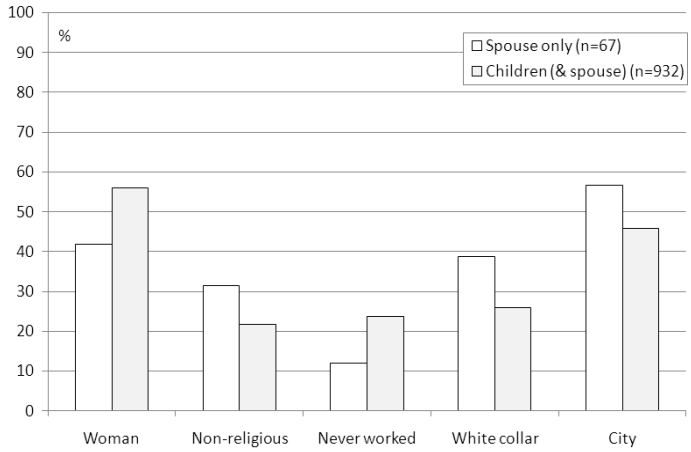
Now, if all the elderly having child(ren) (n=932) are considered, one can notice that respondents having only children are more likely to have ever received children care over the study waves (69.55% against 57.95% for those having spouse and children). This is consistent with the hypothesis that children are second choice care-givers (after the spouse).

The two other comparisons (elderly having a daughter or not, a son or not) were more difficult to interpret[30]. This is probably because it is the fact of having children or not ('only spouse' constellation) that makes the difference (see frame IX-4).
Graph IX-12 shows the characteristics at the first or at the last study waves for which the proportion difference is >10% between the 'only spouse' elderly and those having child(ren)

[28] The comparison is restricted to the 999 family-members elderly being 'at-risk' of family care at both waves. It means that it aims at identifying characteristics of a specific group of spouseless elderly: those having only children; the spouseless elderly having no children – the family-less - have already been studied and excluded in chapter VIII.
[29] The results for the other characteristics related to frame IX-2 and IX-3 are given in appendix table IX-16.
[30] Except for the cohort variable (older elderly were more likely to have daughter(s)), no significant differences are found between the elderly having daughter(s) or not. More significant differences are found between the elderly having son(s) or not, but this may be only due to the fact that having a daughter is more frequent than having a son among the 999 elderly (73% against 65%). There is no reason to think that the gender of the children is related to the elderly personal characteristics.

**FRAME IX-4:** Zoom on the 67 elderly having only a spouse

**GRAPH IX-12:** Main differences between the elderly having 'only spouse' and those having children (PSBH 1994-2002)




Having no child is not common among the study cohorts. One may therefore expect that the childless elderly have specific characteristics (probably negatively associated with a family-oriented behaviour). And indeed, the childless elderly tend to be less religious, more often 'urban' and 'white collar', (figures in appendix table IX-16).

Now, if all the elderly having a spouse (n=595) are considered, it is interesting to notice that the respondents having only a spouse are less likely to have ever received spousal care (14.93% against 23.11% for those having spouse and children). This is consistent with the hypothesis that spousal care is more frequently 'declared' when there are other (potential) care-givers.

## C. Logistic regression on 'spousal care', 'daughter care' and 'son care'

### *1. Preliminary verifications*

Before doing the verifications, some adaptations of the family composition dummies must be made to avoid empty modalities. The adaption choices (see table IX-2) follow three principles: the first is to keep as much **information** as possible (health of the spouse, gender and number of the children); the second is to have a **meaningful 'null' combination** (the combination obtained when all dummies equal '0' should be 'possible'); the third is to make a choice that facilitates the **comparisons** between the three care-giver types regressions (the dummies should be as similar as possible).

**TABLE IX-2:** Definition of the family composition dummies in the three care-giver type regression models

| | DEPENDENT VARIABLE | | |
|---|---|---|---|
| **CARE-GIVER TYPE** | **Spousal care** | **Daughter care** | **Son care** |
| **Spouse** | **No spouse (na)**<br>*Healthy spouse(rc)*<br>Unhealthy spouse | *No spouse (rc)*<br>Healthy spouse<br>Unhealthy spouse | *No spouse (rc)*<br>Healthy spouse<br>Unhealthy spouse |
| **Daughter** | *0 daughter (rc)*<br>1+ daughter(s) | **0 daughter (na)**<br>*1 daughter (rc)*<br>2+ daughters | *0 daughter (rc)*<br>1+ daughter(s) |
| **Son** | *0 son (rc)*<br>1+ sons | *0 son (rc)*<br>1+ sons | **0 son (na)**<br>*1 son (rc)*<br>2+ sons |
| **'Null' combination** | healthy spouse | 1 daughter | 1 son |

The two tests were carried out separately for each care-giver type and at both waves. The most 'problematic' situation is the spousal care sub-sample at the first study wave. Indeed, there are only 58 elderly[31] receiving spousal care, and the sample size criterion was not met for the following modalities: living in Brussels, being non-religious, declaring a moderate disability, having a cohabiting child, having the closest child living at 10 Km away or more. At the last study wave, 121 elderly receive spousal care and the sole modality failing the sample size check is Brussels. Besides these sample size problems, the multicollinearity test was negative and the decision was to keep all the variables[32], but to not interpret the effect of 'problematic' modalities (e.g. Brussels at both waves) or the variable effect when the reference category has a small number problem (e.g. proximity of the closest child at the first study wave).

Neither sample size nor multicollinearity problems were detected for the daughter care or the son care sub-samples.

[31] They may be quite particular elderly: a first analysis of their care trajectory shows that 79.31% (n=46) of them always receive spousal care (while only 65.16%/59.22% of the elderly receiving daughter/son care at the first study wave have always received daughter/son care).

[32] An alternative model, where the urbanisation level replaces the region and where moderate and severe disabilities are regrouped, was tested. Its fit (AIC) was worse and the number of significant variables was lower than for the 'original model' at both waves.

## *2. Binary logistic regression analysis*

Three couples of binary logistic regressions were carried out: the first on spousal care at the first and the last study wave, the second on daughter care and the third on son care. The variables included in the 'full' multivariate model are the same for all the regressions (table IX-3)[33]. It is therefore possible to make some effect comparisons (e.g. has the health status of the elderly a significant effect on each type of care-giver?). To interpret the regression results, it is important to be aware of the fact that the reference category includes all the respondents receiving 'no care' … **from the given type of care-giver**' at the given wave. It means that, for instance, that in the 'daughter care' regressions, the reference category includes respondents receiving no family care, or only spousal and/or son care[34].

A first analysis of the results shows that the socio-demographic and economic characteristics[35] do not seem to influence the likelihood of receiving care from a given type of care-giver except for the **region**: the Flemish elderly are more likely to receive care from their spouse (OR= 2.22 and 2.14) and from their daughter(s) (OR=1.81 and 1.91). It is rather the **health status** and the **presence of other potential care-givers** which have an effect: the elderly having severe disabilities are always more likely to receive care (whatever the care-giver type and the wave). Interestingly, health seems to be a more determinant factor at the last study wave because the elderly having only moderated disabilities are also more likely to receive care from any type of care-giver (OR =6.87 for spousal care, 2.37 for daughter care and 2.33 for son care), while only having a severe disability is significant at the first wave for all the care-giver types (OR are respectively = 3.45, 1.92 and 1.75). This between-wave difference is consistent with the ageing hypothesis: the health status becomes a more important predictor of care.

Concerning the effect of the presence of other potential care-givers, one can notice that having a child living nearby is associated with a higher likelihood of receiving care from any type of care-givers: this close living child does not necessarily provide care but can probably be a support for the elderly and his care-giver. The effect of the family composition dummies will be discussed in the next point when the hierarchical compensation hypothesis is tested.

[33] Distribution of spousal, daughter and son care by characteristics and the bivariate results are in appendix tables IX-17 and IX-18.

[34] Two main other options are possible and can be explained using the example of daughter care. The first is to run a regression excluding respondents having a daughter and receiving only spouse or son care. This option has the advantage of a well-defined and quite homogeneous reference category ('elderly receiving no family care'). Its main disadvantage is that it excludes the 'negative' cases: where daughters are 'there' but not involved in care. Thus, this option fails to answer the question 'what are the determinants of daughter care?' The second option is to run the regression on respondents having a daughter **and receiving family care** at the given wave. Respondents receiving no care are excluded. Again, the reference category is well-defined (respondent receiving only son or spousal care) and negative cases are not excluded. Initially, it was this option that I did prefer. But, I quickly identified two important disadvantages: first, respondents having only daughters (and who are probably the most likely of receiving daughter care) should be excluded, because they are not 'at-risk' of being in the reference category. Second, this option does not really answer the question on daughter care determinant, but rather the question 'given that family care is provided, what determines the participation of daughters to the care configuration'. Finally, these two alternative options have a common disadvantage: as the sub-sample depends on the family care situation at the given wave, the sub-samples at the first study wave and at the last study wave differ.

[35] The mean predicted probabilities by gender, region and cohort groups are not displayed, as only one of these characteristics, the region, has a significant effect.

**TABLE IX-3:** Full multivariate binary logistic regression on 'spousal care' [*W-SPOUSALCARE*], 'daughter care' [*W-DAUGHTERCARE*], and on 'son care' [*W-SONCARE*], at the first and the last study waves (PSBH 1994-2002)

| | SPOUSAL CARE (n=595) | | DAUGHTER CARE (n=728) | | SON CARE (n=647) | |
|---|---|---|---|---|---|---|
| | First study wave **OR** | Last study wave **OR** | First study wave **OR** | Last study wave **OR** | First study wave **OR** | Last study wave **OR** |
| **PREDICTORS** | | | | | | |
| **Gender** | | | | | | |
| *rc: Man* | | | | | | |
| Woman | 1.32 | 1.25 | 1.24 | 1.06 | 1.37 | **1.44 **** |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929* | | | | | | |
| 1920-1924 | 1.02 | 1.09 | **1.43 *** | 1.09 | 1.19 | 1.04 |
| 1915-1919 | 1.33 | 1.33 | 1.19 | 0.78 | 1.42 | 0.95 |
| Before 1915 | 1.86 | 1.56 | 1.33 | 1.14 | 1.27 | 1.43 |
| **Religiosity** | | | | | | |
| *rc: Non-religious* | | | | | | |
| Religious | *1.30* | 1.34 | 1.27 | 1.18 | 1.08 | 0.92 |
| **Education** | | | | | | |
| *rc: Secondary or more* | | | | | | |
| Primary or less | 0.72 | **0.60 *** | 1.18 | **1.34 *** | 0.81 | 1.06 |
| **Region** | | | | | | |
| Flanders | **2.22 **** | **2.14 ***** | 1.81 *** | **1.91 ***** | 1.28 | 0.78 |
| *rc: Wallonia* | | | | | | |
| Brussels | *0.20* | *0.42* | *0.68* | 0.73 | 0.80 | 0.57 |
| **Health** | | | | | | |
| *rc: No problem* | | | | | | |
| Subjective problem | 1.80 | 1.44 | 1.30 | **1.76 **** | 1.39 | 1.00 |
| Moderate disability | *1.12* | **6.87 ***** | **1.69 *** | **2.37 ***** | 1.03 | **2.33 ***** |
| Severe disability | **3.45 **** | **11.18 ***** | **1.92 **** | **2.60 ***** | **1.75 *** | **1.83 **** |
| **Recent hospitalization** | | | | | | |
| *rc: No* | | | | | | |
| Yes | 1.56 | 1.45 | 0.92 | 1.11 | 1.08 | **1.47 *** |
| **Ability to make ends meet** | | | | | | |
| *rc: Easily* | | | | | | |
| Fairly | 1.04 | **1.73 *** | 0.95 | 1.16 | 0.87 | 1.08 |
| Hardly | 1.52 | 1.00 | **1.68 **** | 1.13 | 1.41 | 1.13 |
| **Spousal health** | | | | | | |
| Not in couple | na | na | rc | rc | rc | rc |
| Good | rc | rc | **0.68 *** | **0.56 **** | **0.64 *** | **0.54 **** |
| Fair or bad | 1.63 | **2.05 ***** | 0.89 | **0.67 *** | 1.11 | 0.96 |
| **Number of daughters** | | | | | | |
| 0 daughter | rc | rc | na | na | rc | rc |
| 1+ daughter(s) | 0.89 | 0.91 | rc | rc | 0.77 | **0.55 ***** |
| 2+ daughters | | | 1.01 | 1.02 | | |
| **Number of sons** | | | | | | |
| 0 son | rc | rc | rc | rc | na | na |
| 1+ son(s) | 0.61 | 1.04 | 0.83 | **0.53 ***** | rc | rc |
| 2+ sons | | | | | **1.60 **** | **1.59 **** |
| **Closest child proximity** | | | | | | |
| Cohabiting | *6.57 **** | **2.57 **** | **2.03 **** | 1.40 | **3.73 ***** | **2.63 ***** |
| <10 Km | *4.27 **** | **2.05 **** | **2.53 ***** | **2.81 ***** | **5.94 ***** | **4.63 ***** |
| *rc: 10 Km+/no child* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor* | | | | | | |
| Non-attritor | **2.13 **** | **1.56 *** | 0.99 | **1.55 **** | 1.06 | **1.48 **** |
| **MODEL INFORMATION** | | | | | | |
| Intercept only' model (-2LL) | 380.22 | 600.98 | 928.60 | 932.78 | 809.59 | 865.96 |
| Full multivariate model (-2LL) | 322.92 | 461.33 | 848.62 | 995.99 | 718.45 | 761.24 |
| (AIC) | 364.92 | 503.33 | 848.63 | 932.78 | 762.45 | 805.24 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01. Italics indicate that the result should not be interpreted due to small numbers (only for the regression on spousal care at the first study wave).

## D. Hypothesis to test: hierarchical compensation within the family

The analysis of the care combination allowed testing if the family was the preferred (first choice) care provider and that care services were mainly used to complement (at a second time). The analysis of the determinants of the care provided by the different care-giver types should allow now testing the 'within' nuclear family preferred order. According to the literature presented in chapters II and IV, the spouse is the first and preferred care-giver, then, come the daughter(s) and, finally, the son(s).

In the operational scheme, it was planned to test this hypothesis by studying the relationship between receiving care from a given type of care-giver and (1) the other characteristics of the care configuration (e.g. elderly receiving spousal care should be less likely to receive children care) (2) the characteristics of other potential care-givers (e.g. children care should be more frequent when the elderly is spouseless or has an unhealthy spouse).

Due to the under-declaration of spousal care, it was decided to restrict the regression analysis to the study of the second kind of relationship. The descriptive analyses show that spousal care tend to be declared only when intensive care is provided or when other care providers are involved. Therefore, the period when the spouse is (still) the sole care-giver cannot be easily identified. But, if daughter and or son care are less frequent when the elderly has a (healthy) spouse, one may consider it as an evidence of a care-giver hierarchy: even if no 'spousal care' is declared, it is likely that when children care is less frequent for the elderly living in couple (controlling for the health status), this is because the spouse 'effectively' provides care. If the children are more likely to provide care when the elderly spouse is unhealthy or absent, it is an evidence of the fact that children are 'second order' care-givers.

Following this idea, the main results of the regression analyses can be considered as being in line with of the hierarchical hypothesis:

First, the fact that the elderly having a healthy spouse are less likely to receive daughter or son care at both waves highlights the first rank of the spouse in the care-giver hierarchy.

Second, evidence in favour of a hierarchy between children (daughters first and then sons) is less obvious, but still present in the results. It is less obvious because the presence of a child of the other gender has a negative effect for daughter care and for son care at the last study wave: the elderly having son(s) are less likely to receive daughter care (OR=0.53) and elderly having daughter(s) are less likely to receive son care (OR=0.55). However, some elements suggesting that daughters (1) start to care earlier (when the needs level is not yet too high) and (2) are less influenced by the presence of other care-givers than son(s) are that:
(1) Elderly having only moderate disability *at the first study wave* are already more likely to receive daughter care, while only severe disabilities have a significant effect for receiving son care. *At the last wave*, there is still one-level difference (having only subjective health problem is enough to be more likely to receive daughter care, while having a moderate disability is required for being more likely to receive son care). (2) Elderly having multiple sons are more likely to receive son care than elderly having only one son, while daughter care is not influenced by the number of daughters the elderly have. The descriptive analysis shows that daughters are more likely to care alone than sons.

Before closing this section on care-givers type, it might be interesting to 'zoom' on two particular situations: the 'supportive' couples (when both spouses declare providing spousal care) and 'frail'

couples (when the elderly has a severe disability and his spouse has a fair or bad health status) (frame IX-5).

**FRAME IX-5:** Zoom on the 'supportive' and the 'frail' couples

The availability of a spouse is a key factor of the definition and of the sustainability of the elderly care configuration: the elderly living in couple are less likely to receive care services or children care because spouses try to manage without extra help to support each other. However, when both spouses need care, it might become necessary to accept extra help. For a social policy point of view, it is particularly important to identify the 'supportive' and 'frail' couples because these two characteristics are often linked: 'supportive' couples often are or become 'frail' couples. Their mutual support is often under-declared when it only concerns the IADL or temporary ADL because it is considered as a part of the 'household task division'. When it concerns long-term ADL care, it is more often declared and when the 'help' is bi-directional (the situation of 'supportive couples'), it means that both spouses have health problems. Providing care may make them frailer and, if they were not, they will soon become a 'frail' couple and probably in need of extra help). If children are not available, intensive care would probably be needed. This is why supportive and frail couples can be considered as target groups for social policy.

The analysis of these two situations is limited by the PSBH data: the 'supportive couples' are under-identified due to the overall under-declaration of spousal care and the fact that only couples having both spouses included in the initial study sample of the 1,123 elderly were considered. Only **14 'supportive couples'** were found at the first study wave (28 elderly of the 595 'at risk' of spousal care). What is interesting is that all of them, except one, are still 'supportive' at the last study wave. Among the 28 elderly, 60.71% (n=17) have an unhealthy spouse and 28.57% (n=8) have a severe disability at the first study wave compared to 50.59% and 11.26% of the 'at risk' sample (total n=595). The number of 'supportive couples' is higher at the last study wave (n=27 couples, thus 54 elderly out of the 595) and the difference is more obvious: 81.48% of the 54 (n=44) have an unhealthy spouse and 48.15% (n=26) have severe disabilities against 58.82% and 21.18% of the 595). **It means that the 'supportive couple' are usually more fragile, and the more at the last study wave.**

But how to define a 'frail' couple? For the stake of this description, it will be defined according to the health status of both spouses and regardless care being provided or not. An elderly is considered as living in a frail couple at a given wave if he declares a severe disability and if his spouse is unhealthy. According to this definition, 45 elderly over the 595 live in a frail couple at the first study wave and 84 at the last study wave. Most of the elderly having a frail couple (30 over 45) at the first wave are still in this situation at the last study wave. Interestingly, the care aspects, the attrition status and the reasons for leaving the panel of the elderly living in a frail couple at the last study wave differ from the total 'at risk' sample (n=595): they are more likely to receive spousal care (40.05% against 20.34%), to use care services (65.48% against 53.28%) and those having children, more likely to receive children care (50.65% against 43.66%). The proportion of non-attritors among the 84 is smaller (29.76% against 36.97% of the 595), while the proportion of attrition due to 'sickness' and 'death' is higher (19.05% and 32.14% of the 84 against 10.42% and 16.64%). These figures highlight, on the one hand, the role of the spouse as first care-provider (even when unhealthy) and the use of children and/or care services in complement; on the other hand, the tangent situation of these elderly who are, despite all the care provided, more likely than the other couples, to leave the panel before its end and because of a health related reason.

## *SECTION 4. What determines the care intensity?*

The last aspect to study is the family care intensity[36]. Two measures will be used: **the number of care-givers** (the elderly having multiple care-givers are assumed to receive, globally, more intensive care) and the type of **family care activities** (in increasing intensity order: no care, IADL, ADL, IADL&ADL). The hypothesis to test here is that the care intensity is positively associated with the needs (poorer health status).

The analyses of the care-givers number distinguishes three situations (response modalities): '0 care-giver', '1 care-giver', '2+ care-givers'. The decision of grouping all the situations of multiple care-givers into one modality (2+) is motivated by two reasons. The first is to avoid modalities with small numbers[37]. The second is the willingness to work on an 'at risk' study sample as large and general as possible: when regrouping multiple care-givers into one modality, the analyses can be done on all the elderly respondents having two or more potential care-givers at both waves (n=825). Already 174 of the 999 family-members elderly are excluded (see frame IX-6) because they have only one potential care-giver at the first and/or at the last study wave[38] and are therefore not 'at risk' of having '2+ care-givers' at both waves. The more detailed the response modalities, the more restrictive and specific the 'at risk' study sample would be.

The analyses of family care activities are carried out on 972 elderly as the 27 elderly having 'undefined'[39] care activities were excluded.

[36] The presence of care services is not accounted for: remember that the term 'care-giver' is exclusively used for family care (while 'care-provider' also includes care services). As for the activities, only the care provided by the family is considered: a respondent receiving no family care but using care services, is in the modality 'no family care'.

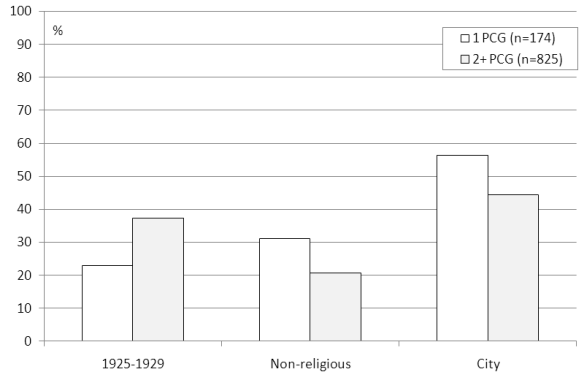
[37] The maximum number of care-givers observed is seven but the number of elderly having five, six and seven care-givers at a given wave is never larger than eight and sometimes equal to zero.

[38] Thirteen elderly had two potential care-givers at the first study wave (a spouse and a child) but lost their spouse during the panel and thus have only one potential care-giver remaining at their last study wave.

[39] These are the cases were no care was 'declared', but the respondent said that his health status required extra effort from the other household members.

**FRAME IX-6:** Zoom on 174 elderly having only one potential care-giver

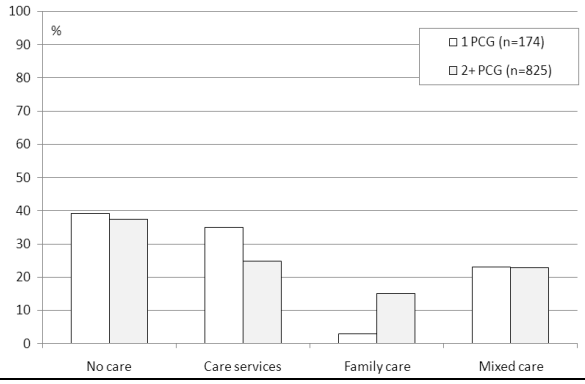
**GRAPH IX-13:** Main differences between the 174 having only one potential care-giver (PCG) and the 825 having at least two (PSBH 1994, n=999)




A third of the 174 elderly have only a spouse (see frame IX-4); a third, only a daughter and another third, only a son. The main differences (≥10%) between them and the 825 having at least two potential care-givers are shown in graph IX-13 (for the other characteristics, see appendix table IX-19). Those having only one potential care-givers are older, more likely to live in a city and to be non-religious. No large differences in health status or in attrition status are observed.

Concerning the received care (graph IX-14), it is not surprising to observe a lower proportion of 'family care' (2.87% against 15.03% at the first wave[40]): as there is only one potential care-giver, the family care is more likely to be under-declared or to become insufficient; and a higher proportion of 'care services' (35.06% against 24.73% at the first wave), not only because of the low availability of family care, but also because the 'non-religious' and the 'urban', who are over-represented in this sub-sample, are usually more care services oriented.

**GRAPH IX-14:** Care combination of the 174 having only one potential care-giver (PCG) and the 825 having at least two (PSBH 1994-2002, n=999)



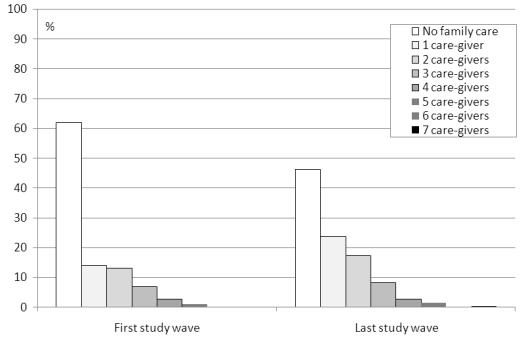

# A. Description

## *1. More than a third of the 'at risk' elderly have ever received ADL care*

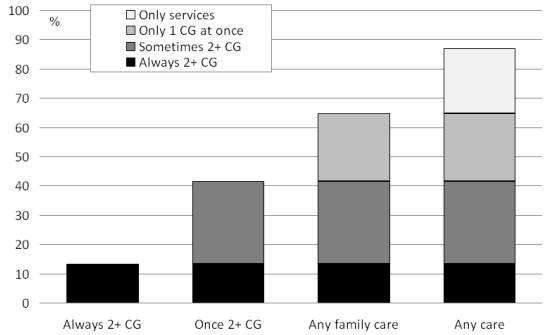
As usual, the very first description consists in distributing the care intensity variables at the first and the last study waves (Graphs IX-15 and IX-17, over waves distributions are displayed in appendix tables IX-20 and IX-22). A second way of describing the frequency of intensive care is to show the proportion of elderly who have always or at least once been in an intensive care situation (receiving ADL care, having two or more care-givers) (Graphs IX-16 and IX-18, figures in appendix tables IX-21 and IX-23).

[40] The distribution of the care combination at the last study wave is given in appendix table IX-19: Globally, the same differences are observed.

**GRAPH IX-15:** Number of care-givers at the first and the last wave
(n=825, PSBH 1994-2002)

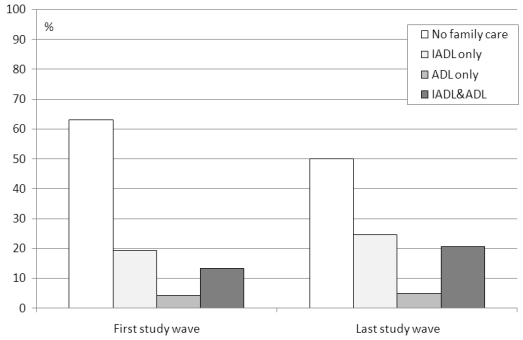



**GRAPH IX-16:** Having received care from 2 or more care-givers simultaneously over the study waves
(PSBH 1994-2002, n=825)

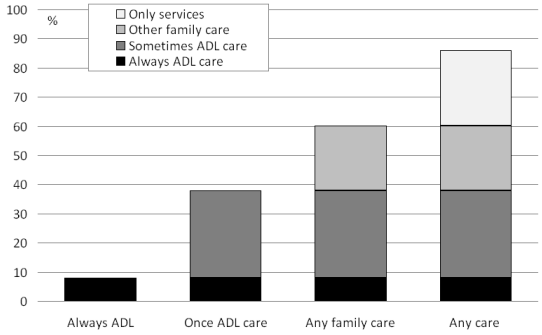



The proportion of the elderly receiving no family care is lower at the last study wave (graph IX-15), probably (at least partially) due to an ageing effect (46.18% against 62.06% at the first study wave). Symmetrically, all the other bars (proportions of 1, 2, 3…7 care-givers) are higher at the last study wave: 23.88% of the respondents have two or more care-givers at the first study wave against 30.17% at the last study wave. Considering all the study waves (graph IX-16), 41.58% of the elderly who have at least two potential care-givers have received care from two care-givers or more at one wave at least ('once 2+ CG') but only 13.21% have been 'always' in this situation (having two or more care-givers at all their study waves).

**GRAPH IX-17:** Family care activities at the first and the last wave (PSBH 1994-2002, n=972)




**GRAPH IX-18:** Having received ADL family care over the study waves (PSBH 1994-2002, n=972)




Now, concerning the family care activities, the most striking finding on graph IX-17 is the low proportion of elderly receiving only ADL care. This is not surprising: when people need help for the ADL (e.g. bathing, dressing, eating, etc.), they usually need help for the IADL too (e.g. gardening, shopping, cleaning, etc.). This suggests that the elderly declaring care for the 'ADL only' also receive -but do not always declare- IADL[41] care). The decision was taken to regroup 'ADL only' and 'IADL&ADL'. This allows avoiding small numbers in the response modalities and, also, correcting for the suspected under-declaration of IADL care. The family care activities variable used for the next analyses has three

[41] These activities are usually included in the household task division and thus more likely to be under-declared especially when the care-giver is a cohabitant.

modalities: 'no family care', 'IADL care only', 'ADL (and IADL) care'. Graph IX-18 indicates that 8.02% of the 'at risk' sample always received ADL care. This small proportion is probably due to the fact that the elderly receiving long-term intensive care are less likely to take part in a survey (healthy selection of the participants). But, it is also interesting to see that **more than a third (37.96%) of the elderly received at least once ADL care from a family member**. This is quite an important proportion if we consider that the sample is made of respondents aged 65+ at the first study wave.

### *2. ADL care can be assumed equally by one or more care-givers*

The last part of the description point consists in looking at the association between the studied care aspect(s) and the other ones. Most of them have already been tested in the previous sections (association with care services in section 2 and with the care-giver types in section 3). The sole association which has still to be tested is the one between the care-givers number and the family care activities. One may expect that the presence of multiple care-givers is justified by a heavier care load. But, when the family care activities (IADL only or ADL (and IADL)) is distributed by the number of care-givers (1 or 2+) on the 'at risk'[42] sample, no significant association is found: at both waves, the **elderly having only one care-giver are as likely to receive ADL care than those having two or more care-givers.** Of course, the family care activities variable is a very gross measure of intensity. Usually, more detailed variables are used (number of IADL and ADL, number of caring hours, etc.) but these are not available (longitudinally) in the PSBH. Although these 'gross' results do not allow telling that a single care-giver can provide as much care as several care-givers, they are in line with the literature which showed that a sole care-giver can provide quite intense care.

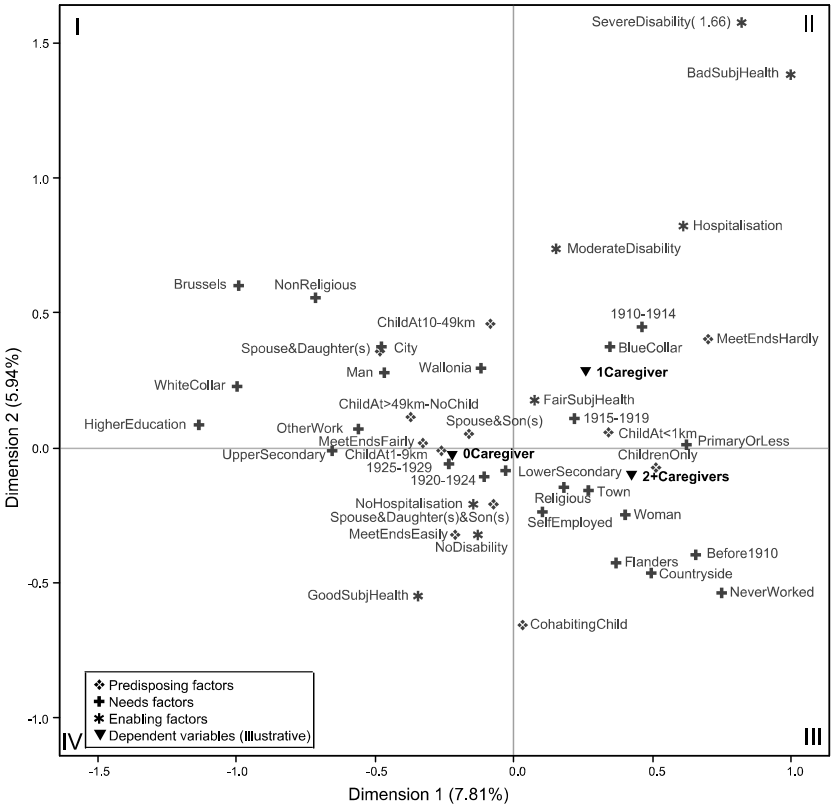
## B. Multiple correspondence analysis

The results of the MCA done at the first study wave on the 825 elderly 'at risk' of having two or more care-givers are displayed in graph IX-19. Although the graph seems to have been reversed compared to the care combination one (graph IX-5): 'Brussels', 'non-religious', 'higher education' being on the left and 'primary or less', 'meet ends hardly' on the right, the structure remains the same: with a first 'socio-economic' dimension (explaining 7.81% of the inertia) and a second 'health status' dimension (explaining 5.94% of the inertia). The 'number of care-givers' was added as illustrative variable. Having no care-giver at the first study wave is a more frequent characteristic among the high socio-economic statuses (modalities situated at the left side of the centroid on the horizontal axis). Interestingly, having only one care-giver seems to be 'closer' to poor health status characteristics (in the second quadrant), than having two or more care-givers which seems to be more associated with the availability of children (close to 'children only' and 'child at $\leq$ 1 Km').[43]

[42] Here, the two criteria ('at least two potential care-givers' and no 'undefined' care activities) should be applied. Furthermore, it was decided to work on the sub-sample of respondents receiving family care at the given wave because respondents who did not receive family care are necessary in '0 care-giver' and 'no family care' cell (no variation). The 'at-risk' sample includes 313 elderly at the first study wave and 427 at the last study wave (results not shown).

[43] The results of the last wave are quite similar, see appendix graph IX-5.

**GRAPH IX-19:** Multiple correspondence analysis on the 825 elderly 'at risk' of receiving care from two care-givers or more, first study wave (PSBH 1994)

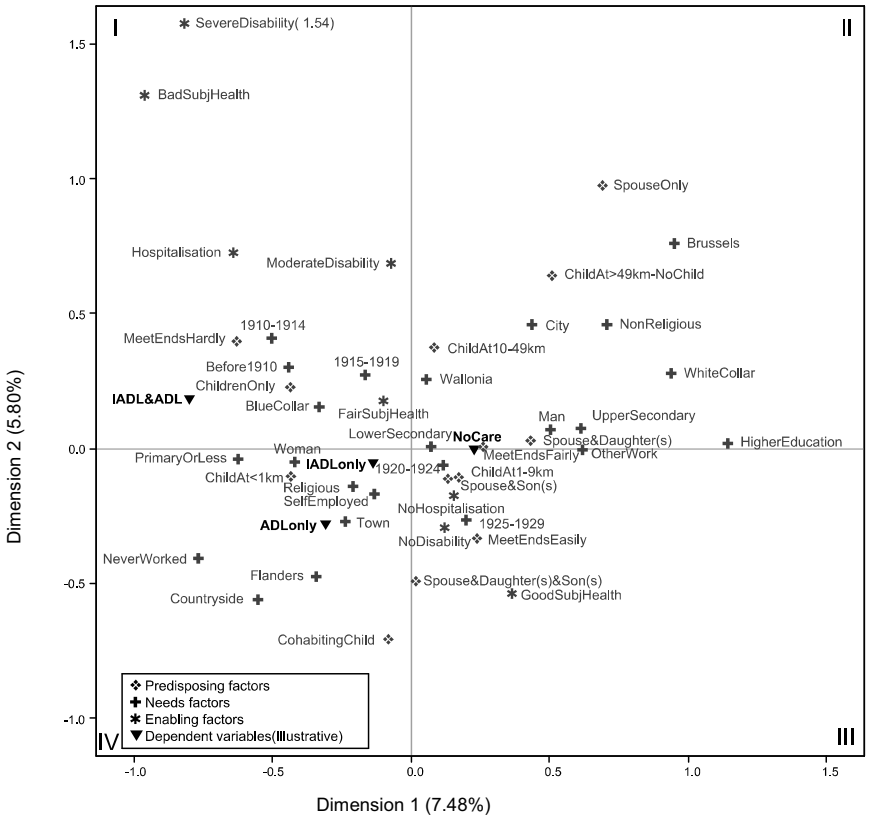



*Note:* the family constellation 'only spouse' is absent from the graph because 'impossible' in the 'at risk' sample. The spousal health variable is not included in the MCA because it is too associated with the family constellation variable.

The picture given by the MCA done on the family care activities sample (n=972) is nearly identical to the one shown in graph IX-5. This is because the two samples only differ by the 27 elderly with 'undefined' care activities included in the 'at risk' sample for care combination, but not for care activities. The comment of graph IX-20 can therefore be restricted to the position of family care activities modalities (illustrative variable): interestingly, the three modalities 'no care', 'IADL only' and 'ADL' are on the horizontal axis[44], suggesting that the care activities are not much associated with the health status (vertical axis), but mainly with the socio-economic status (lower statuses being more likely to receive ADL care). However, a closer look at the coordinates of the health status and the birth cohort modalities shows that the value of 'no care' on the horizontal axis is closer to the value of the younger and healthier ('1920-1924', '1925-1929', 'no hospitalisation', 'good health status'): these characteristics are more frequent among the high socio-economic statuses. At the other end of the horizontal axis, the values of the older and the unhealthier ('Before1910', '1910-1914', '1915-1919'; 'hospitalisation', 'bad subjective health') are close to the value of 'ADL': these characteristics are more frequent among the lower socio-economic statuses.

[44] In the MCA of the last wave (appendix graph IX-6), the modality 'ADL' is clearly above the horizontal axis showing that elderly receiving ADL care are also more likely to have a poorer health status. Remember that the health status is globally more influential at the last study wave.

**GRAPH IX-20:** Multiple correspondence analysis on the 972 elderly 'at risk' of receiving IADL or ADL care, first study wave (PSBH 1994)



## C. Logistic regression on 'care-givers number' and 'family care activities'

### *1. Preliminary verifications*

Before making the preliminary verifications (sample size and multicollinearity), the family composition dummies should be adapted again because of the definition of the sample used for the care-giver number analysis[45]. As all the elderly included in this 'at risk' sample have at least two potential care-givers, all of them have children[46].

The choice of the family composition dummies is based on the same principles as for the care-giver types (informative, meaningful 'null' combination, allowing comparisons). The taken decision is to use: '2+ daughter(s)', '2+son(s)' and the spousal health variable (with 'not in couple' as reference category). The 'null' combination (when all the dummies equals zero) corresponds to a situation where the elderly has no spouse, one daughter and one son for the 'care-givers number' variable[47] and to the situation when the elderly has no spouse, one daughter and/or one son[48] (see table IX-4).

**TABLE IX-4:** Definition of the family composition dummies in the two family care intensity regression models

| | **REGRESSION MODEL** | |
|---|---|---|
| **FAMILY CARE INTENSITY** | **Care-givers number** | **Family care activities** |
| **Spouse** | *No spouse (rc)* | |
| | Healthy spouse | |
| | Unhealthy spouse | |
| **Daughter** | *0-1 daughter (rc)* | |
| | 2+ daughters | |
| **Son** | *0-1 son (rc)* | |
| | 2+ sons | |
| **'Null' combination** | 1 daughter and 1 son | 1 daughter and/or 1 son |

The two preliminary tests were carried out accounting for this decision. For the care-givers number sample, no problem was identified. For the family care activities, a problem was found at the first study wave for Brussels: less than 10 Brussels inhabitants received ADL care at this wave. As no

[45] The 'family care activities' variable does not have an influence on the choice of family composition dummies. For making the interpretations easier, the decision is taken to use the same family composition dummies in both equations.

[46] Using the dummies '1+ daughter(s)' and '2+ children' alike the care combination regression is not possible: if '2+ children' equals zero, the modality 'no spouse' is impossible (the only way to have two potential care-givers with only one child is to have also a spouse). Likewise, using the dummies '1+daughter(s)' and '1+son(s)' alike the care-giver types regressions is not possible: if '1+daughter(s)' equals zero, '1+son(s)' cannot be equals to zero (if there is no daughter, the only possibility to have two potential care-givers is to have both son(s) (and spouse)) and conversely.

[47] The respondent having this profile has '*no spouse', '0-1 daughter'* and *'0-1 son'*. As the 'at-risk' sub-sample only includes respondents having at least two potential care-givers, having *'0 son'* or *'0 daughter'* and *'no spouse'* is not possible: the respondent having a null combination has necessarily *'1 son'* and *'1 daughter'*.

[48] For being included in the 'at-risk' sub-sample of family care activities, it is not necessary to have two potential care-givers: one is enough. Therefore, the null combination includes three types of situation: when the elderly has only a daughter, only one son or one daughter and one son.

multicollinearity problem was identified, it was decided to keep the region variable, but to not interpret the odds ratio of Brussels in the regression on family care activities at the first study wave.

## *2. Multinomial logistic regression*

As both dependent variables have three response modalities ('no family care', '1 care-giver', '2+ care-givers' for the one; 'no family care', 'IADL only', 'ADL' for the other), multinomial logistic regressions are carried out. The interpretation will focus on the regression part '2+ care-givers' *versus* '1 care-giver' and 'ADL' *versus* 'IADL only': what we are interested in is to assess whether more intensive care is associated will more intensive health needs or influenced by other characteristics. The results of the 'full' multivariate models are displayed in tables IX-5 and IX-6[49].

Comparing the bivariate (in appendix tables IX-25 and IX-27) and the multivariate results, one can see that several variables (or modalities) are significant in the bivariate regression, but no longer in the full multivariate model[50]. As it was the case in the previous models, the proximity of the closest child and the health variables are 'strong' determinants of the family care aspect which remain significant in the multivariate models. They probably capture a part of the variation of the other variables (birth cohort for the health status: older cohorts tend to have a poorer health status; number of daughters and sons for the proximity variable: having many children (especially daughters) increases the likelihood of having a child living nearby).

[49] Distributions of the dependent variable by characteristics are available in appendix tables IX-24 and IX-26.

[50] The means predicted probabilities by gender, region and cohort groups are not displayed because of small number of ADL care in Brussels in one case, and because of the non significant effect of birth cohorts on care-givers number in the other case.

**TABLE IX-5:** Full multivariate multinomial logistic regression on 'care-givers number' [*W-CGNUMBER*] at the first and the last study waves (PSBH 1994-2002, n=825)

| | FIRST STUDY WAVE | | | LAST STUDY WAVE | | |
|---|---|---|---|---|---|---|
| | **1 CG / *0 CG*** | **2+ CG / *0 CG*** | **2+ CG / *1 CG*** | **1 CG / *0 CG*** | **2+ CG / *0 CG*** | **2+ CG / *1 CG*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | | | | | | |
| *Rc: Man (n=383)* | | | | | | |
| Woman (n=442) | **1.76** ** | **1.51** ** | 0.86 | 1.19 | **1.51** ** | 1.26 |
| **Birth cohort** | | | | | | |
| *Rc: 1925-1929 (n=307)* | | | | | | |
| 1920-1924 (n=260) | 1.53 | 1.27 | 0.83 | 1.17 | 1.19 | 1.02 |
| 1915-1919 (n=127) | 1.70 | 0.97 | 0.57 | 1.17 | 0.73 | 0.63 |
| Before 1915 (n=131) | 1.72 | 1.32 | 0.77 | 1.34 | 1.42 | 1.06 |
| **Religiosity** | | | | | | |
| *Rc: Non-religious (n=170)* | | | | | | |
| Religious (n=655) | 0.81 | 1.38 | 1.71 | 1.14 | 1.50 | 1.32 |
| **Education** | | | | | | |
| *Rc: Secondary or more (n=449)* | | | | | | |
| Primary or less (n=376) | 0.86 | 1.20 | 1.39 | 0.81 | 1.27 | **1.56** ** |
| **Region** | | | | | | |
| Flanders (n=383) | **2.06** *** | **1.67** ** | 0.81 | 1.38 | **1.62** ** | 1.17 |
| *Rc: Wallonia (n=338)* | | | | | | |
| Brussels (n=104) | 0.98 | 0.57 | 0.59 | 0.85 | **0.49** ** | 0.58 |
| **Health** | | | | | | |
| *Rc: No problem (n=369/265)* | | | | | | |
| Subjective problem | **1.72** * | 1.25 | 0.73 | **1.63** * | 1.25 | 0.77 |
| Moderate disability | **2.99** *** | 0.98 | **0.33** ** | **3.46** *** | **4.02** *** | 1.16 |
| Severe disability (n=90/188) | **2.96** *** | **2.13** ** | 0.72 | **2.72** *** | **3.56** *** | 1.31 |
| **Recent hospitalisation** | | | | | | |
| *Rc: No (n=662/606)* | | | | | | |
| Yes (n=163/219) | 1.48 | 1.40 | 0.95 | **1.58** ** | **1.50** * | 0.95 |
| **Ability to make ends meet** | | | | | | |
| *Rc: Easily (n=311/290)* | | | | | | |
| Fairly (n=288/283) | 1.06 | 0.85 | 0.80 | 1.15 | 1.11 | 0.96 |
| Hardly (n=226/252) | 1.38 | 1.45 | 1.05 | 1.44 | 1.19 | 0.83 |
| **Spousal health** | | | | | | |
| *Rc: Not in couple (n=246/294)* | | | | | | |
| Good (n=277/221) | **0.54** * | 0.69 | 1.28 | **0.61** * | 0.72 | 1.19 |
| Fair or bad (n=302/310) | 1.02 | 1.10 | 1.08 | 0.99 | **1.50** * | 1.52 |
| **Number of daughters** | | | | | | |
| *Rc: 0-1 daughter (n=470)* | | | | | | |
| 2+ daughters (n=355) | **0.64** * | 1.28 | **2.01** *** | **0.48** *** | 1.19 | **2.45** *** |
| **Number of sons** | | | | | | |
| *Rc: 0-1 son (n=484)* | | | | | | |
| 2+ sons (n=341) | 0.75 | **1.52** ** | **2.03** *** | 0.81 | **1.52** ** | **1.88** *** |
| **Closest child proximity** | | | | | | |
| Cohabiting (n=115/97) | **2.33** ** | **5.36** *** | **2.30** * | 1.02 | **3.81** *** | **3.73** *** |
| <10 Km (n=528/546) | **1.77** ** | **7.17** *** | **4.05** *** | **1.67** ** | **9.31** *** | **5.56** *** |
| *Rc: 10 Km+/no child (n=182/182)* | | | | | | |
| **Attrition status** | | | | | | |
| *Rc: Attritor (n=504)* | | | | | | |
| Non-attritor (n=321) | **0.61** * | 1.13 | **1.85** ** | 1.24 | **1.67** ** | 1.35 |
| **MODEL INFORMATION** | | | | | | |
| Intercept only' model (-2LL): | | 1,507.92 | | | 1,747.81 | |
| Full multivariate model (-2LL): | | 1,312.22 | | | 1,505.65 | |
| (AIC): | | 1,400.22 | | | 1,593.65 | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**TABLE IX-6:** Full multivariate multinomial logistic regression on 'family care activities' [*W-CGACTIVITY*] at the first and the last study waves (PSBH 1994-2002, n=972)

| | FIRST STUDY WAVE | | | LAST STUDY WAVE | | |
|---|---|---|---|---|---|---|
| | IADL only/*No* **OR** | ADL/ *No* **OR** | ADL/ *IADL only* **OR** | IADL only/*No* **OR** | ADL/ *No* **OR** | ADL/ *IADL only* **OR** |
| **PREDICTORS** | | | | | | |
| **Gender** | | | | | | |
| *rc: Man (n=437)* | | | | | | |
| Woman (n=535) | **1.50 **** | **1.74 **** | 1.17 | 1.16 | **1.44 *** | 1.25 |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (n=338)* | | | | | | |
| 1920-1924 (n=307) | 1.13 | **1.89 **** | **1.68 *** | 0.82 | **1.66 **** | **2.03 ***** |
| 1915-1919 (n=160) | 1.26 | **1.82 *** | 1.44 | 1.01 | 1.31 | 1.30 |
| Before 1915 (n=167) | 1.27 | **2.47 ***** | **1.94 *** | 1.06 | **1.84 **** | **1.73 *** |
| **Religiosity** | | | | | | |
| *rc: Non-religious (n=220)* | | | | | | |
| Religious (n=752) | 0.90 | 1.28 | 1.41 | 0.99 | **1.57 *** | **1.58 *** |
| **Education** | | | | | | |
| *rc: Secondary or more (n=530)* | | | | | | |
| Primary or less (n=442) | 0.78 | 1.32 | **1.69 **** | 0.97 | 1.17 | 1.21 |
| **Region** | | | | | | |
| Flanders (n=436) | 0.77 | **6.06 ***** | **7.89 ***** | **0.58 ***** | **3.94 ***** | **6.85 ***** |
| *rc: Wallonia (n=406)* | | | | | | |
| Brussels (n=130) | ***0.62 **** | *0.72* | *1.16* | **0.62 *** | 0.73 | 1.18 |
| **Health** | | | | | | |
| *rc: No problem (n=429/308)* | | | | | | |
| Subjective problem (n=347/291) | 1.21 | **2.06 ***** | **1.71 *** | 1.22 | **2.44 ***** | **2.00 **** |
| Moderate disability (n=91/158) | 1.31 | **3.15 ***** | **2.41 **** | **2.27 ***** | **6.14 ***** | **2.71 ***** |
| Severe disability (n=105/215) | **1.85 *** | **6.97 ***** | **3.76 ***** | **2.07 ***** | **6.10 ***** | **2.95 ***** |
| **Recent hospitalization** | | | | | | |
| *rc: No (n=786/715)* | | | | | | |
| Yes (n=186/257) | 1.00 | **1.51 *** | 1.51 | 0.84 | **2.00 ***** | **2.38 ***** |
| **Ability to make ends meet** | | | | | | |
| *rc: Easily (n=349/331)* | | | | | | |
| Fairly (n=344/338) | 0.94 | 0.84 | 0.90 | 0.91 | 1.42 | **1.57 *** |
| Hardly (n=279/303) | **1.51 *** | 1.29 | 0.86 | 1.21 | 1.42 | 1.17 |
| **Spousal health** | | | | | | |
| *rc: Not in couple (n=338/397)* | | | | | | |
| Good (n=302/235) | 0.78 | **0.44 ***** | **0.56 *** | **0.54 **** | 0.73 | 1.34 |
| Fair or bad (n=332/340) | 0.95 | 1.09 | 1.16 | 1.08 | 0.92 | 0.85 |
| **Number of daughters** | | | | | | |
| *rc: 0-1 daughter (n=624)* | | | | | | |
| 2+ daughters (n=348) | 0.96 | 1.13 | 1.18 | 0.90 | 0.87 | 0.98 |
| **Number of sons** | | | | | | |
| *rc: 0-1 son (n=637)* | | | | | | |
| 2+ sons (n=335) | 1.27 | 1.17 | 0.92 | 1.31 | 1.17 | 0.89 |
| **Closest child proximity** | | | | | | |
| Cohabiting (n=117/103) | **7.63 ***** | 1.52 | **0.20 ***** | 1.68 | **2.04 **** | 1.22 |
| <10 Km (n=575/594) | **7.17 ***** | **2.82 ***** | **0.39 ***** | **4.51 ***** | **3.97 ***** | 0.88 |
| *rc: 10 Km+/no child (n=280/275)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (n=591)* | | | | | | |
| Non-attritor (n=381) | 0.83 | 0.90 | 1.08 | **1.59 **** | **1.57 **** | 0.99 |
| **MODEL INFORMATION** | | | | | | |
| Intercept only' model (-2LL): | | 1,774.64 | | | 2,021.01 | |
| Full multivariate model (-2LL): | | 1,461.85 | | | 1,676.75 | |
| (AIC): | | 1,549.85 | | | 1,764.75 | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01. Modalities/variables which cannot be interpreted due to small numbers are italicised.

## D. Hypothesis to test: needs intensity

According to the needs hypothesis, the elderly having a serious health problem should be more likely to receive ADL care than IADL care and to be cared by multiple care-givers rather than only one (in comparison with elderly having no health problems). The null hypothesis is therefore the absence of a positive relationship between health problems and family care intensity.

**The null hypothesis can be rejected for the family care activities:** all the health modalities are significant and positive at both waves and the more severe the health problem, the higher the OR: elderly having only a subjective health problem are (already) more likely to receive ADL care rather than only IADL care (OR=1.71 at the first wave and 2.00 at the last wave) but the likelihood of receiving ADL rather than IADL only is higher when moderate or severe health problems are present. Having been recently hospitalised also increases the likelihood of receiving ADL care but at the last wave only.

**Concerning the number of care-givers, the null hypothesis cannot be rejected:** having two or more care-givers rather than one is influenced by the availability of the family members: having many daughters, many sons, a child living less than 10 Km away, increases the likelihood of having multiple care-givers. It is also interesting to note that the Flemish are more likely to have multiple care-givers. But the health status has no significant effect: it increases the likelihood of receiving care from one or more care-givers rather than receiving no family care but does not determine the number of care-givers[51].

[51] With the exception that, at the first wave, the elderly having a moderate disability are significantly more likely to have one rather than two or more care-givers. But this may be due to the small proportion of respondents having a moderate health problem at this wave (78/825). It may correspond to a particular sub-population.

## *CONCLUSION*

This chapter allowed studying family care more in details, looking at specific aspects (combination with care services, care-givers number, types and activities) and testing some of the hypotheses mentioned in the theoretical scheme (ageing effect, family solidarity, regional differences, hierarchical compensation and needs hypotheses). Most of the null hypotheses could be rejected except one: for the needs intensity, (the null hypothesis is the absence of a positive relationship between the health problems intensity and the care intensity) the null hypothesis could be rejected when the care intensity is measured by the family care activities but not when it is measured by the number of care-givers.

In this conclusion, I would like to focus several difficulties in the study of family care characteristics that are highlighted by the analyses.

The first and the main difficulty in the study of family care is that the care situation is not easy to define nor to identify. This was discussed from a theoretical point of view in chapter I, highlighted in the literature review (chapter II) by the variety of care definitions and the resulting mixed findings. In chapter VI, I explained how I used the information available in the PSBH data to have as many details as possible on the family care and how I decided to impute the care variables in order to have the most 'likely' and 'consistent' responses on the care variables. This file preparation allowed analysing specific care aspects but could not completely correct for the lack of precision in the care questions or for the under-declaration of care situations. These limitations are visible in the results: the most obvious is the **under-declaration of spousal care**. According to the literature, the spouse is the first and the main care-giver but the analyses done in this chapter seem to show the opposite: the proportion of elderly 'declaring' spousal care is lower than the proportion of elderly 'declaring' daughter or son care (in the respective 'at risk' groups) and spousal care is more often declared when there are other care providers. But, when these observations are put in regard to the fact that, controlling for the cohort and health status, the elderly living in couple are less likely to receive children care, it becomes clear that the results are not contradictory with the literature, they measure something else. The literature on spousal care is very often based on a sample of elderly 'declaring' to receive spousal care (e.g. Burton *et al.* 2003; Lima *et al.* 2008; Brazil *et al.* 2009). In those studies, there is a declaration bias: the dependent variables are the characteristics of the spousal care in the cases when the caring relationship is duly recognised. In the dissertation, the decision was taken to define the 'at risk' samples as broadly as possible to avoid this kind of bias. Therefore, we study the determinants of the 'spousal care declaration' in the 'at risk' sample (elderly having a spouse).

Another limitation due to the lack of precision in the care questions concerns children care: according to the literature (e.g. Coward & Dwyer 1990; Stoller 1990; Miller & Cafasso 1992 ; Laditka & Laditka 2001; Sarkisian & Gerstel 2004), it was expected to find gender differences in children care. Some evidence of it was found in our data (e.g. daughters being more likely to care 'alone' and to be less influenced by the presence of other potential care-givers than sons), but it was not possible to study gender differences further. To do that, it is necessary to have detailed information on the care provided by each child. Here, the information on non-cohabitant children care was available at the aggregate elderly level and was individualised afterwards following a set of rules (see chapter VI) to identify the most likely care-giver(s) among the children. This imputed information allows identifying trends and general care aspects in the sample, but might not be reliable enough to identify very detailed care characteristics.

Finally, a last difficulty appearing in this chapter, which is not specific to the study of family care, is the need to find a good balance between sample definition, variables to include in the model, significance of the results and comparison possibilities. Here, the primacy was given to the sample definitions (the 'at risk' sub-populations) and to the comparison possibilities (in the definition of the population: being 'at risk' at both waves to allow between-waves comparisons; in the choice of the included variables: considering the same family composition dummies for the regressions analysing a same care aspect). It implied that some variables were included even if they could not always be interpreted (e.g. Brussels where the sample size criterion was not met). The fact of including many variables in the analysis may have sometimes led to an 'over' control (variables very significant in the bivariate analyses become insignificant in the full multivariate model because it controls for several strongly associated characteristics).

# CHAPTER X

## HOW DOES THE RECEIVED FAMILY CARE EVOLVE OVER TIME?

We are arrived at the last chapter of the analysis part. In chapter VIII, the determinants of having ever received family care were studied. Chapter IX went into more details by analysing the determinants of specific care aspects (spousal, daughter and son care, family care activities and use of care services in complement or instead of family care) at two specific waves. The comparison between the first and the last study waves has already introduced a time notion: receiving family care is more frequent at the last wave because the elderly are older. But we did not know whether they were the same or different elderly who receive family care at both waves. A dynamic approach is needed to identify who starts, continues or stops to be cared from one wave to another, and how family care evolves over waves. This is the purpose of this chapter.

The purpose is to identify the determinants of changes or of the stability in family care with a particular interest in the effect of health needs: how does increasing, decreasing or 'long-term' care needs influence the evolution of family care?

Section I considers the study of family care evolution in the broader context of population ageing (why is it necessary to adopt a dynamic approach?) and explains how it will be done with the PSBH data. Section II analyses the determinants of entering, continuing or exiting a family care spell. Section III focuses on 'long-term' family care spells and studies the determinants of changes 'within' the family care spell.

# *SECTION 1. Studying family care evolution*

## A. Why to study family care evolution?

Elderly care is often embedded in a long-term story. The care relationship may start suddenly: when intensive care is needed after a hospitalisation, an accident or a severe illness. It may appear progressively: when the elderly starts having moderate disability because of ageing and has difficulties to assume alone all the daily activities as he was used to. In this situation, the 'care' may start by a redistribution of the household tasks between spouses or with the cohabitant children or by more frequent visits and occasional 'help' from the non-cohabitant children (for shopping, transport, etc.). Of course, neighbours, friends, volunteers or professionals may also be called upon to provide well-defined and usually temporary care (e.g. a younger neighbour may offer to put the trash out and to carry heavy purchases; nursing at home services are often used in case of injection or when medical care needed). But **the particularity of the family as care-provider is the duration and the boundless character of the provided care**. Caring often becomes an integrated part of the spousal or child-parent relationship. Even when the needs are not longer 'acute' (the elderly has recovered from the accident or the illness), the care relationship tends to continue. This is partly because of the **ageing process** (an elderly person will recover less quickly and maybe not completely from a health problem; he is likely to have a declining health status even without having an acute health problem). But also because **'new' habits** have been taken (it is nice to see his daughter more often or to be helped with the housework). But this long-term care relationship may have detrimental consequences on the care-giver(s)' health, work, income or family life (e.g. Haug *et al.* 1999; Pavalko & Woodbury 2000; Wright 2000; Choi & Marks 2006) and finally lead to anticipated institutionalisation of the elderly if the care-giver(s) is no longer able to carry the care load when it becomes too heavy.

This is why it is important to study the evolution of family care over time: why does it start, continue or stop? How does it change (family care activities, care-giver types and numbers, use of care services in complement)? The answer to these questions would allow researchers and policy makers to better understand the dynamics and the limitation of family care to imagine innovative solutions to support family care or to compensate for its absence.

In the previous chapters, evidence of family solidarity was found through the positive association between health needs and family care (especially for mixed care). It was also shown that the caring activities were more intensive (ADL care instead of IADL care only) when health problems were more severe. The question is now to see what explains the change or the stability in the family care. In the theoretical scheme, it corresponds to the 'adaptation' hypothesis. Due to the methodological choices in the analysis of the care evolution, only a part of the 'adaptation' hypothesis (the health effect) will be tested in this chapter[1]. The hypothesis to test is that **changes in family care are associated with the evolution of the health status of the elderly: if his health worsens or remains bad, family care would be more likely to start, to increase or to remain stable (because it is not possible for the care-givers to provide more care and external care sources would be needed to maintain the elderly at home); on the contrary, if it improves, family care is more likely to stop, to decrease, or to remain stable (because care has become a part of the relationship).**

[1]The flexibility or adaptation of the family care-givers should have been tested in the analyses of the care-givers types' evolutions. Due to methodological decisions explained in this chapter, this analysis was not carried-out. For clarity purpose, it was decided to focus on the health effect hypothesis since the beginning of the chapter.

## B. How to study evolution with the study PSBH file

Adopting a dynamic approach to family care is probably the best way to identify its adaptation capacities and limitations over time, but it is also the most challenging.

Whatever the statistical method used to study the care evolution, there are some limitations imposed by the data and the study phenomenon itself. Most of them (limited window of observation, yearly data collection, wording of the care questions, etc.) were already discussed in chapter V. Some new issues have been highlighted by the analyses: (1) there is a suspicion of **spousal care under-declaration**. This implies that the observed changes in care-givers type and the transitions in or out family care may mainly concern 'children care'; (2) the fact that the information on the non-cohabitant children care was **aggregated** in the questionnaire and disaggregated afterwards (chapter VI), made it difficult to identify gender differences in children care. In the study of the family care evolution, it may lead to an under-identification of the changes occurring in the care-givers number; (3) having a well-defined **'at-risk' population** may lead to work on sub-sample(s) (e.g. the determinants of daughter care can only be studied on respondents having daughter(s)) and raised the issue of selectivity and small numbers. Therefore, a method of change analysis that does not impose (too strict) restrictions on the 'at-risk' group definition should be preferred.

Once these limitations are recognised, the following stage is to choose the most adequate statistical method to study care evolution in the study PSBH file. Among the methods commonly used to study changes, three seem to be particularly well-suited to study observed changes in a categorical dependent variable with discrete-time data[2]: 'discrete-time event-history analysis', 'sequence analysis' and 'transition analysis'. Each of them will be briefly described as well as their advantages and disadvantages for the study of family care evolution with the PSBH data.

### *1. Discrete-time event-history analysis[3]*

This is probably the most popular method for longitudinal data (Allison 1982; Singer & Willett 1993, 2003; Steele 2005). It can be considered as a kind of 'survival analysis' applied to discrete-time data. This type of analysis answers the question **'when does a given event happen?'** Or 'how long does it take until a given event happens?' The focus is therefore on the timing (or duration) before the event (or the change or the transition). The simplest situation is when the dependent variable is dichotomous (single-event) and occurs only once (unrepeated-event) in the 'at-risk' population (risk set)[4]. The best example is probably the event 'death'. But the method was extended over the last decades to the study of more complex events: competing events (Steele *et al.* 1996; Pintilie 2006), repeated events (e.g. McDonald & Rosina 2001), simultaneous events (e.g. Ishizaki 2004) or events influenced by characteristics at different levels (e.g. Barber *et al.* 2000; Beauchemin & Schoumaker 2005).

But in all these models, the key issue remains the definition of the **risk set** (who is 'at-risk' of experiencing the event(s)?) and the **'beginning of the time'** (when do they start to be 'at-risk'?). These parameters cannot be defined in a meaningful and feasible way in the dissertation research. For instance, if one takes the simple event 'receiving family care' (yes or not). The risk set will exclude all the respondents who receive family care at the first study wave (because they are not 'at-risk' of making a

[2] Causal analysis methods, such as cross-lagged structural equation modelling (Finkel 1995; Billiet & Davidov 2008) and graphical chain model (Wermuth & Lauritzen 1990; Whittaker 1993) are not considered.
[3] Also known as 'biography analysis', '(discrete-time) survival analysis' and 'discrete-time hazard model'.
[4] I applied this type of model to study the effect of providing care on the event 'exit from the labour market' among European women at work at the first wave of the ECHP data (Masuy 2009a).

transition to family care[5].) and, as there is no retrospective question on care, one cannot know if the elderly in the risk set have already received family care before the first study wave. This problem of the 'beginning of time' definition is common in panel data (Hamerle 1991). It may lead to a definition of the event which is technically correct but not really meaningful, like 'timing of the first family care spell observed between 1995 and 2002 among the elderly receiving no family care in 1994'.

Indeed, the discrete-time event history is mainly applied to retrospective data (e.g. Courgeau & Najim 1995; Blossfeld *et al.* 2007) where the number of time measurements is large and when it is possible to move backward to an 'origin event' which will define a meaningful beginning of the time (e.g. time of marriage for the study of the event 'divorce'). Another reason for not using this method is that it focuses on the time 'until the event'. This approach is difficult to apply here because there are not many time measurements and because the care imputation may have influenced the timing of the family care changes ('event')[6]. It does not mean that any dynamic analysis is impossible (it is still possible to study care sequences, transitions and to account for the effect of time-varying and time-invarying characteristics) but all this implies that an analysis based on the timing of an 'event' should be misleading by producing biased results or over-interpreting the data.

## *2. Sequence analysis[7]*

The second method, 'sequence analysis' is used to classify individual trajectories or 'sequences' into more homogeneous groups. For instance, the care combination observed for a given elderly between the first and his last study wave can be considered as a **'sequence'**: an elderly receiving no care (coded 'N') until wave 5, mixed care (coded 'M') at wave 6 and 7, family care only (coded 'F') at wave 8, and who leaves the panel before wave 9 will have the following sequence NNNMMF. The three **statuses** observed are 'N', 'M' and 'F'.

The main differences with discrete-time event history analysis are that: (1) sequence analysis is mainly used for **descriptive or exploratory analysis[8]**; (2) it gives a **holistic view** of the sequences while the other methods focus on the timing of a given event during a given period of time; (3) it does not require to define a 'risk set': **all the respondents have a 'valid' sequence** even if they remain in the same status all the time.

These particularities of the sequence analysis method looked attractive for the study of family care evolution and I tried to test it on the care combination variable[9].

[5] In the event-history analysis jargon, individuals who have already experienced the study event before the beginning of time are called a 'left censored observation'.

[6] For instance, if an elderly has only non-cohabitant children and declares receiving IADL care from them at wave 3 and ADL&IADL care at wave 6, but did not answer the questions at waves 4 and 5, then, the imputed care value at these two waves will depend on the visit frequency of the children. It might be that IADL care is imputed at wave 4 and ADL care at wave 5. But if the children really did start to care for the ADL at wave 6, the imputation would have anticipated the change.

[7] Also known as 'optimal matching', 'optimal alignment', or even as *'Méthode d'appariemment optimal'* in the French literature (see Robette & Thibault 2008).

[8] The typology of sequences resulting from the OM and the cluster analysis may be entered as dependent or independent variable in a further regression analysis (e.g. in di Paola & Moullet 2003, the work sequence becomes the dependent variable).

[9] I used the SQ-ados in STATA 10 following the tutorial of Brzinsky *et al.* (2006). I also tried with a combined variable.

Among the 1,008 elderly family members, there is a huge variety of 'care combination sequences' (572 different individual sequences are observed). It is quite easy to make a group with those who never received any care, another with those always receiving mixed care, … family care,… care services. It is more difficult to classify 'composite sequences' (including various care combinations). The sequence analysis method has been created for solving this type of classification problem. Indeed, the method originates from genetics where it is used to compare DNA sequences. Andrew Abbott (1990) contributed to introduce it in the social sciences to study sequences of events. This method is particularly useful to **study the order of life transitions in a (sub)-population** (e.g. Elzinga & Liefbroer (2007) used it to study the 'de-standardisation' of the family-life trajectories of young adults).

The **first step** of the sequence analysis[10] is the distribution of the sequences found in the data: gross sequences (e.g. 'NNNMMF' in the above example), included 'statuses' sequences (like 'NFM' in the example), ordered statuses sequences (as 'NMF'), etc. It allows identifying the most frequent sequences and making a first description of the data (it is also possible to distribute the sequences over sub-groups). Table X-1 gives the 10 most frequent 'ordered care combination sequences' observed among the 1,008 family-members elderly over the study waves and the three most frequent sequences by family care constellation.

**TABLE X-1:** Most frequent care combination ordered sequences observed among the 1,008 family-members elderly in total and by family constellation

| Among the 1,008 family-members elderly : 10 most frequent sequences | | Among the 1,008 family-members elderly, by family constellation | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Only spouse** | | **Spouse and son(s)** | | **Spouse, daughter(s) & son(s)** | |
| M | N=147 | N | n=22 | N | n=31 | M | n=34 |
| N | N=136 | S | n=16 | M | n=13 | N | n=33 |
| S | N=116 | NS | n=14 | NS | n=10 | S | n=20 |
| NS | N=57 | n represented | 52 | n represented | 54 | n represented | 87 |
| FM | N=48 | % of the 76 | 68.42 | % of the 125 | 43.20 | % of the 276 | 31.52 |
| F | N=38 | **Spouse and daughter(s)** | | **Only children** | | | |
| NF | N=29 | N | n=32 | M | n=79 | | |
| MF | N=21 | S | n=19 | S | n=56 | | |
| NM | N=20 | M | n=19 | N | n=18 | | |
| SN | N=20 | n represented | n=70 | n represented | 153 | | |
| n represented | 632 | % of the 194 | 36.08 | % of the 337 | 45.40 | | |
| % of the 1008 | 62.70 | | | | | | |

*Note:* N=**N**o care, S=care **S**ervices, F=**F**amily care, M=**M**ixed care.

This table provides useful information for describing the care combination sequences. For instance, it shows that the most frequent among the 1,008 is 'receiving always mixed care' ('M[11]'). It is the situation of 147 elderly. Together, the ten most frequent sequences concern 632 elderly (62.70% of the 1,008). It means that the remaining thirty-seven percent of the elderly having a less frequent sequence, often more complex and sometime unique. The distribution of the ordered sequences by care constellation highlights differences in 'top 3' sequences: those having only a spouse or a spouse and daughter(s) or

[10] The presentation of the method is over-simplified here. For more details, see, Abbott (1990, 1995), Abbott & Tsay (2000), Macindoe & Abbott (2004), Stovel & Bolan (2004).

[11] The sequence 'M' means that the elderly has received mixed care during all his study waves (whatever their number). It is, in fact, an abridged annotation referring to the sequences 'M' (during his sole study wave) 'MM' (during his two sole study waves) … 'MMMMMMMMM' (during all the study waves of a non-attritor elderly).

son(s) are more likely to have no 'declared' care. Receiving mixed care is even not in the 'top 3' of the elderly having only a spouse, while it is the most frequent among the elderly having 'Only children' or 'Spouse, daughter(s) and son(s)'.

**The second step** of a sequence analysis is to use the optimal matching[12] method to compute an algorithm and a cost matrix to determine the 'distance' and 'proximity' (or degree of similarity) between the sequences (see example below). The computed distances are entered into a cluster analysis to regroup the sequences according to their proximity (or similarity). In short, optimal matching permits to apply cluster analysis to longitudinal data.

Let's keep the care combination variable as an example. For making the sequence more readable, a letter refers to each status: '**S**' for care **S**ervices, '**F**' for **F**amily care, '**M**' for **M**ixed care, 'N' for **N**o care.

The analysis level is the sequence of statuses (e.g. SFNNNFSS and MSSNNFS are two observed sequences of the care combination variable, they represent the successive statuses two individuals experience during their stay in the panel).

Optimal matching uses an algorithm to compute the minimal distance between the two individual sequences by computing the 'cost' of regrouping individual sequences, more or less similar, into a same cluster. The idea is that one sequence may be changed into the other by making three kinds of operations: insertion, deletion or substitution. In this example were the substitution cost=1 and the insertion-deletion 'indel' cost=1:

**SFNNNFSS**
S**S**NNNSS **(substitution F>S): cost = 2**
SSNNN**F**S **(substitution S>F): cost = 2**
SSNN**.**FS **(deletion N): cost = 1**
**M**SSNNFS **(insertion M): cost = 1**

To change the first sequence into the second, two substitutions, a deletion and an insertion have been done. The researcher should have set the 'cost' of insertion and deletion (indel cost) and specify a matrix for the substitution 'costs' (based on theory or frequencies: e.g. more frequent changes are less costly). Based on these costs, the algorithm computes the cheapest way between each pair of sequences (or between each sequence and a reference sequence). These costs attributed to each pair of sequences are used to make a cluster analysis which will define groups (the cost of a move from one sequence to another of the same group is low and the cost of a move from one sequence to another of a different group is high). It is therefore possible to represent all individual sequences present in a given group by an 'indexplot' and to identify the regularities (e.g. all the individual sequences of a given group start with an 'FM…'). It is also possible, as for any cluster analysis, to distribute illustrative variables on each cluster: in order to see, for example, if women are more represented in a given cluster or if the people belonging to a cluster, where the provided care is quite stable, are more often cared by a spouse only than in the other clusters.

The method seems quite 'mechanic' but, indeed, many parameters should be defined by the researcher, including the cost matrix. This is a key point, because the cost matrix allows allocating a different weight to the different changes (e.g. in the care-giver types variable, it is possible to decide that the distance

[12] 'Optimal matching' is indeed not a synonymous of sequence analysis but the most popular method used to regroup or 'match' sequences. Other methods exist such as the 'non alignment metrics for sequences' (Elzinga 2005), the Kohonen cards (Delaunay & Lelièvre 2006), the 'machine learning approach' (Billari *et al.* 2006) or the 'dynamic Hamming dissimilarity measure' (Lesnard 2010).

between being 'cared by a daughter' and being 'cared by a son' is smaller than the distance between being 'cared by a daughter' and being 'cared by a spouse'). The definition of the variable also has a great importance. It can even be a combined variable (e.g. like Aassve *et al.* 2007 who created a combined variable of family and work situations, it would be possible to define a combined variable of the family care activities and the presence of care services for instance). There are many possible options that can be tried and compared.

I tried several options but the resulting clusters were either too simple or not meaningful, moreover they varied very much according to the taken options. I should have spent much more time in trials and errors to have any chance to reach concluding results. I have decided thus to abandon this method. Another argument for not using this method is that it does not account for the direction of a transition[13]: moving from no care to mixed care 'costs' as much as moving from mixed care to no care, which is substantively very different. However, **I use the sequence variables created in the first step for describing the care sequences.** For instance, to give the proportion of elderly who are always in a given status or who have been in this status at least once (see chapter VIII), or to count the number of elderly with multiple family care spells later in this chapter.

### *3. Transition analysis*

The third approach, which has been chosen for the dissertation, focuses on 'transitions' and their determinants. The term of 'transition' or 'transitional' analysis does not refer to a particular statistical method. It may be used for the analysis of transition rates (e.g. Peek *et al.* 1997; Geerlings *et al.* 2005; Guilley *et al.* 2008), to study the effect of a transition between $t_{n-1}$ and $t_n$ on a dependent variable measured at $t_n$ (Allison 1994); when there are only two waves (or time measurements) and that most of the longitudinal methods are not applicable (e.g. Dwyer *et al.* 1992; Broese Van Groenou & van Tilburg 1997; Johnson 2005), or when the panel data include more than two time measurements and that the research focus is on the presence of a transition (whatever its exact timing). In this last situation, the analysis is either done on each couple of waves separately (e.g. Williams & Umberson 2004) or on all the waves together, controlling for the presence of multiple observations by respondents (Guiaux *et al.* 2007; Szinovacz & Davey 2007). In short, the sole common point of all the so-called 'transition analyses' is the focus on transitions.

In the elderly care studies, transition analyses were used (1) in (potential) care-givers samples to study determinants of transitions in or out care-giving (e.g. Kasper *et al.* 1994; Kramer & Lambert 1999; Hirst 2002) or the effect of the care load 'transition' on the care-givers well-being (Lawton & Moss 2000; Marks *et al.* 2002; Burton *et al.* 2003); (2) in elderly (potential) care-receivers, to study the determinants of a transition between care arrangements (e.g. Miller & McFall 1991,1992; Anderson *et al.* 1998; Hallberg & Lagergren 2009) or of the transition to an institution (Greene *et al.* 1993; Aneshensel *et al.* 2000; Glaser *et al.* 2003).

In the present situation, the choice for a 'transition' approach is motivated by the willingness to make a dynamic analysis of family care without over-estimating the accuracy of the data (*cfr* comment on the 'timing' of change). The transition analysis will consist in studying the determinants of transitions in a given family care aspect between $wave_{n-1}$ and $wave_n$. A key issue of this type of analysis is (1) the definition of the transition and (2) the time of measurement of the independent variables.

[13] At least, this is not possible with the software I have used (Stata©).

(1) When the transition is the dependent variable, it may be defined in three ways: (a) accounting for the status at $wave_{n-1}$ (e.g. transition out of ADL care), (b) for the status at $wave_n$ (e.g. transition into ADL care), or (c) for the statuses at $wave_{n-1}$ and at $wave_n$ (e.g. transition from IADL to ADL care). **The last option – the 'fully defined transition' - is chosen** (like in Spiess & Schneider 2003), because it allows working on the whole sample and accounting not only for the transitions but for the stability of the care statuses too: for instance, if one considers two successive waves where family care is provided, all the elderly are 'at-risk' of four family care activities 'transitions' or, more exactly 'follow-up statuses[14]': ADL-IADL, IADL-ADL, IADL-IADL, ADL-ADL. Using a multinomial logistic model, it is therefore possible to identify the characteristics influencing the fact of having made a decreasing care intensity transition (ADL-IADL) rather than remaining in a intensive care status (ADL-ADL), and similarly for all the couples of 'follow-up statuses' (being in IADL-ADL rather than in IADL-IADL, etc.).

(2) The three options described in the previous point also apply to the independent time-varying variables[15] specification: it is possible to use the value at the previous wave (one year-lagged predictor), at the current wave or to consider the status of the independent variable at both waves (to measure the effect of a transition). There is no consensus on the best approach (Liker *et al.* 1985, Singer & Willett 2003). The choice depends on substantive and feasibility aspects (e.g. when the approach is causal or when there is a state dependency issue, lagged predictors are usually preferred). In the present situation, **it was decided to use the value of the independent time-varying variables at the current wave except for the health** status (where a transition variable is created). The rationale is that a transition in care is more likely to be influenced by the current characteristics than by the past characteristics (a daughter starts to care at $w_n$ because her parent who is usually the main care-giver is sick at this wave and not because this parent was healthier at $w_{n-1}$). Of course, it would have been interesting to study the effect of a transition in time-varying variables on the family care changes (e.g. to see if a transition to widowhood influences the intensity of children care) but small numbers[16] of the transitions observed in most of the independent variables (see description of individual trajectories in each variable in chapter VII) made this option infeasible 'in general'. However, there are quite a lot of health transitions observed over the study waves and it is possible to create a transition independent variable for this 'particular' situation. The variable will have four modalities 'no disability', 'past disability', 'current disability' and 'long-term disability'[17]. The interest of introducing a transition health variable is that it allows - at least partly - accounting for the duration of the health problem.

The application of such a transition analysis on the PSBH has some implications:

First, elderly who left the panel after the first study wave (**'early leavers'**) must be excluded from the analyses because they are not 'at-risk' of making a transition. The first wave where 'transition' can be recorded is the second study wave (wave 4). To make it clear, the term of 'transitional wave' will be used to refer to waves 4 to 11, where transitions can be recorded.

[14] This term is preferred to 'transition' which implies a change in status. A 'status follow-up' may refer to a transition as well as to stable situations.

[15] No decision should be taken for the time-invarying variables (e.g. gender, birth cohort, etc.) as they are, by definition, fixed over time.

[16] For instance, there are only 60 elderly experiencing a transition out of partnership (see frame IX-1).

[17] The transition variable was built based on *W-HEALTH* (0= no health problem; 1= subjective problem; 2= moderate disability; 3= severe disability) and considering the 'status follow-up': '0-0', '1-1', '0-1', '1-0' = 'no disability'; '2-0', '3-0','2-1','3-1' = 'past disability'; '0-2', '0-3','1-2','1-3' = 'current disability'; '2-2', '2-3','3-2','3-3' = 'long-term disability'.

Second, only **'direct' transitions** (occurring between $w_{n-1}$ and $w_n$) are considered. Unlike in a sequence analysis approach, where all the transitions observed in the sequence are considered simultaneously, the transition analysis studies the determinant of a transition observed at a given wave. For instance, if an elderly received family care until wave 8 and then moved to mixed care until wave 11, the transition is recorded at wave 9 and there are no more 'traces' of this transition at the other transitional waves. At waves 4, 5, 6, 7 and 8, he will be considered as 'continuing receiving family care' and at waves 10 and 11 as 'continuing receiving mixed care'.

Third, (deriving from the previous point), the idea of **'long-term'** (used for the effect of health or to describe the duration of a family care spell) is quite restrictive: a situation is considered here as a 'long-term' situation as soon as it remains stable over two successive waves. Imposing a longer period would have put further restrictions on the waves considered for the transition analysis (e.g. three-year stability in disability can only be observed since wave 5).

Fourth, two limitations of the panel data in the study of changes (see chapter V) should be recalled: (1) as the data are collected yearly, **short-term** care spells or care interruptions happening between the interviews may be overlooked; (2) the respondents are not observed for the same length of time (attrition): elderly leaving the panel earlier may be less likely to experience a transition during the observed period.

## C. Which transitions to analyse

After having chosen and justified how to study the family care evolution with the PSBH data and having defined the specification of the dependent and time-varying independent variables, a last step should be made before starting the analysis of the family care aspect transitions: it is the determination of the 'fully defined transitions' in family care aspects.

Moving from a wave variable to a transition variable increases dramatically the number of modalities to consider. For instance, the family care combination variable (*W-COMBICARE*) which can take four values at a given wave ('no care', 'care services', 'family care', 'mixed care') produces 16 'follow-up statuses' possibilities (from 'no care-no care' to 'mixed care-mixed care'). Some of them are very rare (e.g. 'no care-mixed care') or not very interesting for the study of family care evolution (e.g. 'no care-care services' or 'care-services- no care'). For the other care aspect, an additional problem is the definition of the 'at-risk' group (e.g. a respondent having only one type of care-giver cannot make 'care-giver types' transitions).

Three 'rules of decision' were set to define the transitions to study:

> **1.** As the creation of a 'transition' variable 'increases' its complexity, the transition analysis should be more **selective** and focus on family aspects which are more likely to change in the data.
>
> **2. The** 'status follow-up' may be regrouped in order to have **meaningful modalities with enough observation**s[18].
>
> **3.** It is important to avoid working on a too **small or selective sub-sample**.

Following these rules, the care-givers types and the number of care-givers aspects were removed from the transition analyses (1) and the care combination aspect was divided into two transition variables (2).

[18] The sample size criterion suggested by Peduzzi *et al.* (1996) (see chapter VIII) is applied,

The transition between family care activities will be studied only when the elderly received family care at two successive study waves (3).

1. The **care-givers number** variable does not satisfy the criteria (rules) 1 and 3: the analysis of chapter VIII showed that the number of care-givers is mainly determined by the availability of potential care-givers (enabling factor) and not by the needs factors. It makes this care aspect less relevant to test the hypothesis of the effect of health on care transitions (rule 1). Furthermore, it is quite difficult to define at the same time a meaningful transition variable and a non too selected 'at-risk' sample: if one wants to account for the direction of the change 'same number' 'increasing number', 'decreasing number', the elderly receiving care from one care-giver at $wave_{n-1}$ are not 'at-risk' of 'decrease' (except if he stops to be cared) and an elderly receiving care from all his potential care-givers is not 'at-risk' of an 'increase'. To not account for the direction of the change would solve this problem, but this is not meaningful because the determinants of an 'increase' or of a 'decrease' in the care-givers number are not the same (rule 3). Descriptive analyses of the care-givers number sequences (not displayed) show that 147 family-members elderly have experienced a change in care-givers numbers during a family care spell. It represents 265 changes (128 decreases and 137 increases). The most common situation remains to keep a stable number of care-givers during a given caring spell.

   In the study of the transition in care-giver types, the most interesting is not to look at the 'in' and 'out' transitions for each given care-giver type (e.g. the spouse starting, stopping or continuing to care), but to study the transition between care-giver types combinations (e.g. moving from spousal care only to care from spouse and children). The problems are (a) the definition of the 'at-risk' sample: only respondents having potential care-givers of all the types involved in the 'follow-up statuses' can be included (rule 3); changes in spousal care are very rare (probably due to the under-declaration of spousal care in general) and it creates a problem of small numbers (rule 2). A descriptive analysis of the care-givers number sequences (not displayed) shows that 101 elderly have experienced a change in their care-givers types combination during a family care spell. It represents 153 transitions (among them, only 10 consist of the entry in or the exit of the spouse from care).

2. For the **care combination variable**, it sounds more interesting to distinguish the transition **between** combinations including family care and those excluding family care ('care combination between-transition') and the transition **within** a family care spell ('family care'><'mixed care')('care combination within-transition') (rule 2). The first variable allows identifying the determinants of the beginning, the ending or the continuation of a family care spell; the second variable allows identifying what makes the elderly continuing, starting or stopping using care services in complement to family care.

3. For the **family care activities variable**, a within-transition variable is created to study the decrease, increase or stability in care activities intensity. It is one of the care aspects which is the most likely to change over time (rule 1).

The modalities of the transition variables and the definition of the 'at-risk' sample are explained in the section 2 for the 'between-transition' variable and in section 3 for the two 'within-transition' variables.

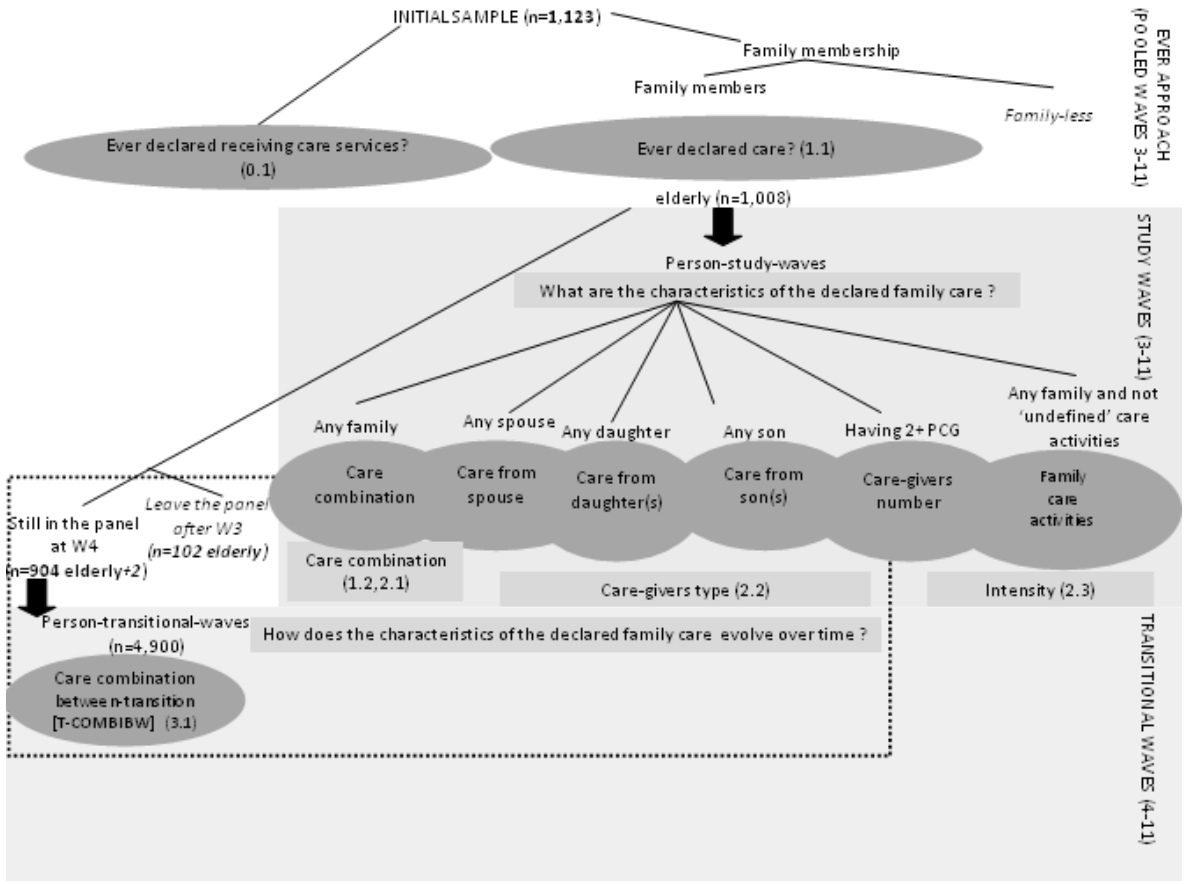
## *SECTION 2. Family care: start, stop or again?*

In a logical order, the between-transition should be studied first: before looking at changes within a family care spell, one should wonder at what are the determinants of its beginning, its ends or its continuation?

### A. Localisation in the sample scheme

Scheme X-1 makes the link with the analyses done in the previous chapter.

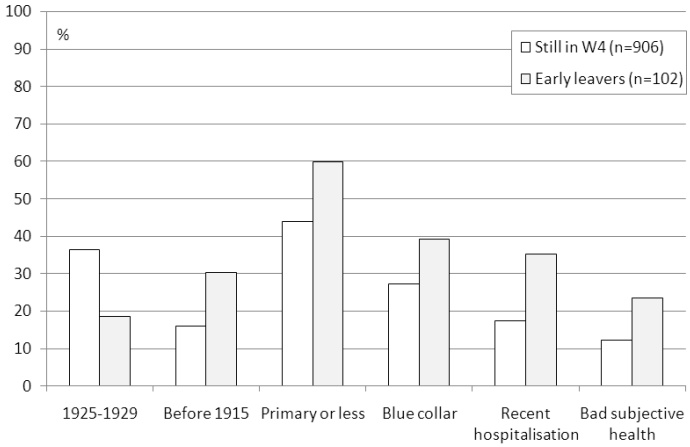
**SCHEME X-1:** Localisation of dependent variable 'care combination between-transition' ***[T-COMBIBW]*** in the sample scheme




To define the 'at-risk' sample, one has to come back to the 1,008 family-members elderly ('at risk' of having ever received family care over the study waves). Among them, 102 early leavers must be excluded from the transition analyses. A comparison with the other 906 family-members elderly 'still in W4' is presented in frame X-1. It shows that the next analyses will be carried out on a sub-sample of relatively healthier elderly who are in a better socio-economic position (at least at wave 3) than the average of the 1,008 elderly family members.

**FRAME X-1:** Zoom on the 102 'early leavers'

**GRAPH X-1:** Main differences between the 'early leavers' and the 'family members' still in the panel at wave 4 (PSBH 1994, n=1,008)




The stronger disparities (more than ≥10% difference) concern the health status, the socio-economic status and the birth cohorts: at wave 3, early leavers are older, of a poorer socio-economic background and have a poorer health status. No difference in family composition (spousal health, having many children, having any daughter) or family care is found (all the figures are displayed in appendix table X-1).

For reaching the number of 904 elderly (mentioned in the scheme), the two family-members elderly who are still in the panel at wave 4 but who have lost their spouse between waves 3 and 4 and have no children must be removed. Together, the 904 elderly totalise 4,900 person-transitional-waves on which the analyses can be carried out.

## B. Description: creation and distribution of the variable, frequency of the family care spell(s) sequences

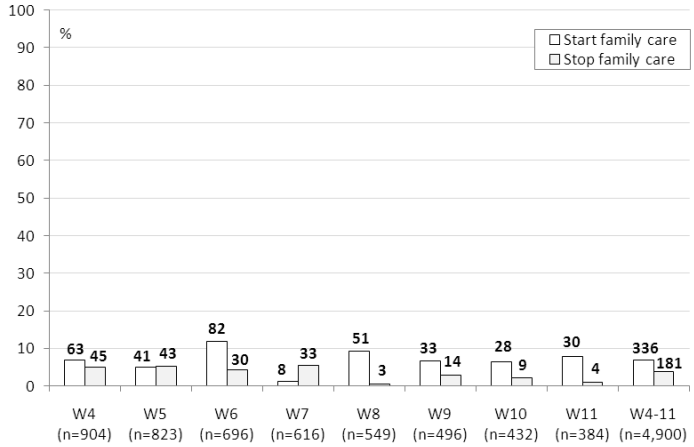
The dependent variable 'care combination between-transition' accounts for the situation at the current wave and at the previous wave. For instance, to study the transition into or out of family care, the dependent variable at the first 'transitional wave' (wave 4) is built as shown in table X-2.

**TABLE X-2:** Building the dependent variable 'family care between-transition'

| | **Current wave (wave 4)** | |
|---|---|---|
| **Previous wave (wave 3)** | 'Family care' or 'Mixed care' | 'No care' or 'Care services' |
| 'Family care' or 'Mixed care' | **Continue** | **Stop** |
| 'No care' or 'Care services' | **Start** | **No** |
| | **= the 4 modalities of the transition variable** | |

The same is done for the other transitional waves (5 to 11). The dependent variable has four modalities, two of them (start and stop) refer to a change (or transition), the two others to an absence of change (or transition) since the previous wave. Note that only the presence of family care is considered: an elderly receiving 'no care' at the previous wave and 'care services' at the current wave will be considered as having not made a transition. The dependent variable can therefore be distributed over all the 4,900 person-transitional-waves together or by waves.

**GRAPH X-2:** Transitions into and out of family care [*T-COMBIBW*] (PSBH 1995-2002)




*Note:* Numbers in bold give the number of elderly making the given transition (e.g. 63 elderly start to receive family care at wave 4: they did not receive family care at wave 3 but they receive it at wave 4).

Graph X-2 shows that transitions in family care are not frequent: about 15-20% changes are observed by wave. The remaining 75-80% (not in the graph) stay in the same combination as in the previous study wave (all the figures are in appendix table X-2). The number of elderly making a given transition at a given wave may be very small: only three elderly have moved from no family care to family care between wave 7 and wave 8. But, if one considers all the transitions observed since wave 4 until wave 11, more 'robust' numbers are found: 336 transitions into family care and 181 out of family care are observed. The larger number of transitions into family care implies that family care is more likely to start than to stop. But the numbers may not be interpreted in terms of elderly making a given transition: some elderly may have experienced multiple family caring spells over the study waves: a first spell stops and a new one starts and may stop. In such situations, the elderly will 'count' for one 'start transition' and two 'stop transitions'. But this 'recidivist' behaviour (elderly with multiple family care spells) is not frequent (8.52% of the 904 elderly 'at -risk', see table X-3). When a family care spell starts (or is already ongoing at wave 3), the most likely is that it continues until the elderly leaves the panel (24.56% 'unbounded spell' +19.69% 'start of a family care spell').

**TABLE X-3:** Frequency of the different family care spell(s) sequences (PSBH 1994-2002, n=904)

| FAMILY CARE SEQUENCE | DESCRIPTION | % (number of elderly) |
|---|---|---|
| No | 'No family care spell' | 35.95 (n=325) |
| No – **Family** | 'Start of a family care spell' | 19.69 (n=178) |
| No – **Family** – No | 'Bounded family care spell' | 5.42 (n=49) |
| **Family** | 'Unbounded family care spell' | 24.56 (n=222) |
| **Family** – No | 'End of a family care spell' | 5.86 (n=53) |
| (No) – **Family** – No – **Family** – (No) | 'Multiple family care spells' | 8.52 (n=77) |

## C. GLMM regression on 'care combination between-transition'

### *1. Accounting for the non-independence of the observations*

As seen from the above description, the analysis of the care combinations between-transition must be done on all the person-transitional-waves simultaneously. The 'specific waves' option taken in chapter IX is not possible because there are not many transitions observed at any given wave. Considering all the transitional waves together involves that a same elderly may contribute to multiple observations (up to 8 observations in case of non-attritors having any family member until the end of the panel). This raises the problem of non-independence of the observations.

Indeed, one of the basic assumptions of the (multinomial) logistic regression (used so far) is that the observations are independent (the outcome for each observation is unrelated to the outcome of the other observations). If this assumption is violated, the error terms may be correlated and this would produce biased results.

In all the previous analyses, each elderly contributed to only one observation and the independence of observations assumption was satisfied. Now, in the transition analyses, the elderly may have multiple observations which are necessarily correlated: first, because the time-invarying variables are, by definition, constant over waves for a same elderly; second (what is more problematic), because it is likely that some 'unobserved' characteristics (e.g. expectations toward the children caring role, the sense of autonomy, etc.) influence the family care outcome for all the observations of the given elderly. Because these characteristics are 'unobserved' (not controlled in the regression), they are integrated in the error terms. The result is that the error terms of the observations of a given elderly are correlated[19]. Actually, having multiple observations for a respondent is typically the case of clustered data: observations (here: person-transitional-waves) are nested to a subject (here: the elderly).

To not account for the clustered structure of the data "usually produces standard errors that are underestimated […] test statistics that are overestimated [and] coefficient estimates that are inefficient." (Allison 1999a: 180).

There are several methods that can be used for dealing with observations clustered to a subject. Some of them only allow estimating the effect of time-varying variables, the time-invarying characteristics being reduced to a single parameter (e.g. 'fixed effect model'). Other permit to estimate the effect of time-varying and time-invarying variables, but only for continuous dependent variable (e.g. 'mixed model'[20]). However, in the 1990s, many attempts of extending the mixed model principles to categorical dependent variables were done and unified by Breslow & Clayton (1993) under the name of **the generalised linear mixed model** (GLMM) (Littell *et al.* 2006).

[19] This phenomenon, also known as 'unobserved heterogeneity' has been widely studied by econometricians (see Wooldrige 2002) and was at the origin of the 'frailty models' in mortality studies (e.g. Vaupel *et al.* 1979).

[20] Hedeker (2004: 215) lists the variety of names used for these models and their variants: 'hierarchical linear models', 'random-effects models', 'variance component models', 'multilevel models', 'two-stage models', 'random-coefficient models', 'mixed models', 'empirical Bayes models' and 'random regression models'.

## *2. Applying a generalised linear mixed model with SAS©*

In mixed models, the correlation between observations[21] related to a same individual is accounted for by including a 'random subject effect' into the regression. It is like controlling for the identification number of each elderly. The independent variables included in the model are considered as a 'fixed effect' and the parameters are estimated for each of them and can be interpreted like in a linear regression. The GLMM allows applying this principle to categorical dependent variable under the assumption that the random subject effects are normally distributed. Conditional on these random effects, the data can have any distribution of the exponential family.

In the present situation (care combination between-transition), a **logistic multinomial distribution** is chosen because the dependent variable has more than two modalities. The GLMM is carried out using the GLIMMIX procedure recently available in the SAS© software[22]. Frame X-2 briefly describes the development of GLMM in the SAS© system and the consequences of using a recent procedure on the analysis choices while frame X-3 explains concretely how the GLIMMIX procedure was used for the analysis of care combination between-transition.

**FRAME X-2:** Development of GLIMMIX in the SAS© software

The GLIMMIX macro was created by Wolfinger & O'Connell in 1993. In 1999, Allison (1999a) presented it as a way of accounting for observations clustered at the individual level. He said that the MIXED procedure (for mixed models) "does an excellent job of estimating mixed models when the dependent variable is continuous and normally distributed [and that] there is also a SAS© macro called GLIMMIX […] enabling […] to estimate models for dependent variables with binomial, Poisson, and other distributions" (p 207).

But, at that time, the macro was criticised because of the inaccuracy of its estimations. In 2005, Molenberghs & Verbeke wrote a book on "models for discrete longitudinal data". GLIMMIX has then recently been introduced as a procedure and the authors compared the output obtained from the macro and from the procedure. The latter seemed to produce better results.

One year later, the GLIMMIX procedure is detailed in a book entirely devoted to mixed models in SAS© (Littell *et al.* 2006). In 2007, Kuss & McLerran, made use of the GLIMMIX procedure for a case very similar to the one of interest in this chapter. The title of their article is "A note on the estimation of the multinomial logistic model with correlated responses in SAS". At that time (2007!), the procedure did allow dealing with binary, but not with multinomial distribution. The authors explain how the dataset must be restructured in order to transform the multinomial model into a multivariate binary model which can be treated with GLIMMIX. In SAS© 9.2 (version used for dissertation), the multinomial distribution can be directly specified in the GLIMMIX procedure and new options and estimation methods are made available.

The quick improvement of the method over the last decades is a good thing per se, but it makes it more difficult to rely on the literature. All the above-mentioned authors made use of previous versions of GLIMMIX. Therefore, I had to confront this literature to the software 'help' guide to choose the most suitable options available in the GLIMMIX procedure of SAS© 9.2. I also discussed it with a statistician at the *Institut de recherche multidisciplinaire pour la modélisation et l'analyse quantitative* (IMMAQ) for some specific questions.

[21] The number of observations can vary from one individual to another. This is an advantage of the mixed models because it allows working with incomplete data or unbalanced panel data.

[22] Mixed modelling with categorical dependent variables is also available in other software (e.g. Applied Maximum Likelihood-AML, LMwin©, SABRE which included plug-in for Stata© and R). I used the first one for a summer course on multilevel analysis. But the time of execution is very long and the models often failed to converge (when the starting values are not well defined). I did not try the others but preferred to use SAS©, as most of the available literature on GLMM refers to this software and I am personally more comfortable with it.

**FRAME X-3:** The GLMM applied through the GLIMMIX procedure

The GLIMMIX procedure uses the maximum likelihood estimation and approximates the marginal log likelihood with an **adaptive Gauss-Hermite quadrature**[23] "which uses a singly iterative algorithm with a separate sub-optimization to compute the random-effects solutions as modes of the log-posterior distribution" (SAS© help and documentation guide).

In the present situation, only the fixed effect parameters are displayed and interpreted: the purpose of the analysis is not to distinguish the 'elderly' effect from the other covariates effects but to measure the effect of predisposing, enabling and needs factors on family care transitions, controlling for the non-independence of observations belonging to a same elderly.

Like in a 'classic' multinomial logistic regression, the OR, confidence intervals and significance tests are computed for each parameter (the adaptive Gauss-Hermite quadrature computes a student t-test for the fixed effects); the AIC, -2LL and other measures of fit are available for the global model (including random and fixed effects). In addition, a test of independence is performed: the null hypothesis is that observations belonging to a same elderly are independent between them. The test gives the value of the -2LL statistics 'under the null hypothesis (of independence). This value is compared to the global -2LL statistics: in table X-4, the test is highly significant (p value <0.0001)[24] and the values of -2LL are respectively equal to 8,741.33 and 7,222.83. It means that accounting for the random effect significantly improves the fit of the model and that the null hypothesis must be rejected. The test of independence was equally highly significant for the two other transitions analyses (see tables X-8 and X-9).

The sample size and the multicollinearity (considering all the person-transitional-waves together) preliminary verifications were done for the three multivariate models presented in the chapter and no problems were found.

The distribution of the elderly characteristics by the dependent variable and the bivariate results are presented in appendix tables X-3 and X-4. The multivariate results are displayed in table X-4[25]. They look very similar to the results of the 'classic' multinomial regression, except for the presence of the **independence test** (explained in the above frame) and the content of the **first column which gives**, for each modality, the number of person-transitional-waves and the number of concerned elderly. When the two numbers are close, it means that most of the elderly tend to have this characteristic (modality) only once over the transitional waves.

[23] By default, the GLIMMIX procedure uses quasi-likelihood estimation methods. They were the only methods available in the original GLIMMIX macro. According to Hartzel *et al. (*2001) and to Hedeker (2003), an adaptive Gauss-Hermite quadrature method fits better to multinomial logistic mixed models. As this estimation method is available in SAS© 9.2 for proc GLIMMIX, it was chosen instead of the default option.

[24] The p-value for this test is computed from a mixture of Chi² distributions, applying the results of Self & Liang (1987).

[25] Contrary to the 'classic' multinomial logistic regression, the values of the estimated parameters and statistics (AIC, -2LL, etc.) may slightly change according to the chosen reference modality. For parsimony reasons, only the results obtained with the 'first' reference category are displayed (e.g. the modality 'no' in the care combination between-transition which is used as reference category in the three 'first' regression parts).

**TABLE X-4:** Multivariate multinomial logistic mixed-model regression on 'care combination between-transition' *[T-COMBIBW]* (PSBH 1995-2002, n=4,900)

| | MULTIVARIATE FULL MODEL | | | | | |
|---|---|---|---|---|---|---|
| **PREDICTORS** | **Start/*No*** OR | **Stop/*No*** OR | **Continue/*No*** OR | **Stop/*Start*** OR | **Continue/*Start*** OR | **Continue/*Stop*** OR |
| **Gender** | | | | | | |
| *rc: Man (w=2,158; e=404)* | | | | | | |
| Woman (w=2,742; e=500) | 0.99 | 1.08 | **1.58 *** | 1.04 | 1.49 | 1.28 |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (w=1,929; e=330)* | | | | | | |
| 1920-1924 (w=1607; e=286) | 1.22 | 1.25 | 1.28 | 1.09 | 1.52 | 1.17 |
| 1915-1919 (w=779; e=145) | 1.36 | **1.55 *** | 1.63 | 1.15 | 1.60 | 1.06 |
| Before 1915 (w=585; e=143) | 1.19 | 1.04 | **2.65 **** | 0.87 | **2.35 *** | 2.01 |
| **Religiosity** | | | | | | |
| *rc: Non-religious (w=1,131; e=202)* | | | | | | |
| Religious (w=3,769; e=702) | 0.96 | 0.81 | 1.11 n | 0.86 | 1.55 | 1.50 |
| **Education** | | | | | | |
| *rc: Secondary or more (w=2,874; e=506)* | | | | | | |
| Primary or less (w=2,026; e=398) | 1.10 | 0.99 | **2.61 ***** | 0.85 | **2.03 **** | **1.89 **** |
| **Region** | | | | | | |
| Flanders (w=2,189; e=400) | 1.02 | 1.01 | **2.52 ***** | 1.02 | **2.40 ***** | **1.86 **** |
| *rc: Wallonia (w=2,063; e=382)* | | | | | | |
| Brussels (w=648; e=122) | 0.83 | 0.81 | **0.41 **** | 0.98 | 0.63 | 0.62 |
| **Health transition** | | | | | | |
| *rc: No disability (w=2,778; e=676)* | | | | | | |
| Past disability (w=376; e=676) | **1.66 **** | 1.29 | 1.27 | 0.90 | 1.11 | 1.25 |
| Current disability (w=568; e=426) | **2.45 ***** | **1.62 **** | 1.29 | 0.75 | 0.86 | 1.12 |
| Long-term disability (w=1,178; e=375) | **1.63 ***** | 1.22 | **10.12 ***** | 0.93 | **3.22 ***** | **2.97 ***** |
| **Recent hospitalization** | | | | | | |
| *rc: No (w=3844; e=862)* | | | | | | |
| Yes (w=1056; e=516) | **2.46 ***** | **0.60 **** | 1.11 | **0.37 ***** | **0.62 ***** | **1.65 **** |
| **Ability to make ends meet** | | | | | | |
| *rc: Easily (w=1,828; e=531)* | | | | | | |
| Fairly (w=1,553; e=616) | **1.40 **** | 1.09 | 1.10 | 0.88 | 0.98 | 1.07 |
| Hardly (w=1,519; e=441) | 1.19 | **1.53 **** | 1.23 | 1.26 | 1.23 | 1.02 |
| **Spousal health** | | | | | | |
| *rc: Not in couple (w=1,901; e=372)* | | | | | | |
| Good (w=1,358; e=366) | 0.99 | 1.23 | **0.18 ***** | 1.04 | **0.21 ***** | **0.24 ***** |
| Fair or bad (w=1,641; e=455) | 1.29 | 0.69 | **0.40 ***** | 0.72 | **0.40 ***** | 0.67 |
| **Number of children** | | | | | | |
| *rc: 0-1 child (w=1,578; e=248)* | | | | | | |
| 2+ children (w=3,322; e=656) | 1.07 | 1.33 | 1.21 | 1.07 | 1.25 | 1.37 |
| **Number of daughters** | | | | | | |
| *rc: 0 daughter (w=1,329; e=248)* | | | | | | |
| 1+ daughter(s) (w=3,571; e=656) | **1.56 ***** | **2.38 ***** | **2.67 ***** | 1.25 | **2.41 **** | 1.06 |
| **Closest child proximity** | | | | | | |
| Cohabiting (w=549; e=120) | | **1.80 *** | 1.67 | 1.72 | 1.81 | 1.10 |
| <10 Km (w=3,023; e=590) | **2.05 ***** | **3.49 ***** | **8.56 ***** | 1.40 | **3.25 ***** | **2.04 **** |
| *rc: 10 Km+/no child (w=1,328; e=315)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (w=1,815; e=516)* | | | | | | |
| Non-attritor (w=3,085; e=388) | 1.06 | 1.18 | **0.46 ***** | 0.99 | 0.83 | 0.80 |
| **MODEL INFORMATION** | | | | | | |
| Model fit | -2LL: 7,222.8 | AIC: 7,358.83 | | | | |
| Test of independence of observations within a same elderly | | | | | | |
| | (-2LL) | DF | Chi² | p value | | |
| | 8,741.3 | 3 | 1,518.5 | <.0001 | | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

As usual, the interpretation of the effect implied in the hypothesis to test (here the effect of health on family care changes) is made in a separate point (see point D). But some observations on the other significant variables can already be made here: the Flemish and the lower educated elderly are more likely to receive long-term family care (all the regression parts comparing 'continue' to other 'follow-up statuses' have significant OR >1). This is in line with the idea of a strong 'family care orientation' among the lower social classes. For the Flemish, a possible explanation is that the 'community care' orientation in elderly care policies and the development of support for the informal care-givers may facilitate a long-term family care. As for the effect of family composition, the number of children has no effect on transitions[26], but having a daughter increases the likelihood of having recently received family care (all the regression parts having 'no' as reference category have significant OR>1: it is more likely to have just stop, start or continue receiving family care… in short, to have recently received family care). Having a spouse, whatever his health status, is associated with a lower likelihood of receiving long-term family care (probably due to the under-declaration of spousal care), but with one exception: the elderly having a spouse in a poor health status are not less likely to continue receiving family care than to stop. If one considers that the declared family care is mainly 'children care', the effect of spousal health can be interpreted as follows: when the elderly has a spouse, then children care is less frequent and usually of a short duration. In this situation, long-term children care is as frequent as it is in case for a spouseless elderly. Finally, having his closest child living at less than 10 Km away is associated with a higher likelihood of receiving family care in general and long-term family care in particular.

## D. Hypothesis to test: health effect

The hypothesis formulated at the beginning of this chapter is that changes in family care were due to health evolution. This section studies the transitions 'in' and 'out' family care and the health effect is measured by two variables: a transition variable for the presence of a disability (in the recent past, the present or the long-term) and a variable on recent hospitalisation.

Both variables show large and significant effects in bivariate and multivariate analyses. In the multivariate model, having a disability (at the previous and/or at the current wave) increases the likelihood of starting receiving family care, but the elderly having a long-term disability are more likely to have already received family care at the previous wave: they have 10.12 times the odds of receiving long-term family care of those having no (recent) disability.

Having been recently hospitalised (which had seldom a significant effect in the previous multivariate analyses, see chapter IX) increases the likelihood of starting receiving family care: the OR of 'start *versus* no' are >1 and the OR of 'stop *versus* start' and 'continue *versus* start' are <1, showing that starting family care is the most frequent in case of recent hospitalisation. Stopping family care is the least likely: OR >1 in 'continue *versus* stop' shows that if family care was already provided at the previous wave, it is likely to continue and OR<1 in 'stop *versus* no' shows that, in some cases, family care is neither provided before nor after the hospitalisation (maybe because it is not needed or because the family is not available for care). The results of the analyses are consistent with the health effect hypothesis: controlling for the predisposing and enabling factors, the needs variables continue to have a significant effect on the entry, exit and continuation of family care. The presence of a disability or of a recent

[26] Indeed, in bivariate analyses, having two or more children was positively associated with long-term family care and, to a lesser extent, to short-term family care (start and stop family care being more likely than not receiving family care during the two successive waves. These findings favour the supplementation hypothesis (which cannot be tested with multivariate analysis in this chapter).

hospitalisation both increase the likelihood of starting receiving family care but, in case of a long-term disability, the most likely is to have always received family care and to continue receiving it.

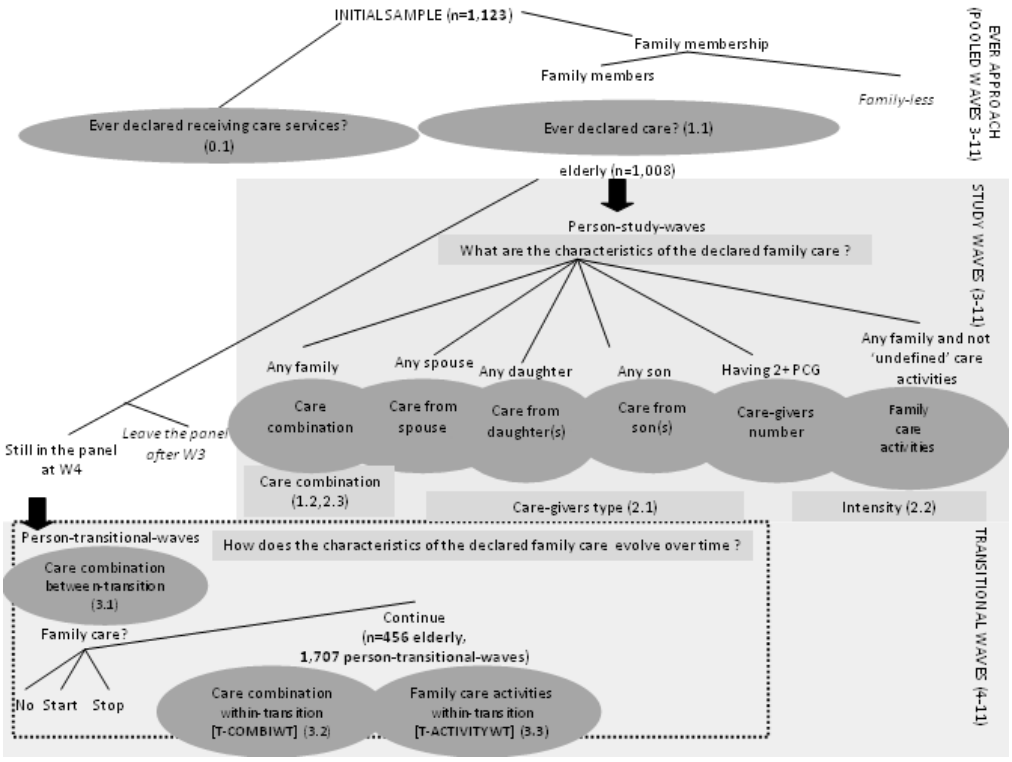
## *SECTION 3. Long-term family spell: stability or changes?*

After having studied the determinants of the start, the end or the continuation of a family care spell, this section will focus on transitions occurring 'within' a family care spell: when the elderly is receiving family care at two or more successive study waves, do some changes occur in the activities or in the use of care services?

### A. Localisation in the sample scheme

As shown in scheme X-2, the analyses are restricted to the person-transitional-waves where the elderly 'continue' to receive family care: he is currently receiving family care and was already receiving family care at the previous study wave (corresponding to the modality 'continue' of the 'care combination between-transition' variable). It means that (1) the family-members elderly who never received family care or who only received 'short-term' family care (caring spell(s) of one wave) are excluded from the analyses; (2) the family-members elderly who ever received 'long-term' family care (caring spell(s) of two waves or more) contribute to as many observations as the number of person-transitional-waves when they 'continue' to receive family care.

**SCHEME X-2:** Localisation of two 'within-transition' dependent variables in the sample scheme



To make it clearer, five different care sequences (types of situation) are presented in table X-5. For each situation, the first line gives the care combination observed at the current study wave ('No care', 'Care services', 'Family care', 'Mixed care') and the second line gives the value of the 'care combination between-transition' ('No', 'Start', 'Continue', 'Stop'). The transitional waves (or observations) included in the within-transition analyses are indicated in the grey cells.

**TABLE X-5:** Observations considered for the 'within-transitions' in different fictive care sequence situations

| | | W3 | W4 | W5 | W6 | W7 | W8 | W9 | W10 | W11 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Situation 1** | *W-COMBICARE* | No Care | No care | No Care | No care | Care services | Care services | - | - | - |
| | *T-COMBIBW* | | No | No | No | No | No | - | - | - |
| **Situation 2** | *W-COMBICARE* | Family care | Family Care | No Care | No care | No Care | Care services | No Care | No care | No care |
| | *T-COMBIBW* | | Continue | Stop | No | No | No | No | No | No |
| **Situation 3** | *W-COMBICARE* | No Care | *Mixed care* | No | *Mixed care* | - | - | - | - | - |
| | *T-COMBIBW* | | Start | Stop | Start | - | - | - | - | - |
| **Situation 4** | *W-COMBICARE* | *Mixed care* | No | No | Family care | Mixed Care | Mixed Care | - | - | - |
| | *T-COMBIBW* | | Stop | No | Start | Continue | Cont. | - | - | - |
| **Situation 5** | *W-COMBICARE* | Family care | Family Care | Family Care | Family Care | Mixed Care | Mixed Care | Mixed Care | Mixed Care | Mixed Care |
| | *T-COMBIBW* | | Continue | Cont. | Cont. | Cont. | Cont. | Cont. | Cont. | Cont. |

*Note:* the black cells indicate that *T-COMBIBW* is only available since wave 4 (the first person-transitional-wave). The '-' indicates that the elderly is no longer in the panel. Excluded (short-term) family care spells are italicised.

In situation 1, the elderly has never received family care and, therefore, does not contribute to the transition analyses. In situation 2, the elderly has one family care spell of two waves and will therefore contribute to one observation (wave 4). In situation 3, the elderly has two short-term family care spells and is therefore excluded from the analyses. In situation 4, the elderly has two family care spells: the first is a short-term spell and will not be considered in the analyses; the second spell lasts three-waves and will contribute to two observations in the analyses (waves 7 and 8). In the last situation, the elderly is in the panel until its end and receives family care during all his study waves. In such a case, the elderly contributes to eight observations in the analyses (the maximum).

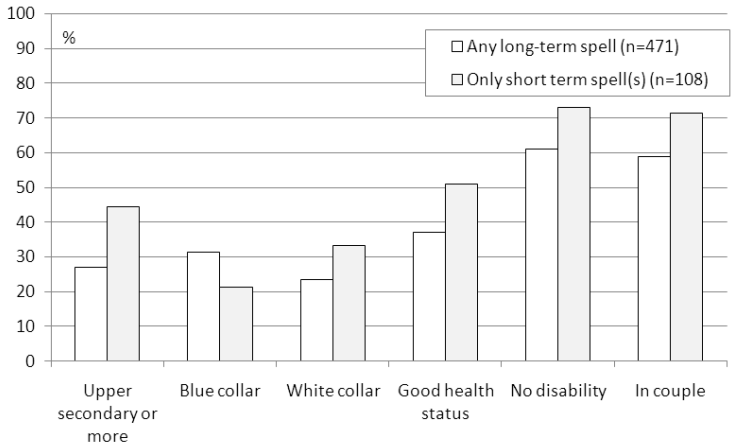
Table X-5 shows that an elderly may be included in the analyses for none (situations 5 and 2), some (situation 4) or all (situation 3) his caring spells according to their duration. The exclusion of an elderly can be complete or partial. Among the excluded, a sub-group is particularly interesting because it has not been described yet[27] and may present specific characteristics: the elderly having only experienced short-term family care spell(s) (corresponding to situation 3) (frame X-4).

Among the 904 elderly 'at risk' of care transitions, 325 never received family care, 471 have at least one long-term family care spell and 108 only experience short-term family care.

[27] The characteristics of the other excluded sub-group (elderly family members having never received family care over the study waves) were analysed in chapter VIII ('ever received care').

**FRAME X-4:** Zoom on the 108 elderly receiving only short-term family care spells

**GRAPH X-3:** Main differences between the 'short-term spellers' and the elderly having at least one long-term family care spell (PSBH 1994, n=579)




Graph X-3 shows the characteristics which are the most discriminative (≥10% difference) at the first study wave: the elderly having only short-term family care are in better health and have a higher social status. They are also more often in couple. Although not displayed in the graph, they tend to be younger and are more often men. Indeed, these are the characteristics of people less in need of care or who have a wife caring 'invisibly' for them (detailed figures are in appendix table X-1).

It might be interesting to compare the characteristics of the two groups when they receive family care: as they are healthier at the beginning (at wave 3), one may think that short-term spellers receive less intensive care. This is highlighted by the analyses done on the study waves where the elderly received family care (n= 2,272 study waves for the long-term spellers and n=123 for short-term spellers, results not displayed): short-term spellers are in better health, less likely to receive mixed care (40.65% against 70.38% of the waves of the long-term spellers), to have multiple care-givers (37.40% against 54.23% of the caring waves of the long-term spellers) or to be cared by their daughter (50.41% against 66.59%). At their last study wave, only 19.93% of the short spellers receive family care against 46.93% of the long spellers.

Finally, to reach the number of 456 elderly (1,707 person-transitional-waves) indicated in the scheme X-2, 15 elderly (31 transitional waves) who have undefined family care activities are excluded, because they are not 'at-risk' of family care activities 'within-transition'[28].

Among the 456, 39.04% (n=178) have received care during all their study waves (*cfr* situation 5, table X-5), 47.37% (n=216) have one long-term care spell (*cfr* case 2), 5.04% (n=23) have multiples long-term spells and 8.55% have long-term and short-term family care spell (n=39)[29].

Noteworthy, the distribution of the socio-demographic characteristics in this sub-sample of 456 elderly is very similar to that of the initial study sample of 1,123 elderly. This is probably because the two last 'selection steps' cancel each other: removing the 'early leavers' lead to work on a 'healthier' and 'wealthier' sub-sample; removing the short-spellers and those who never received family care led to suppress a part of the 'healthier' and the 'wealthier'.

[28] These 15 elderly are 'at risk' of 'care combination within-transition'. However, it was decided to exclude them from both within-transitions analyses in order to have the same number of observations and facilitate the interpretation of the results.
[29] Only long-term spells are considered in the next analyses (*cfr* situation 4).

## B. Description: creation and distribution of the variable, frequency of the family care spell(s) sequences

If family care is provided at $wave_{n-1}$ and at $wave_n$ (*T-COMBIBW* = 'continue'), then two 'family care within-transition' variables can be created as shown in table X-6a and X-6b.

**TABLE X-6A:** Building the dependent variable 'care combination within-transition'

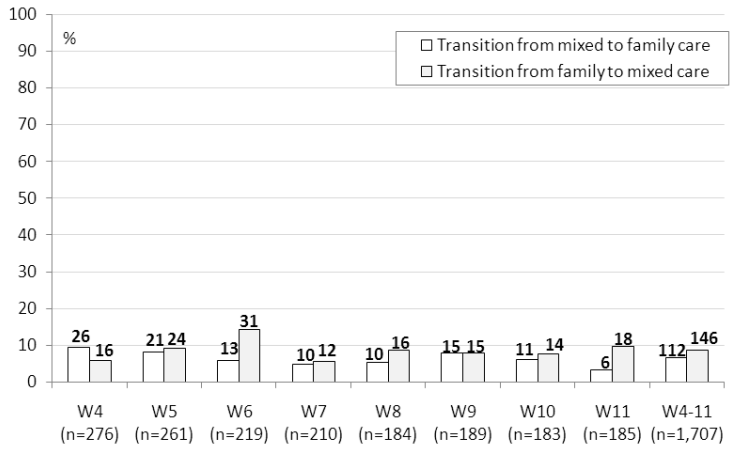
| | **Current wave** | |
|---|---|---|
| **Previous wave** | 'Family care' | 'Mixed care' |
| 'Family care' | Long-term family care only or **'Fam-fam'** | From family to mixed care or **'Fam-mix'** (increasing intensity) |
| 'Mixed care' | From mixed to family care or **'Mix-fam'** (decreasing intensity) | Long-term mixed care or **'Mix-mix'** |
| | **= the 4 modalities of the transition variable** | |

**TABLE X-6B:** Building the dependent variable 'family care activities within-transition'

| | **Current wave** | |
|---|---|---|
| **Previous wave** | 'IADL' | 'ADL' |
| 'IADL' | Long-term IADL or **'IADL-IADL'** | From IADL to ADL or **'IADL-ADL'** (increasing intensity) |
| 'IADL' | From ADL to IADL care or **'ADL-IADL'** (decreasing intensity) | Long-term ADL or **'ADL-ADL'** |
| | **= the 4 modalities of the transition variable** | |

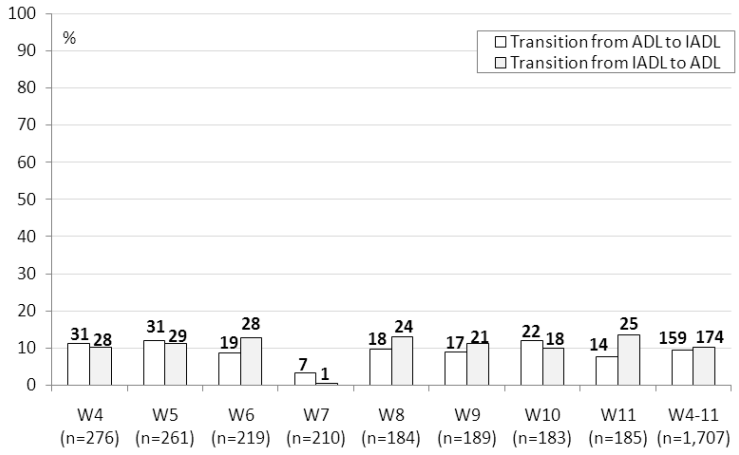
The proportion and the number of the elderly having an increasing or a decreasing intensity transition are given for each transitional wave separately and for all the transitional waves together in graph X-4 for the 'care-combination' and in graph X-5 for the 'family care activities'.

**GRAPH X-4:** Changes in the use of care services within a family care spell [*T-COMBIWT*] (PSBH 1995-2002)




*Note:* The numbers in bold give the number of elderly making the given transition. Detailed figures are in appendix table X-5.

**GRAPH X-5:** Changes in family care activities within a family care spell [*T-ACTIVITYWT*] (PSBH 1995-2002)




*Note:* The numbers in bold give the number of elderly making the given transition. Detailed figures are in appendix table X-5.

As it was the case for the between-transitions, the number of observed transitions at any given wave is too small to allow a 'specific wave' transition analysis. A GLMM analysis would be needed to work on all the transitional waves together and accounting for the non-independence of the observations belonging to a same elderly.

Table X-7 highlights the relative stability of family care over time but also shows that 'up & downs' (increasing and decreasing care intensity observed over the study waves) are quite frequent. For instance, if one considers the **care combination** (family versus mixed care): half of the 456 elderly (51.10%) received mixed care during all their family care spell(s). They do not experience changes. But,

the second most frequent 'care sequence' is 'up and down' (17.32%). In total, a third of the elderly (4.82%+10.75%+17.32%) have ever made a care combination transition during a care spell.

As for the **activities**, having received only IADL care is the most frequent (32.46%), the other 'stable' sequence (always ADL care) follows, with 22.59%. It means that, nearly half (44.95%) of the elderly experience a transition in family care activities (IADL only >< ADL) over their study waves.

For both care aspects (activities and care combination), 'upward' sequences (transitions toward more intensive care) are more frequent than 'downward' sequences. This is consistent with the ageing hypothesis: as they are ageing, the elderly are more likely to receive more intensive care. In the next point, the multivariate analysis will allow identifying the determinants of changes or stability.

**TABLE X-7:** Family care sequences: changes within a long-term family care spell
(PSBH 1994-2002, n=654)

| FAMILY CARE ONLY OR MIXED CARE | | IADL CARE ONLY OR ADL CARE | |
|---|---|---|---|
| **Family care sequence** | **% among the 456 elderly** | **Family care sequence** | **% among the 456 elderly** |
| (No) **– Family –** (No) | 16.01%<br>(n= 56 '1spell'+ 17 '2+spells') | (No) **– IADL only –** (No) | **32.46%**<br>(n= 127 '1spell' + 21 '2+spells') |
| (No) **– Mixed –** (No) | **51.10%**<br>(n= 212 '1spell' + 21 '2+spells') | (No) **– ADL –** (No) | **22.59%**<br>(n= 95 '1spell' + 8 '2+spells') |
| (No) **– Mixed – Family –** (No)<br>('downward') | 4.82%<br>(n= 18 '1spell' + 4 '2+spells') | (No) **– ADL – IADL only –** (No)<br>('downward') | 11.40%<br>(n= 44 '1spell' + 8 '2+spells') |
| (No) **– Family – Mixed –** (No)<br>('upward') | 10.75%<br>(n= 33 '1spell' + 16 '2+spells') | (No) **– IADL only – ADL –** (No)<br>('upward') | 14.25%<br>(n= 52 '1spell' + 13 '2+spells') |
| 'Up & down' | 17.32%<br>(n= 75 '1spell' +4 '2+spells') | 'Up & down' | 19.30%<br>(n= 76 '1spell' + 12 '2+spells') |

*Note*: '2+spells' indicates that the elderly has multiple care spells (e.g. 16.01% of the 456 elderly have only received family care, among them, 17 have multiple spells and 56 have only one spell). 'Down' and 'up' refer to the care intensity: moving from mixed care to family care or to ADL care to IADL care are considered as 'downward' changes, while moving from family care to mixed care or from IADL care to ADL are considered as 'upward' changes. If both upward and downward changes are observed, the sequence is qualified as 'up & down'. The same principle is used to qualify sequences having multiple family care spells (e.g. the sequence 'Family- No – Mixed' is considered as 'upward' while 'Family – Mixed – No – Family' is considered as 'up & down). The '(No)' means that the family care spell can last during all the study waves (e.g. 'Family'), can start (e.g. No – Family), end (e.g. Family – No) or be bounded by the study waves (e.g. No – Family - No).

## C. GLMM regression on care combination and family care activities 'within-transition'

The method, the included variables and the presentation of the results are exactly the same as for the 'care combination between-transition' analysis (section 2). The sole difference (selection of the sub-sample) has been discussed in point A. We can therefore directly start to interpret the regression results. The distribution of the elderly characteristics by the dependent variable and the bivariate results are in appendix tables X-7 to X-10. The multivariate results are displayed in table X-8 and X-9. The effect of the transition disability variable and of recent hospitalisation will be discussed in point D, when testing the health effect hypothesis. Some comments on the effect of the other variables can already be made here.

**TABLE X-8:** Multivariate multinomial logistic mixed-model regression on 'care combination within-transition' *[T-COMBIWT]* (PSBH 1995-2002, n=1,707)

| | MULTIVARIATE FULL MODEL | | | | | |
|---|---|---|---|---|---|---|
| | **Mix-Fam** ***/Fam-Fam*** | **Fam-Mix** ***/Fam-Fam*** | **Mix-Mix** ***/Fam-Fam*** | **Fam-Mix** ***/Mix-Fam*** | **Mix-Mix** ***/Mix-Fam*** | **Mix-Mix** ***/Fam-Mix*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | | | | | | |
| *rc: Man (w=641; e=183)* | | | | | | |
| Woman (w=1,066; e=273) | 1.32 | 1.32 | 0.90 | 1.06 | 0.67 | 0.72 |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (w=562; e=153)* | | | | | | |
| 1920-1924 (w=558; e=145) | 1.09 | 1.16 | **2.44** * | 0.96 | 1.47 | 1.43 |
| 1915-1919 (w=312; e=79) | 1.67 | **2.02** ** | **16.89** *** | 1.05 | **5.75** *** | **3.89** *** |
| Before 1915 (w=275; e=79) | 2.15 | **2.66** * | **128.09** *** | 1.03 | **24.89** *** | **13.72** *** |
| **Religiosity** | | | | | | |
| *rc: Non-religious (w=311; e=92)* | | | | | | |
| Religious (w=1,396; e=364) | 1.04 | 1.47 | **2.77** * | 1.48 | 1.97 | 1.38 |
| **Education** | | | | | | |
| *rc: Secondary or more (w=845; e=233)* | | | | | | |
| Primary or less (w=862; e=223) | 0.92 | 0.84 | 0.50 | 0.97 | 0.62 | 0.72 |
| **Region** | | | | | | |
| Flanders (w=887; e=219) | 0.99 | 0.85 | 1.19 | 0.85 | 1.14 | 1.36 |
| *rc: Wallonia (w=650; e=185)* | | | | | | |
| Brussels (w=170; e=52) | 1.50 | **1.89** * | 1.62 | 1.28 | 0.89 | 0.76 |
| **Health transition** | | | | | | |
| *rc: No disability (w=739; e=266)* | | | | | | |
| Past disability (w=376; e=290) | **2.03** * | 1.23 | 1.84 | 0.61 | 0.92 | 1.40 |
| Current disability (w=232; e=183) | 0.80 | 0.99 | **2.68** *** | 1.07 | **3.10** ** | **2.17** ** |
| Long-term disability (w=586; e=210) | 1.38 | 1.41 | **4.35** *** | 0.98 | **2.88** *** | **2.39** *** |
| **Recent hospitalization** | | | | | | |
| *rc: No (w=1271; e=410 )* | | | | | | |
| Yes (w=436; e=225) | 1.02 | **1.73** ** | 1.38 | **1.86** ** | 1.32 | 0.78 |
| **Ability to make ends meet** | | | | | | |
| *rc: Easily (w=455; e=205)* | | | | | | |
| Fairly (w=544; e=270) | **2.23** ** | 0.88 | 1.11 | **0.36** *** | 0.58 | 1.48 |
| Hardly (w=708; e=237) | **2.31** ** | 1.21 | 1.66 | **0.46** ** | 0.59 | 0.96 |
| **Spousal health** | | | | | | |
| *rc: Not in couple (w=798; e=217)* | | | | | | |
| Good (w=299; e=122) | **0.42** *** | **0.49** ** | **0.04** *** | 1.50 | **0.10** *** | **0.12** *** |
| Fair or bad (w=610; e=207) | 0.62 | 0.75 | **0.12** *** | 1.40 | **0.25** *** | **0.27** *** |
| **Number of children** | | | | | | |
| *rc: 0-1 child (w=417; e=122)* | | | | | | |
| 2+ children (w=1,290; e=334) | 1.34 | 1.12 | 1.23 | 0.81 | 0.96 | 1.19 |
| **Number of daughters** | | | | | | |
| *rc: 0 daughter (w=331; e=89)* | | | | | | |
| 1+ daughter(s) (w=1,290; e=367) | 1.11 | 0.78 | 1.05 | 0.68 | 0.84 | 1.11 |
| **Closest child proximity** | | | | | | |
| Cohabiting (w=178; e=51) | **0.36** ** | **0.40** ** | **0.03** *** | 1.06 | **0.13** *** | **0.14** *** |
| <10 Km (w=1,320; e=360) | 1.22 | 1.61 | 2.26 | 1.11 | 1.85 | 1.32 |
| *rc: 10 Km+/no child (w=209; e=89)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (w=629; e=235)* | | | | | | |
| Non-attritor (w=1078; e=221) | 1.02 | 1.24 | 1.05 | 1.30 | 0.93 | 0.80 |
| **MODEL INFORMATION** | | | | | | |
| Model fit | -2LL: 2,471.04 | AIC: 2,605.04 | | | | |
| Test of independence of observations within a same elderly | | | | | | |
| | (-2LL) | DF | Chi² | p value | | |
| | 2,899.86 | 3 | 427.8 | <.0001 | | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**TABLE X-9:** Multivariate multinomial logistic mixed-model regression on 'family care activities within-transition' *[T-ACTIVITY]* (PSBH 1995-2002, n=1,707)

| | MULTIVARIATE FULL MODEL | | | | | |
|---|---|---|---|---|---|---|
| | **ADL-IADL/ *IADL-IADL*** | **IADL-ADL/ *IADL-IADL*** | **ADL-ADL/ *IADL-IADL*** | **IADL-ADL/ *ADL-IADL*** | **ADL-ADL/ *ADL-IADL*** | **ADL-ADL/ *IADL-ADL*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | | | | | | |
| *rc: Man (w=641; e=183)* | | | | | | |
| Woman (w=1,066; e=273) | 1.23 | 1.31 | **2.19 **** | 1.02 | 1.41 | 1.22 |
| **Birth cohort** | | | | | | |
| *rc: 1925-1929 (w=562; e=153)* | | | | | | |
| 1920-1924 (w=558; e=145) | 1.20 | 1.44 | **2.49 **** | 1.20 | 1.60 | 1.16 |
| 1915-1919 (w=312; e=79) | 1.06 | 1.42 | **3.75 **** | 1.39 | **2.43 *** | 1.59 |
| Before 1915 (w=275; e=79) | 1.46 | **1.66 *** | 2.30 | 1.13 | 1.01 | 0.95 |
| **Religiosity** | | | | | | |
| *rc: Non-religious (w=311; e=92)* | | | | | | |
| Religious (w=1,396; e=364) | 1.34 | 1.36 | 1.64 | 1.08 | 1.03 | 1.00 |
| **Education** | | | | | | |
| *rc: Secondary or more (w=845; e=233)* | | | | | | |
| Primary or less (w=862; e=223) | **1.46 **** | 1.26 | **1.83 *** | 0.82 | 0.96 | 1.20 |
| **Region** | | | | | | |
| Flanders (w=887; e=219) | **3.12 ***** | **3.32 ***** | **37.88 ***** | 1.00 | **6.92 ***** | **5.12 ***** |
| *rc: Wallonia (w=650; e=185)* | | | | | | |
| Brussels (w=170; e=52) | 0.56 | 0.67 | 0.50 | 1.35 | 0.89 | 0.81 |
| **Health transition** | | | | | | |
| *rc: No disability (w=739; e=266)* | | | | | | |
| Past disability (w=376; e=290) | **2.00 **** | 1.20 | **2.92 ***** | 0.58 | 1.44 | 1.91 |
| Current disability (w=232; e=183) | 1.22 | **2.33 ***** | **3.10 ***** | **1.88 *** | **2.37 **** | 1.07 |
| Long-term disability (w=586; e=210) | **2.18 ***** | **1.72 **** | **4.23 ***** | 0.75 | **1.78 *** | **1.97 **** |
| **Recent hospitalization** | | | | | | |
| *rc: No (w=1271; e=410 )* | | | | | | |
| Yes (w=436; e=225) | 1.23 | **2.70 ***** | **2.63 ***** | **2.22 ***** | **2.08 ***** | 0.91 |
| **Ability to make ends meet** | | | | | | |
| *rc: Easily (w=455; e=205)* | | | | | | |
| Fairly (w=544; e=270) | **1.78 **** | **1.72 **** | **1.94 **** | 0.96 | 1.00 | 0.98 |
| Hardly (w=708; e=237) | 1.40 | 1.37 | **1.92 **** | 0.94 | 1.29 | 1.18 |
| **Spousal health** | | | | | | |
| *rc: Not in couple (w=798; e=217)* | | | | | | |
| Good (w=299; e=122) | 0.67 | **0.46 ***** | **0.52 *** | 0.71 | 0.62 | 1.09 |
| Fair or bad (w=610; e=207) | 0.69 | 0.70 | 0.84 | 1.10 | 1.03 | 1.05 |
| **Number of children** | | | | | | |
| *rc: 0-1 child (w=417; e=122)* | | | | | | |
| 2+ children (w=1,290; e=334) | 1.12 | 0.73 | **0.51 *** | 0.64 | **0.49 *** | 0.72 |
| **Number of daughters** | | | | | | |
| *rc: 0 daughter (w=331; e=89)* | | | | | | |
| 1+ daughter(s) (w=1,290; e=367) | **1.61 *** | **1.67 **** | 1.82 | 1.09 | 0.92 | 0.70 |
| **Closest child proximity** | | | | | | |
| Cohabiting (w=178; e=51) | 0.49 | 1.56 | **3.17 *** | **3.12 **** | **4.80 **** | 1.63 |
| <10 Km (w=1,320; e=360) | **0.63 *** | 1.17 | 1.14 | **1.85 *** | 1.58 | 0.81 |
| *rc: 10 Km+/no child (w=209; e=89)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (w=629; e=235)* | 0.83 | 0.79 | 1.03 | 0.97 | 1.12 | 1.09 |
| Non-attritor (w=1078; e=221) | | | | | | |
| **MODEL INFORMATION** | | | | | | |
| Model fit | -2LL: 3,115.99 | AIC: 3,249.99 | | | | |
| Test of independence of observations within a same elderly | | | | | | |
| | (-2LL) | DF | $Chi^2$ | p value | | |
| | 3,438.02 | 3 | 322.03 | <.0001 | | |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

The most 'impressive' result is probably (table X-8) the OR of 128.09 for the 'very old' (the elderly born before 1915) in the regression part 'Mix-Mix *versus* Fam-Fam'. It means that the very old are more likely to receive long-term mixed care than long-term family care only compared to the cohort 1925-1929 but it does not mean that they have 128 times the odds of the 1925-1929 of being in long-term mixed care rather than in long-term family care. Indeed, this OR 'inflation' is due to the fact that, in the sample, many very old elderly have most of their person-transitional-waves in long-term mixed care (245 waves belonging to 73 very old elderly) and few very old have few transitional waves in long-term family care (13 waves belonging to 7 very old elderly). The 'inflation' phenomenon can also occur in standard logistic regression but is more likely to appear when multiple observations are nested to individuals and when a given behaviour is more likely to appear for a particular sub-sample at all their waves, like receiving mixed care for the very old.

The effect of the birth cohort is however consistent with the idea that the **older are more likely to make an 'increasing intensity' transition or even to remain in an intensive care situation**: in table X-8, the OR comparing 'Mix-Mix' to any other situation and the OR of 'Fam-Mix' *versus* 'Fam-Fam' are significantly >1 for the elderly born before 1920. In table X-9, the effect is only significant for the difference between 'ADL-ADL' and 'IADL-IADL': the older[30] are more likely to received long-term ADL care than long-term IADL care. **Regional differences** between Flanders and Wallonia are observed, but only for the family care activities: the Flemish elderly are more likely to receive long-term ADL care. Brussels and Wallonia differ in the use of care services: a transition towards mixed care (rather than long-term family care) is more frequent in Brussels. Among the family composition variables, it is interesting to notice that having a daughter is associated with a higher likelihood of activity changes (rather than long-term IADL: the OR of 'ADL-IADL' *versus* 'IADL-IADL' and 'IADL-ADL' *versus* 'IADL-IADL' >1). It can be interpreted as the fact that **daughters may provide short-term ADL care if needed**. As for the complementary use of care services, it is the proximity of the closest child that shows an interesting pattern: **having a cohabiting child decreases the likelihood of using care services, even for a short time. The child is there to care or to complement spousal care** (all the OR are <1 except for the one which compares the two transitions. It means that the elderly having a cohabiting child are more likely to receive only family care than to start or stop receiving mixed care and, finally (the least likely), to receive long-term mixed care.

## D. Hypothesis to test: the health effect

In the previous section, the (long-term) health status was shown to influence the transition into and out a family care spell. In this section, the effects of a transition within a care spell are studied. Let's start with the disability transition variable: in table X-8, we can see that it is the current disability status that matters for care combination (the 'past disability' modality is always non-significant except in the first regression part[31] and the OR of 'long-term disability' and 'current disability' are very close): the elderly, disabled at the current wave (and at the previous one) are more likely to receive long-term mixed care. The quasi absence of difference between 'newly' disabled and long-term disabled might be explained by a 'preventive' use of care services (before becoming too disabled). As for the family care activities: there is a clear effect of long-term disability which increases the likelihood of having long-term ADL care (it was expected!) and decreases the likelihood of having long-term IADL care. No significant differences are observed between the two transitions. **Being 'newly' disabled increases the likelihood of receiving long-term ADL or to move from IADL to ADL care** (the OR>1 in 'ADL-ADL' *versus* 'ADL-IADL', 'ADL-ADL' *versus*

[30] The OR of the very old are significant in the bivariate regression only.

[31] The elderly having recovered from a disability problem are more likely to have received more intensive care at the previous wave (when they were disabled) than to have received long-term non-intensive care. This effect is found for the two care aspect transitions (activities and use of care services).

'IADL-IADL', 'IADL-ADL' *versus* 'IADL-IADL' , 'IADL-ADL' *versus* 'ADL-IADL'). **Having been recently hospitalised increases the likelihood of moving to mixed care when family care was only provided at the previous wave** (the OR 'Fam-Mix' *versus* 'Fam-Fam', 'Fam-Mix' *versus* 'Mix-Fam' >1 but 'Fam-Mix' *versus* 'Mix-Mix' is ns). It also increases the likelihood **of moving from IADL to ADL care or to continue receiving ADL care.** The hypothesis of a health effect on family care transitions is supported by the results, both for the between and the within spell transition analyses: having (long-term) disabilities and having been recently hospitalised do influence the family care evolution when controlling for the predisposing and enabling factors.

## *CONCLUSION*

This chapter is the last and also the most complex and challenging of the analyses part of my dissertation. If is quite easy to understand why family care should be studied from a long-term perspective, it is rather difficult to do it. Whatever the study phenomenon, one may think that panel data tend to under-estimate changes because of the limited window of observation and the fact that changes are, usually, only recorded at the moment of the interview. In the specific situation of elderly care, changes are even more difficult to observe for two reasons: (1) family care is likely to change progressively: child starts to visit his parents more frequently, then offers a drive to a medical appointment, proposes to do the heavy purchases, etc. over time, the 'help' or 'care' becomes more regular and intensive; (2) attrition may be due to a family care change and it is not possible to control for that[32]. Acknowledging for the risk of under-estimation of changes and the other limitations coming from the data, methodological choices were made carefully. The purpose was to find a method to study the determinants of 'observed' changes that was technically correct, substantively interesting and adapted to the data. The result was to use a GLMM multinomial model with dependent 'follow-up statuses' variables. This solution seems perhaps complicated at the first sight, but the regression results are, *in fine*, quite easy to interpret and converge with the one of the previous analyses: the ageing effect appears through the positive effect between birth cohort and moving into family care, increasing family care intensity or being already in an intensive family care spell. The observed regional differences stay in the same direction: with more important (intensive and long-term) family care in Flanders. The strong effect of health on family care was predictable and illustrated in chapter IX: having a poorer health status is positively associated with the presence and the intensity of family care.

In the present chapter, it was shown that the health of the elderly also influences the transition in and within family care. In some cases, the duration of the disability makes a difference (care combination between-transitions, family care activities within-transitions); in some cases the health status influences only a transition in one direction (recent hospitalisation makes the elderly more likely to move from family to mixed care, but does not influence the likelihood to be in one of the three other statuses rather than in another) but in some others, the variable influences the two transitions (recent hospitalisation makes the elderly more likely to enter in a family care spell and less likely to exit a family care spell). In short, accounting for the direction or the transition and the duration of the disability produces more nuanced results. Although they are not 'perfect', these results confirm the necessity to look at family care from a dynamic perspective and urge to carry out further research and to define a strategy to have better information on the real provided care by the family and its evolution over time. All this will be further discussed in the general conclusion of this dissertation.

[32] Sometimes, the attrition reason is unambiguous (e.g. 'institutionalisation', 'death'), but in most cases ('refusal', 'sickness', 'other reason'), one can never be sure that the attrition is not associated with a family care change.

# GENERAL CONCLUSION

## WHAT ARE THE MAIN CONTRIBUTIONS AND LIMITATIONS OF THE DISSERTATION? WHAT ARE THE IMPLICATIONS FOR FUTURE RESEARCH AND SOCIAL POLICIES?

> We are arrived at the end of the dissertation and at the end of this study on elderly family care. The purpose of this research was to gain a better understanding of the characteristics and the evolution of elderly family care in Belgium. This has been done by using a representative Belgian panel survey, the PSBH, to answer three research questions: Who is receiving family care? What are the characteristics of the received family care? How do these characteristics evolve over time?

**In the contextual part** of the dissertation, we have seen how this phenomenon was difficult to identify and to measure (chapter I); how it has been studied in the quantitative literature (chapter II); we have situated the phenomenon in the Belgian context of the study cohorts (chapter III); examined and compared the recent surveys which includes information on elderly family care in Belgium and justified our preference for the PSBH data (chapter IV). At the end of this first part, the theoretical scheme could be drawn. **In the methodological part**, the study data and the study sample were presented and validated (chapter V); the reasons for- and the way of building a specific working file, the 'carelines', were explained (chapter VI); the care determinants were operationalised into variables (chapter VII). At the end of this second part, the theoretical scheme could be translated into an operational table. **The analysis part** started by the study of the determinants of having ever received care (chapter VIII), was continued with the study of the care characteristics (chapter IX) and ended by a tentative analysis of the evolution of elderly family care over time (chapter X).

The contributions and limitations related to a given chapter were each time specified in its conclusion. The purpose of this general conclusion is not to summarise the chapter conclusions but to go a **step further**. This means three things: first, it means to complete the research building: the theoretical scheme presented what I would like to test while the operational table makes explicit what is 'testable' with the PSBH data. The final is now to confront the operational table to the reality to see what could actually be tested? Second, 'going further' means proposing a more comprehensive interpretation of the results using the Life Course approach; third, 'going a step further' means trying to translate the findings and limitations of the dissertation into recommendations for future research and social policies related to elderly home care.

This conclusion follows this structure: beginning with the confrontation of the 'theoretical hypotheses *versus* the actually performed analyses', followed by a Life Course 'reading' of the results when highlighting the main contributions and limitations, and, end by discussion on two important questions: *To what extent could the dissertation findings be inferred to the next cohorts of elderly? How could we better approach the reality of elderly family care?*

## *From theory to data analysis: a confrontation*

After having performed the analyses, it might be useful to reorder the findings according to the theoretical hypothesis (table conclu-1). This will allow assessing, for each hypothesis, whether it is (partially) supported or not by the analyses or could not be tested. The table below is structured like the operational table (see inter-part II) but differs in the order in which the results are presented (starting from the 'predisposing factors' hypothesis and no longer by 'dependent variables') and in the content of the last column. The focus will be on this column: what are the supported and not supported hypotheses and what are those which could not be tested and why? By and large, the study hypotheses can be divided into three groups: those referring to the effects of predisposing, needs and enabling factors on care (the most common in the literature), those referring to the 'family care - care services articulation' and those referring to the Life Course approach.

**TABLE CONCLU-1:** Assessing whether the formulated theoretical hypotheses are supported or not by the analyses or are not testable or could not be tested

| THEORETICAL HYPOTHESES | OPERATIONALISED DEPENDENT VARIABLE | OPERATIONALISATION (EXPECTED RELATIONSHIPS) | HYPOTHESIS SUPPORTED? NOT SUPPORTED? NOT 'TESTABLE'? COULD NOT BE TESTED? |
|---|---|---|---|
| **Predisposing hypothesis** | Ever received (family) care *[E-EVERCOMBICARE]* | The model including only predisposing factors is significant as a whole.<br>Some predisposing factor(s) are significant in the full multivariate model. | Yes, the predisposing factors model fit is much better than the intercept only model fit.<br>In the full model, gender, birth cohort, education and region have still a significant effect. |
| **Family solidarity[1] hypothesis** | Care combination *[W-COMBICARE]* | Positive association between needs factors and 'family care' or 'mixed care' | Yes, for mixed care. Elderly receiving family care only are younger and healthier (probably because the family care starts to be provided earlier, when the elderly does not yet have severe health problem). |
| **Needs hypothesis** | Care-givers number *[W-CGNUMBER]* | Positive association between needs factors and '>2 care-givers+'. | No, the number of care-givers seems to be more influenced by the enabling factors. |
| | Family care activities *[W-CGACTIVITY]* | Positive association between needs factors and 'ADL care' | Yes |
| **Adaptation hypothesis** | Changes in the care combination *[T-COMBIBW]* | Positive association between the number of children and the stability of 'family care' and/or 'mixed care'. | The 'flexibility' of family care was not tested because the analysis of change considered only 2 waves at the same time and it is a too short period to study over time flexibility. |
| | | Increasing or long-term disability are positively associated with an increase in care (transition from no care to care or from family care to mixed care). | Yes, having a disability increases the likelihood of starting receiving family care; having a long-term disability increases the likelihood of long-term family care |
| | Changes in the care-givers type combination | No association with needs factors (changes are explained by the difficulties of the effective care-giver to continue to care in the same conditions).<br>Changes involve more often children than spouse. | Not tested due to methodological choices made for the analysis of changes. |
| | Changes in the care-givers number | Increasing or long-term disability are positively associated with an increase in the care-givers number. | |
| | Change in the care-givers activities *[T-CGACTIVITY]* | Increasing or long-term disability are positively associated with more intensive activities (from IADL only to ADL care). | Yes, long-term disability increases the likelihood of having long-term ADL care. Increasing disability is positively associated with receiving long-term ADL or to move from IADL to ADL care |

[1] The family solidarity hypothesis actually tests the effect of a type of 'enabling factor': when there are needs and the elderly has a family (enabling factor), this family will, in principle, be the first mobilised source of care.

**TABLE CONCLU-1:** Assessing whether the formulated theoretical hypotheses are supported or not by the analyses or are not testable or could not be tested (follow-up)

| THEORETICAL HYPOTHESES | OPERATIONALISED DEPENDENT VARIABLE | OPERATIONALISATION (EXPECTED RELATIONSHIPS) | HYPOTHESIS SUPPORTED? NOT SUPPORTED? NOT 'TESTABLE'? COULD NOT BE TESTED? |
|---|---|---|---|
| **Substitution hypothesis** | Having ever received care services *[E-EVERCARESERVICES]* | Family-less are more likely to use care services (as they have no other potential care providers). | **No for all the family-less/Yes for** the **spouseless**: care services are more often used by spouseless elderly: care service is used as a substitute for IADL spousal care (declared or not). |
| | Change in the care combination | Elderly who received spousal care and lost their spouse are more likely to make a transition to care services than a transition to 'no care' | Not testable because of small numbers (only 60 elderly become widowed during the study waves). |
| | Change in the care-givers number | Positive association between transition from use of 'family care' to 'mixed care' and a decrease in the care-givers number. | Not testable because of the small number of 'simultaneous' transitions in various care aspects. |
| **Task-specific hypothesis** | ADL care combination | 'Technical' specialisation is more frequent among heavily dependent elderly or elderly having a chronic disease. | Not testable because there is no information on ADL care services. |
| **Supplementation hypothesis** | Change in the care-givers number | Negative association between the care services use and a decrease in care-givers number. | Not tested due to methodological choices made for the analysis of changes. |
| | Changes in the family care activities | Negative association between care services use decreasing family care intensity. | |
| **Hierarchical hypothesis (between family and care services)** | Care combination *[W-COMBICARE]* | Negative association between being 'in couple' and use of 'care services' or 'mixed care'.<br>The number of children, having a daughter and having a child living nearby are positively associated with use of 'family care only' and negatively associated with use of 'formal care only'. | **Yes**, (whatever the health status of the spouse).<br>**Yes,** for the proximity of the closest child.<br>**No,** for having a daughter and the number of children (ns in multivariate analysis). |
| | | Positive association between having 'only spouse' and use of 'care services' or 'mixed care'. | Not testable because of small numbers. |
| **Hierarchical hypothesis (within family)** | Care from spouse *[W-SPOUSALCARE]* | Negative association with having '2 care-givers +' | **No,** due to under-declaration of spousal care, the reverse is observed: spousal care is more often declared when there are other care providers. |
| | Care from daughter(s) *[W-DAUGHTERCARE]* | Positive association with having an 'unhealthy spouse' and negative association with having a 'healthy spouse'. | **Yes and no:** whatever the health status of the spouse, the elderly living in couple are less likely to receive daughter(s) care. |
| | | Negative association with receiving 'care from spouse'<br>Positive association with having $\geq$2 care-givers'<br>Non significant association with 'ADL care' | Association between care aspects not tested in multivariate analysis. |
| | Care from son(s) *[W-SONCARE]* | Positive association with having an 'unhealthy spouse' and negative association with having a 'healthy spouse'<br>Negative association with receiving 'care from spouse' | **Yes and No:** whatever the health status of the spouse, the elderly living in couple are less likely to receive son(s) care. |
| | | Positive association with having '$\geq$2 care-givers'<br>Negative association with 'ADL care'. | Association between care aspects not tested in multivariate analysis. |

**TABLE CONCLU-1:** Assessing whether the formulated theoretical hypotheses are supported or not by the analyses or are not testable or could not be tested (end)

| THEORETICAL HYPOTHESES | OPERATIONALISED DEPENDENT VARIABLE | OPERATIONALISATION (EXPECTED RELATIONSHIPS) | HYPOTHESIS SUPPORTED? NOT SUPPORTED? NOT 'TESTABLE'? COULD NOT BE TESTED? |
|---|---|---|---|
| **Age and ageing hypothesis** | Care combination *[W-COMBICARE]* | Initial proportion of elderly receiving (mixed) care is higher for older birth cohorts (age effect) but increasing over time for all the birth cohorts (ageing effect). | **Yes,** 22.92% of the family-members elderly received mixed care at the first study wave against 37.24% at their last study wave. Older birth cohorts are more likely to receive mixed care at both waves. |
| **Regional differences hypothesis** | Care combination *[W-COMBICARE]* | The Flemish have higher likelihood of receiving family care. Brussels inhabitants are less likely to receive family care. | **Yes,** the comparison of the mean predicted probabilities by region, gender and cohort groups show that the Flemish are more likely to receive only family care and that the Brussels inhabitants are more likely to receive only care services. |
| **Adaptation hypothesis** | Changes in care combination *[T-COMBIBW]* | Positive association between the number of children and the stability of 'family care' and/or 'mixed care'. | The 'flexibility' of family care was not tested due to methodological choices made for the analysis of changes. |
| | | Increasing or long-term disability are positively associated with an increase in care (transition from receiving no care to care or from receiving family care to mixed care). | **Yes,** having a disability increases the likelihood of starting receiving family care; having a long-term disability increases the likelihood to receive long-term family care |
| | Changes in care-givers type combination | No association with needs factors (changes are explained by the difficulties of the effective care-giver to continue to care in the same conditions).<br>Changes are more likely to involve the children than spouse. | Not tested due to the methodological choices made for the analysis of changes. |
| | Changes in care-givers number | Increasing or long-term disability are positively associated with an increase in care-givers number. | |
| | Change in care-givers activities *[T-CGACTIVITY]* | Increasing or long-term disability are positively associated with more intensive activities (from IADL only to ADL care). | **Yes,** long-term disability increases the likelihood of having long-term ADL care. Increasing disability is positively associated with receiving long-term ADL or to move from IADL to ADL care. |

*Note:* a grey cell indicates that the hypothesis was not tested. In this case, no variable name is given in the second column, because no adequate dependent variable could be built.

Many hypotheses were put forward: the purpose was to gain a better understanding of the elderly family care determinants and their evolution. About a half of these hypotheses could actually be tested with the PSBH data.

The first hypotheses (about predisposing, needs and enabling factors) were very simple and quite common. Indeed, one of the main reasons for having formulated them is to make an ultimate validation of the data after correction and imputation. To test if the strongest relationships observed in the literature (e.g. the older, the lower educated, the more disabled are more likely to receive family care, the women are more likely to receive children care, etc.) are also observed in the carelines file, can be considered as a kind of consistency validation. The validity 'test' was successful, implying that the carelines file could be used to test more specific or original hypotheses.

A second group of hypotheses are those on 'family care - care services articulation'. As there are four major models ('substitution', 'task specific', 'supplementation' and 'hierarchical compensation'), specific hypotheses were formulated for each of them in the theoretical scheme but, the 'task specific' hypotheses and some of the hypotheses formulated on 'substitution' and on 'hierarchical compensation' have been abandoned during the operationalisation phase ('not testable'). This was due to the lack of information on ADL care services used in the PSBH data or to small number of respondents being in a given situation. Some other hypotheses have been set aside during the analysis phase ('not tested') because of methodological choices. At the end, only the hierarchical compensation and the substitution hypotheses could by partially tested. The results are nuanced but interesting: for the substitution hypothesis, evidence of IADL care services substitution was found for spouseless elderly but not for the family-less. In other words, the elderly having only children (the spouseless) are more likely to use care services for the IADL (the type of activities which are often shared between spouses), but the elderly having no family at all (the family-less) are not more likely to use IADL care services. This is probably because the family-less elderly living in the community and having accepted to be interviewed are more selected than the other elderly respondents (more independent). As for the hierarchical compensation hypothesis, evidence of the primacy of the spouse as care-giver is found: controlling for the cohorts and other independent variables, the elderly living in couple are less likely to receive children care or care services. The health status of the spouse seemed to have no effect on the presence of other care-providers at a given time. Note that the tested relationship here is 'living in couple' and not 'receiving spousal care'. However they are interpreted as of 'living in couple' is synonymous of 'receiving spousal care'. This is because other results suggest that spousal care is under-declared (it seems to be declared mainly in intensive care situation when other care providers are also involved[2]). Therefore, 'living in couple' is considered here as a gross indicator of spousal care (as one can expect that the occasional ADL care and the redistribution of household tasks are usually possible when one of the two spouses needs it). Finally, having a child living closer was associated positively with a higher likelihood of receiving family care only and negatively with receiving care services only, the other children characteristics (having a daughter and having more children) were no longer significant in multivariate analysis. This is probably because their effect is partially absorbed by the proximity variable[3].

The remaining hypotheses ('age and ageing', 'regional differences' and 'adaptation') are more or less directly related to the Life Course approach[4]. Rather than summarising the evidence for or against each of them, it seems more interesting to take each of the Life Course principles, one after the other, in an attempt to develop a 'Life Course' reading of the results.

[2] This is consistent with O'Connor (2007) who found that the presence of other care providers may lead the spouse to recognise his care-giver role.
[3] No multicollinearity problem was identified.
[4] The adaptation hypothesis was initially not presented as a Life Course hypothesis. However, it may be linked to the 'Timing of Transition' principle as it deals with the evolution of elderly family care over time.

The first principle, **'Time and Place',** urges to situate the study phenomenon in its historical and geographical contexts. The hypothesis on 'regional differences' is related to the Place aspect of this principle. Indeed, the region variable was included not only to control for the place of living of the elderly but also as a proxy of cultural differences. So far, few researches have studied the regional differences in elderly family care in Belgium, because either, most of the analysed surveys were region specific (like LOVO, MZE, ZVE, FRB/KBS°, CRIV°) or the regional sub-samples of elderly were not large enough to make regional comparisons (e.g. SHARE). The possibility to conduct regional comparisons was one of the reasons for having chosen the PSBH. And differences between Flanders and Wallonia clearly appear and in more care characteristics than expected. Initially, the region was assumed to play in the care combination: as the elderly care policy in Flanders is more 'community care' oriented, it was hypothesised that the Flemish could more easily combine family care and care services and could stay longer at home. Moreover, if one considers the situation of the study cohorts (1900-1929), it could be hypothesised that the Flemish were more likely to receive family care anyway because of specific demographic and cultural factors: large families are more frequent in Flanders (more potential children care-givers) and 'family solidarity' is more valued by the society (potential care-givers are more likely to become effective care-givers). Regional differences appear in most of the analyses: not only are the Flemish more likely to receive family care, but also to have multiple care-givers and to receive long-term ADL family care. The family care received in the two other regions seems to be less stable over time and, in general, less frequent in Brussels where receiving only care services is more common[5]. If the observed regional differences seem plausible, they should be interpreted cautiously especially **for Brussels**: even if the initial sub-sample of elderly can be considered as large enough for comparative analyses (n=148), it seems to be more selected than the sub-sample of the two other regions (see chapter V) and, in some specific analyses, it becomes too small and the coefficients could not be interpreted. Concerning the differences between Flanders and Wallonia, the numbers were large enough to make valid analyses, but the real reason of the differences may still be questioned: they are obviously linked to cultural differences but how do they act? A **'care declaration' difference** has to be considered: the fact the community care and support for informal care providers was already well developed in Flanders at the time of the survey, while it was not yet the case in the two other regions, may lead to a better visibility of informal care in the society and a better recognition of the care situation by those who are involved. **Family structure differences** are possibly playing a role**:** as the Flemish study cohorts have more children, they are also more likely to receive family care and to have multiple care-givers, to have at least one daughter, to have a child living very close, etc. Even though this 'structure' effect cannot be denied, it must not be over-estimated: first, this structure difference is (partially) an effect of cultural differences (fertility behaviour, family-orientation, etc.); second, as the number of children and the region variables are both included in the regression model and are, usually, both significant, we may consider that regional differences are not reduced to family structure differences. Finally, it may act through sub-sample structure differences: in chapter VII, graph VII-17 shows that the proportion of elderly living in the countryside in the study sample was higher in Flanders than in Wallonia. It seems strange (as Wallonia is more rural than Flanders) but it can be explained by a better participation to the survey of the rural elderly in Flanders[6]; by the fact that elderly living in rural areas in Flanders have a better access to community care than in Wallonia and are therefore more likely to remain living at home, while the elderly living in rural Wallonia when going earlier to an institution, were therefore not eligible for the panel. However, if one assumes that the urbanisation variable is reliable[7] enough and that, a higher proportion of rural elderly is found in the Flemish sub-sample, this

[5] This is consistent with the results of the HIS 2008 showing that the proportion of 65+ declaring having no potential informal care provider and having to rely on formal care services only is higher in Brussels (30%), slightly lower in Wallonia (27%) and much lower in Flanders (18%), (Demarest *et al.* 2010b).
[6] No information was available on the participation rate by age and urbanisation level.
[7] More than half of elderly of the study sample have an imputed value on the urbanisation variable. Although these imputations were done very carefully and submitted to various verifications, this variable is not as reliable as the others.

may also contribute to explain the more intense 'family-orientation' observed in Flanders (as rural inhabitants are usually more traditionally family oriented). All these show that the region is an important determinant of elderly family care in Belgium and should be further studied. *To really understand the nature of the cultural differences and the impact of the regional elderly care policies on elderly family care, detailed information on the values, expectations, care motivations and of the use of non-family care sources (care services, allowance, etc.) should be collected.*

The historical '**Time'** aspect of the Life Course principle was considered in chapter III by describing the major historic events and the main demographic trends experienced by the study cohorts in their childhood and adulthood and by describing the available elderly care services at the time of the survey.

The **'Lifespan'** principle insists on the influence of past life events on the individual's current situation. To strictly apply this principle, it would have been necessary either *to follow the study cohorts over all their lifetime (from birth to death, even when they have moved abroad or to an institution), or to have data coming from detailed and reliable retrospective questions to analyse.* The PSBH follows the elderly respondents during a maximum of 11 years (for those who participate to the study from the beginning until its end). Due to changes in the questionnaire structure, only nine waves were used for the multivariate analyses. This may seem very short in the lifetime of people aged 65+. However, there are no longer yearly panel data available so far in Belgium. Another limitation is that, at the start of the panel study, the elderly respondents were not all at the same life-stage: some have just reached 65 years of age and are in the transition to retirement, some others were already 85+ and were thus more likely to have health problems because of their old age since the first study wave (age effect). The elderly respondents are neither all observed during the same number of waves because of attrition. As it was expected, the older cohorts are more likely to leave the panel earlier, as their risks of dying, being institutionalised or having a severe health problem preventing them from participating to the panel are higher. A conservative solution would have been to work only on non-attritors (to have a balanced panel) and to use a more restrictive age range (e.g. the youngest: 65-69 or the oldest: 85+) at the first study wave. This would have led to work on a highly selected sample (the most collaborative and probably the healthier). Focussing on the youngest would have reduced the likelihood of observing care spells (having less often care needs); while focussing on the oldest would have increased the selectivity and the specificity of the study sample: those who are able to stay living at home after 84 are usually healthier or are able to mobilise intensive and high-quality care sources. In the dissertation, the decision was taken to work on an unbalanced sample and to define a quite large age-range (65+ at the first study wave), but to introduce the attrition status and the birth cohort as control variables in the regression analyses. This choice allowed working on a less selected[8] sample and to formulate and test the 'age and ageing' hypothesis: in the analyses, the effect of the birth cohorts is actually interpreted as an **age effect**[9]: we found that, at any given wave, the older elderly were more likely to receive (intensive) care. In chapter IX, the care characteristics of the analysis sample were compared at their first and at their last study wave. It was observed that the proportion of elderly receiving (intensive) care was higher at the last study wave and that the effect of the birth cohort dummies was lower at this wave: it is the **ageing effect** (all[10] the respondents are ageing during the panel and this increases their

[8] Except for those extracted from compulsory census data, samples are always more or less selected (at least because they only include people who have been reached and who have accepted to be interviewed). In the sample of the elderly living in the community, there is usually also a health selection (see chapter V). It is unavoidable and can hardly be measured or controlled for but has to be acknowledged.

[9] This is not in contradiction with the choice of the 'cohort approach' made at the end of chapter I: adopting a cohort approach meant that the historical context of the study cohort was considered as an important element to understand the study phenomenon. This context was described in chapter III.

[10] This is true, except the elderly respondents who have left the panel after the first study wave. In this case, the first and the last wave perfectly coincide, in other cases, the number of waves between the first and the last varies between 1 and 8. This is an obvious limitation of the 'first wave - last wave' comparison.

likelihood of being at need and to receive care; age differences become less significant). Another evidence of this effect is to be found in the distribution of the care aspect sequences (chapter VI): moving from IADL care only to ADL care or from care services only/family care only to mixed care over the study waves (showing an increasing care intensity sequence) is more frequent than doing the reversal movement (i.e. a decreasing care intensity sequence).

Applied to elderly family care, the **'Linked Lives' principle** highlights the fact that the care decision of each informal care provider may be influenced by the other care providers. The dissertation focuses on the care provided by the spouse and children. The care network is larger than that: other family-members (such as children-in-law, the elderly siblings, etc.), friends and neighbours may also provide care[11] but the PSBH data does not contain longitudinal information on the informal care provided by non nuclear family members. There are questions about the ADL and IADL care provided by the spouse and/or the children and some questions on the IADL care provided by people living outside of the household (it can be professionals, volunteers or non nuclear family members, regrouped under the appellation of 'care services', see chapter VI). Therefore, it was only possible to partially study the influence of some care relationships on the others: the influence of family composition on the use of care services (in chapter VIII) or on the 'family care- care services articulation' and the influence of the presence of another type of potential family care-givers (spouse, daughters or sons) on the likelihood to receive care from a given type of family care-givers (in chapter IX: for instance, the effect of having sons on the likelihood to receive daughter care). The analyses showed that spousal care was more likely to be declared when other care providers were involved, that the use of care services frequently complemented children care and that sons were more likely to share their care responsibility with brothers, while the daughter care decisions seemed not to be influenced by their sisters' care decisions. Evidence of family care 'negotiations' can also be found in the fact that the number of care-givers is not influenced by the elderly care needs, but is significantly influenced by the family compositions. But, to further account for the interdependence of the potential care-givers' care decisions, particular statistical methods had to be used. One way of controlling for the interdependence of care decisions at a given wave is to introduce a random variable in the regression to account for unobserved heterogeneity. In the summer of 2008, I followed a course on multilevel analysis applied to event history data with unobserved heterogeneity. I applied a three-level analysis model with two unobserved heterogeneity terms to the PSBH data: the most aggregated level was the elderly respondent, the intermediate level was the wave and the lower level was the care-giver at the given wave (carelines level). The dependent variable was the fact that the child did provide care or not. In addition to the independent variables (at the elderly level: gender, education, birth cohort, number of children; at the wave level: subjective health, presence of a spouse; at the care-giver giver level: gender, geographical proximity), an unobserved heterogeneity term was added at the elderly level (to control for the 'family culture' or unobserved characteristics which are likely to be the same among all the children at any wave) and another unobserved heterogeneity term was added at the wave level (to control for the children decision interdependence). In the final model[12], both terms were significant but the explanatory power of the model and the value of the independent variables coefficients did not differ greatly from those obtained doing a binary logistic regression on the same data (without introducing the unobserved heterogeneity terms). The analysis could only be done for elderly children and could not consider the care provided by the spouse. Another limitation of this approach it that the meaning of the two unobserved heterogeneity terms and their correlation is very difficult to interpret (we can only make some guess: it might be linked to the family culture, to the past relationships between the elderly and his adult children, etc.).

[11] Some research have focus on non nuclear family informal elderly care providers (see, for instance Chesley & Poppie (2009) or Henz (2009) on care provided by children-in-law; Cicirelli *et al.* (1992) on care provided by the elderly' siblings, Thompson & Krause (1998) and Barker (2002) on care provided by neighbours and friends).

[12] At the end of the course, I had to write an assignment (structured like an article) in which I applied the method to my data. The results commented here are based on this paper "Caring for older parents: The effect of unobserved care preferences and alternatives "(available on request).

Therefore, I decided to use more simple methods (logistic regression) whose results are more intuitive and easier to interpret. However, the fact that the two unobserved heterogeneity terms were significant in the multilevel analysis could not be ignored. I therefore decided to aggregate the carelines information at the wave level, this solves the within-wave unobserved heterogeneity because there is only one observation by wave[13] and to use a statistical method (GLMM) which allows accounting for the non-independence of the observations of a same elderly, see chapter IX. *In short, to really apply the 'Linked Lives' principle, information on all the potential care providers (groups) and their effective involvement in care should be available. This is rarely the case in general population surveys which can only include a limited number of questions on each specific topic. A detailed analysis of the care support network would only be feasible in a specific survey on care issues. In addition, accounting for the interdependence of each potential care-giver (group) implies using sophisticated statistical method which may require working on a (highly) selected analysis sample and produce results which are difficult to interpret or to generalise.*

The **'Timing of Transition'** principle prompts to study the evolution of the family elderly care over time to assess its stability by identifying when and why it changes. Working with yearly panel data like the PSBH should allow such a longitudinal analysis. As the questions on care refer to the current or to the recent past situation, but asks the respondent to trace back his 'care history', the study of care change is necessarily limited: the duration and the timing of the care spells are inaccurate and short care spells could be overlooked. In such conditions, common longitudinal statistical methods like the discrete time event history cannot be applied. A method describing the care sequence highlighting the various states (or care configurations) experienced by the elderly without giving too much importance on the exact timing of changes seemed to be more realistic. Doing a sequence analysis was therefore envisaged as a possible solution. In the practice, it appears to be inadequate because the method parameters could not be defined in a meaningful way, but also because this method fits better to data having many time measurements (the PSBH has only nine standardised waves). Furthermore, the imputation rules used for the care variables (see chapter VI) led to an over-estimation of the care stability and may have influenced the care sequence. Finally, it was decided to opt for a less ambitious method which would allow studying changes and stability in care, controlling for the non-independence of observations belonging to a same elderly, and which can be used on an unbalanced panel without considering the timing of change. A transitional approach seemed to meet those criteria, providing that the unobserved heterogeneity was controlled for (see chapter X). The final method (applying a GLMM model with a dependent transitional variable) was an original attempt for studying care changes in the PSBH. I did not find any article applying exactly this kind of analysis. It is rather the result of a combination of various readings and the successions of choices I had to make to build a method which seems to be correct and adequate to the study of elderly family care evolution with the PSBH. The obtained results appear to be consistent with the literature (the effect of socio-demographic variables - such as gender, birth cohorts, etc. - goes in the expected direction) and it highlights interesting aspects of elderly family care evolution which have not been studied yet in quantitative Belgian literature: elderly having an unhealthy spouse are more likely to receive long-term children care, having a cohabiting child reduces the likelihood of using care services even for a short time, the presence of a disability or of a recent hospitalisation both increase the likelihood of starting receiving family care but, in case of a long-term disability, the most likely is to have always received family care and to continue receiving it. The major limitation of this approach is that the evolution is only measured considering two waves at the time. *The ideal quantitative data for studying 'Timing of Transition' would be panel data including retrospective questions on the care received by the elderly respondent since the previous interview: Who was*

[13] Another reason for abandoning the analyses at the care-giver level is that there are not much information available at this level for justifying a care-giver level analysis (only the relationship with the elderly, the birth year, the gender and the proximity and the care provided are available for all the study waves). Information on children (marital status, employment status, etc.) is only available at wave 2.

*caring? For doing what? When did it start? How regular was the provided care? Did the care spell stop, and if so, when?*

The last Life Course principle, '**Human Agency**', was immediately presented as the most difficult to apply to quantitative data analysis because it refers to the individual 'margin of freedom' explaining why two people having similar socio-demographic characteristics and experiencing the same event at the same time and on the same place would have different reactions. Quantitative analyses aim at identifying the main trends and the major determinants of a phenomenon in a given sample and to tell to what extent the observed relationships can be inferred to the population of interest. The very specific individual differences are captured by the error term. However, some 'traces' of the 'Human Agency' principle can be found in the dissertation analysis: first, the term included to capture unobserved heterogeneity in the transition analyses presented in chapter X testifies for the presence of remaining inter-individual differences after having controlled with predisposing, needs and enabling factors effects; second, the under-declaration of spousal care was highlighted repeatedly in the dissertation. It is at the same time a finding and a limitation of the research. It recalls that the first and more important bias in survey-based analyses is related to the degree of validity and accuracy of the respondent's answers. This refers to the 'Human Agency' principle: remember that, in the PSBH, information on spousal care is indirect (provided by the spouse potential care provider), therefore his answer depends on how he perceived his relation to the elderly and to what extent it can be declared to the interviewer. *I do not think that any quantitative data could be used to apply the 'Human Agency' principle. Qualitative inquiry is needed to analyse and report the variety of individual experiences in elderly family care.*

This Life Course reading of the analysis results highlights the main findings and limitations of the dissertation research and gives the characteristics (in italics) of what would be the 'ideal' dataset to study the elderly family care evolution. The PSBH has some of its characteristics but not all of them. It is a not a specific survey on care and it only includes few questions on care received or provided by group of care providers (e.g. questions are neither asked on the care needs nor on the satisfaction with the provided care). Indeed, the main challenge and originality of the dissertation research is in its attempt to make possible the analysis of elderly family care change in Belgium with the available data. Many methodological choices, and data preparation and correction were needed. They could not have been done without an in depth analysis of the existing literature on the study phenomenon. But they also imply taking risks, making assumptions and choices and trying new methods (such as the GLMM). The obtained results seem consistent with the international and national literature on elderly family care. They also lead to go further in the understanding of elderly care in Belgium (e.g. through the highlighted regional differences) and in the understanding of elderly family care evolution in general. This dissertation research studied the care provided by the spouse and the adult children between 1994 and 2002 to Belgian elderly born between 1900 and 1929. Like in most researches, the focus is quite narrow but it would also allow going beyond the specific research topic to suggest new avenues for further research and policies related to the study phenomenon. This is why the conclusion ends by addressing three more general questions: First: *To what extent are the dissertation results transferable to the future cohorts of elderly?* Or: *What are the similarities and differences between the study elderly cohorts and the baby-boomers elderly cohorts?* Second: *How to define 'elderly family care' in a way that could improve its declaration by the protagonists?*

## *To what extent are the findings inferable to the next elderly cohorts?*

In the introduction, the social policy interest for the study of elderly family care evolution was justified by the intensification of the population ageing process, the impossibility for the Western Welfare States to absorb the totality of the elderly care demand and the necessity to develop social policies to insure tenable and adequate community care services. The family-members elderly seemed to be important care partners: understanding the dynamics of elderly family care appears thus to be essential to identify the ways to support the family care-givers or to substitute them when they are no (longer) available for care.

Major societal and demographic changes occurring in the 60s were already mentioned in the introduction (individualisation of the parent-child relationship, development of new communications means, de-standardisation of the family structure) as they are supposed to model the modalities of intergenerational solidarities between the baby-boomers cohorts (the elderly of the next decades) and their adult children.

However, in order to have longitudinal data and to be able to study the evolution of elderly family care, it was necessary to work on the recent past. The dissertation analysed the care provided to the birth cohorts 1900-1929. It is therefore important to highlight the major 'contextual' differences between the study cohorts and the baby-boomers:

- The **life conditions** of the baby-boomers were very different from the one of the study cohorts and this will influence their **behaviour and expectations** toward the life in general, the social institutions, the family relationships, etc. as synthesised by Evelyne Sullerot:

  "[…] Arrivés à l'âge de fonder une famille, […les baby-boomers] ont cherché à se conformer à de nouvelles normes, et n'ont accepté ces normes que si elles venaient des gens de leur âge. Il faut dire que les gens de leur âge ont assez de choses en commun pour imposer des normes à l'échelle européenne, à partir du moment où ils arrivent à l'âge adulte. **Leur nombre**, d'abord : ce sont les enfants du baby-boom. Ils représentent la couche la plus importante de population dans toutes les pyramides des âges européennes ou presque. Ils ont le sentiment de leur importance et de leur pouvoir ; ils ont été **les premiers enfants de la paix et de l'abondance**, ils n'ont pas été soumis aux dures nécessités de la survie quotidienne **;** ils ont été exempts des devoirs d'obéissance et de respect dus aux anciens par la formidable et insidieuse incidence de la psychanalyse et de la psychologie vulgarisées auprès de leurs parents à l'inverse de ceux-ci, **ils ne sont pas culpabilisés** – ils sont même les premières générations depuis des siècles à arriver à l'âge adulte sans les contraintes intérieures de diverses culpabilités. Ils ont l'impression de ne devoir rien à personne, ni à la patrie, ni aux partis, ni aux Églises, ni même à leurs parents. **Ils sont les premiers à entrer dès leur jeune âge dans la révolution sexuelle** […]" (Sullerot 1999 :302).

- They are **higher educated (both men and women)**: according to the FELICIE calculations for Belgium, the proportion of low educated among the 75-84 in 2030 (birth cohorts 1946-1955 = baby-boomers) will only be around 20.3% for men and 22.6% for women against 57.6% and 65.4% among the 75-84 in 2000 (birth cohorts 1916-1925 = part of our elderly study cohorts).

- The women of these cohorts have experienced and benefited from much **progress in gender equality**: they gain the right to vote (in 1948), were no longer constrained to exit the labour market after the birth of their first child. Most of the mothers of these cohorts were able to combine a family and a working life. The development of childcare services and the diffusion of modern contraception in the late 60s contributed to an unexpected increase in the freedom of women: they are able to control their fertility and are no more obliged to stay home to care for their young children. Unlike the women of the study cohorts (who were

generally lower educated and who have never worked), the baby-boomer women have their own pension and can therefore expect to have a better standard of living in their later life.

- The baby-boomers had a **less standardised life trajectory**, more often marked by divorce, separation and singlehood spells. Marriage is no longer seen as a requirement for living with a partner or for having a child (see demographic trends in chapter III).

- They are **globally in better health**: they did not experience the hard life conditions and food shortages of the World Wars, they could benefit of preventive medicine in their childhood and from the cardiovascular revolution[14] (Vallin & Meslé 2004) in their adulthood. Compared to them, the elderly interviewed in the PSBH look like survivors: still alive and at home at old age while their birth cohorts were exposed to high infant mortality rate and to several infantile diseases.

The purpose of this point is to highlight some of the main recent evolutions in care needs and family care availability which lead to nuance the transferability of the dissertation results to the future elderly cohorts in Belgium and to identify some new challenges to meet in the next decades.

Starting with the **needs**, the most obvious change is the numeric importance of the dependent elderly. The baby-boomers are expected to live healthier longer than the preceding elderly cohorts (Ulysse & Lesemann 1997. Pérès & Barberger-Gateau 2001; Christensen *et al.* 2009), but there is still a gap to fill between the total life expectancy and the healthy life expectancy: according to the computations of Van Oyen *et al.* (2008)[15] for 2004, at 65 years, the general life expectancy for men equals 16.8 and 20.7 for women, while the healthy life expectancy equals respectively 9.8 and 10.3 years. This means that the baby-boomers[16] will still expect to spend a few years with health problems and care needs.

In the FELICIE research, Gaymu *et al.* (2008) made projections of the proportion of elderly having a bad health status based on the ECHP data. Two scenarios were considered: the 'constant' scenario hypothesises no changes in morbidity while the 'healthy scenario' hypothesises that the morbidity declines[17]: according to the constant scenario, in 2030, 18.6% men and 24.6% of the women aged 75-84 (birth cohorts 1946-1955) will have a bad health status. According to the healthy scenario, these proportions fall to 14.0% and 20.7%.

Given the numeric importance of these birth cohorts, the absolute number of dependent elderly will dramatically increase over the next few years. Willemé (2010) made projections of the number and the rate of dependent[18] elderly in 2060 in Belgium. He used 2007 as a comparison year: at that time,

[14] Since the 70s, the decline in mortality is mainly due to the medical progress in the knowledge, prevention and treatment of cardio-vascular diseases. The baby-boomers were in their early adulthood and could really benefit from these progresses, while the study cohorts (1900-1929) were already too old.

[15] The healthy life expectancy is based on the subjective health questions asked in the HIS. The authors showed the evolution of the figures comparing the HIS 2004 to the HIS 1997 and 2001 and: in 1997, at 65 years, the total life expectancy equals 15.5 for men and 19.8 for women and the healthy life expectancy respectively equals 8.6 and 9.5. For 2001, the figures are 16.2 and 20.2 (life expectancy); 8.7 and 9.6 (healthy life expectancy).

[16] In 2004, the 65+ correspond to the birth cohorts 1939 and older. They do not match exactly the baby-boomers but no more recent figures could be found and given the slow evolution of the phenomenon, the results can be inferred to the baby-boomers.

[17] For detailed methodological issues about the two scenarios and the FELICIE projections computations, see Poulain *et al.* (2008).

[18] The dependency rates computations are based on SHARE 2004: is considered as dependent a person "having ADL-difficulties expected to last at least three months (at least difficulties with bathing/showering and dressing) or experiencing severe cognitive limitations (having difficulties with at least 8/10 items: reading,

the absolute number of dependent elderly (65+) equals 443,829. In 2060, it is expected to reach 1,032,461 (more than twice as high!).

The continuous increase in life expectancy is also associated with an increase in the number of cases of dementia. It is a degenerative disease: the increasing number of people reaching very old age (the most 'at risk') is accompanied by an increase of dementia cases (Pacolet *et al.* 2001). A large study on dementia, named 'Qualiderm', was commissioned by the INAMI/RIVIZ. In the first part of the project (1999-2002), projections of the number of demented people were computed for 2020 (n=202,220 cases among the 65+). It represents an increase of a third compared to the figures of 2000 (n=147,911) (Buntix *et al.* 2003). The demented elderly were excluded from the dissertation study because of the survey design and the type of data analysed (private household survey based on face-to-face or self-completion questionnaire with no possibility of using a proxy respondent). Caring for a demented elderly has its own specificities. The increased number of cases should lead the researcher to develop specific inquiry methods to study the dynamics of dementia care, its limitations and the specific policies aimed at supporting the elderly and his informal care providers.

Finally, another specificity of the care needs of the baby-boomers in Belgium must be mentioned. It is no longer linked to life expectancy but to another phenomenon studied by demographers: migrations. In the Post-War period, there was a large wave of immigrant workers coming mainly from Spain and Greece (1948-1958) and later from Morocco and Turkey (since 1962). Most of them worked in the services sector and in the manufactory industry and were concentrated in Brussels (Ouali 2003). After having reached retirement age, the major part of them decided to stay in Belgium. They, therefore, will reinforce the baby-boomers elderly cohorts.

In 2007, 14.77% of the 65+ living in Brussels have a foreign nationality (the proportion is lower in the two other regions (2.98% in Flanders and 9.28% in Wallonia) (INS/NIS 2009). Having a different culture often imply having different expectations towards intergenerational solidarities (de Valk & Schans 2008), they may be more suspicious towards health professionals and less likely to let a 'stranger' enter their home and imposing his own way of doing the housework (Moulin & Casman 2006). In some cases, they have a large family around them and could easily find family care-givers. In other cases, their family lives still in their country of origin and they have not many sources of care available (Doyen 2009). In any case, the organisation of care for foreign elderly should consider their cultural differences. One of the challenges identified for the next decades in the General States of the Family of 2007 (Casman *et al.* 2007) is to develop a 'multi-cultural' elderly care policy.

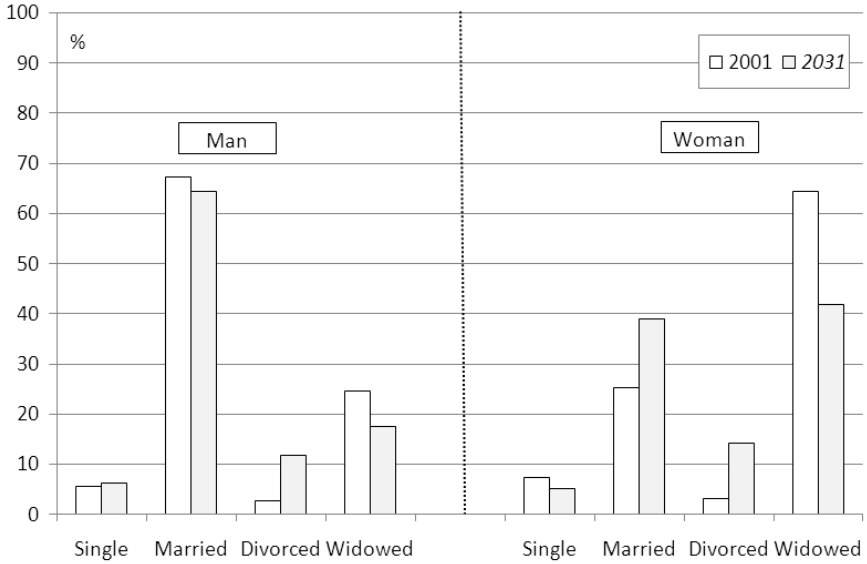
As to the availability of family care, differences between the study cohorts and the baby-boomers cohorts should be acknowledged too. The former had a quite standardised life trajectory with different transitions which are usually done in this order: education, entry in the labour market, marriage and cohabitation, first child and mother stop working to care for the children. At old age, the members of the study cohorts have usually a spouse (unless one of them died) and children who could potentially provide care. This is, of course, very schematic!

The life trajectory of the baby-boomers is less standardised (see above) and this will have an impact on the availability of family care-givers in their later life: first marital disruption is more frequent among these cohorts. This will have a negative impact on the availability of spousal care but it may also affect children care: several studies (de Jong-Gierveld & Dykstra 2002; Mortelmans 2002; Kalmijn 2007) show that divorce has a negative effect on the care provided to the father but not to the mother. Graph conclu-1 compares the marital status at 75-84 years for the birth cohorts 1917-1926 (in 2001) and 1947-1956 (projections for 2031). It shows a higher proportion of divorced people

writing, orientation to time - month, orientation to time - year, ten words recall, verbal fluency, numeracy percentage, numeracy two-thirds, numeracy interest, ten words delayed recall)." Willemé (2010: 8).

and a lower proportion of widowed for both genders among the baby-boomers, this resulting from an expected decreasing mortality gap between men and women. It also means that the men of these cohorts are more likely to become spousal care-givers as they should be still 'alive' when their spouse will start to need care (Himes 1992).

**GRAPH CONCLU-1:** Marital status of the 75-84 by gender, Belgium (2001, 2031)




*Source*: Kalogirou & Murphy (2006). *Note:* Figures are in appendix table III-20; 2031 is italicised because the figures are based on projections.

Second, the proportion of childless elderly is higher among the baby-boomers and researchers (Wenger *et al.* 2000; Dysktra & Wagner 2007; Kendig *et al.* 2007) start to study the impact of being childless on the size and the composition of the social network at old age.

After having discussed all these cohort differences, one can wonder if studying the caring experience of the birth cohorts 1900-1929 was really useful for understanding the current and the future reality of elderly care in Belgium. Hopefully, the answer is yes! The purpose of this conclusive point was to highlight and, sometimes, force the differences in order to nuance the dissertation results but also to orient future research by identifying the new challenges to integrate in the study of elderly care in Belgium. But there are also many similarities between the elderly study cohorts and the elderly baby-boomers. *First* the ageing process: its pace and expressions may differ from one individual to another but the process (becoming frailer, feeling more easily tired, having more frequent health problems, etc.) and the related events (loss of friends, of the spouse, need for care, loneliness, etc.) will probably be similar for both cohort groups. *Second*, the determinants of the family care characteristics are likely to be the same (women being more likely to have children care, higher educated to use formal care services, etc.) although the relationship between some independent variables may change in intensity (e.g. the relationship between gender and low social-economic status is assumed to be weaker for the baby-boomers because of the higher gender equality observed in these cohorts). *Third,* the dynamics of family care is likely to remain the same: even if the elderly has fewer children, the care sharing negotiation will continue to take place: the daughters will probably continue to care more intensively than their brothers, who at their turn will tend to share the care responsibility with others. Even if the intergenerational solidarities are changing, they will probably remain strong as they are today.

## *How to better identify family care-givers?*

Since the beginning of the dissertation, 'elderly family care' has been presented as a complex phenomenon, which does not have a clear and consensual definition and which is often mis-declared. Chapter I goes back to the medical roots of the 'care' term and shows how its use has been progressively extended to the family and other informal 'care' providers. It highlights the complexity of the care relationships between family-members elderly and after having acknowledged that it would be impossible to perfectly account for it in quantitative analyses, the chapter reviews the main existing measures of care, their advantages and disadvantages. The choice for the ADL and IADL measure in the dissertation is partly motivated by practical reasons: it is the sole measure that could be computed with the available PSBH data. One of its drawbacks is that it tends to under-estimate the care provided by the spouse (especially the wife) and other cohabitants. In the preparation of the PSBH data, an effort was made to correct for this potential under-declaration by using a proxy variable on the presence of extra effort from household members due to the elderly physical health condition. But, the interpretation of the analysis results suggests that spousal care remains largely under-declared. This prevents from doing some of the most detailed analyses due to small numbers of declared spouse care-givers or due to the strong relationship between spousal care declaration and other care characteristics. It appears therefore that the first step to do when studying elderly family care it **to find the terminology** favouring the declaration of the care situations of interest.

From a policy point of view, it is important to notice that the creation of a legal status of informal care provider is currently on the Federal agenda of Belgium[19]. To increase the awareness of this reality and the difficulties of caring for a relative, a national day of informal care providers is organised for the first time this 23 June 2011.

Scientific research can also contribute to the self-identification of the family care-givers (or more widely, informal care providers) through a revision of the terminology. If the research is oriented towards social policy action and wants to identify care situations requiring external support to be tenable, this will necessarily influence its definition of care. In such a case, the most interesting is not to know how spouses are sharing the housework nor if the older daughter had once provided care to her elderly father when he had pneumonia. The most interesting is rather to identify the situations where the 'family care activities' are **constrained** (if the care-giver does not ensure them, somebody else would have to replace him because the elderly is not able to perform these activities on his own). It would equally be useful to obtain information about the **tenability** of the current situation: does the care-giver feel able – psychologically, physically and socially - to remain in this situation for a long time?); information about the availability of **alternative sources of informal care:** is there any other member of the family or of the social network who could supplement or substitute for the care provided if needed? Is the elderly or his care-givers informed on the available **formal care services**? Is there any **obstacle** (financial, cultural, psychological, geographical) preventing them to use those services? Having such information would allow identifying the 'frail' care situations (when the care situation is not tenable and the protagonists do not envisage alternatives) and to assess which kind of supportive measure (practical, financial, psychological, etc.) could contribute to maintain the elderly at home in good conditions for him and his care-givers

If the term of care is the most widely used in the literature, it might not be the best to identify the family care-givers. The term of '**care'** suggests an asymmetric relationship: there is a care- 'giver' and a care-'receiver'. This may well describe the situation where medical care is provided by a health care professional, but it fails to describe the complex relationship between family members, friends etc. In

[19] A *loi/wet* proposal related to the social recognition of the informal care provider has been submitted to the *Chambre des représentants/Kamer van volksvertegenwoordigers* on 10/02/2011. This proposal is partially based on the results of the preliminary study of Flohimont (2010).

this situation, the 'care' provided is often considered as a part of the relationship. The relationship did usually exist before the care situation. In the case of adult children, 'caring' for the elderly parent is often considered as delayed reciprocity and in the case of spousal 'care', the supportive relationship is frequently bi-directional (the spouses may go together shopping because it has become too tiring for each of them doing it alone, they may decide to reduce their pace of life and abandon some types of activities to avoid accidents, exhaustion and to remain longer autonomous at home, etc.).

I would propose to use '**support'**[20] instead of 'care' when the provider is a member of the family or of the social network. This term is already used in the literature: 'social support' was used in the gerontological literature before the term of 'informal care' was introduced by the feminists and, today, the term of 'instrumental support' is mainly used in network analyses but, as far as I know, no conceptual discussion has started on the choice for the term of 'care' rather than another term. According to me, the term of 'support' should be preferred for the following reasons:

- *First*, it has a more positive connotation than care: it is **socially valued** for someone to declare providing support to relatives or to a close relationship. It is also valued to declare having the support of someone (being able to rely on someone).
- *Second,* the support can be **bidirectional** (between spouses for instance).
- *Third,* the support also includes the idea that it can be difficult or heavy: in French, the verb 'supporter' has two meanings: 'soutenir' and 'endurer'. In English, the first is translated as 'to support' (being supportive, to encourage) and the second as 'to bear' (to endure). Both aspects should be considered in the definition of support because it highlights the two sides or the **ambivalence** of the relationship. This may help people involved in such a relationship to recognise these two aspects and ask for external help before the situation has become too difficult to manage.
- *Fourth,* the term of support does not imply that the one who is supported depends on the supporter (support does not necessarily mean doing 'instead of' the elderly, it can also mean 'doing' with the other). It is also possible to 'support the **autonomy'** of the elderly.
- *Fifth,* the term of support refers to the supports (or stands) of an object like a stool: some have only one central thick stable leg, other 'models' have three or even four legs which are thinner because the weight of the sitting people is shared. Likewise, elderly **support may be shared** in order to reduce the individual care load.
- *Sixth, '*support' may include a **larger spectrum of activities** than 'care' does and should therefore better account for the multiplicity of exchanges ('instrumental support', 'informative support', 'emotional support', etc.) it often involves.

Then, the question is: which adjective to place before 'support'? Do we have to keep the distinction between 'family'/'informal' and 'formal' support? Is this distinction 'tenable' given the demographic and societal evolutions? I would say no and defend a more integrative definition of care.
The previous point of this conclusion shows that there is an increasing number of elderly who do not have any nuclear family to give them the instrumental support they need: the proportion and the absolute number of childless elderly is increasing and, although the rise in life expectancy, the remaining gender gap and the instability of unions of the baby-boomer cohorts imply that many elderly (mainly women) will spend several of their old years spouseless.

This dissertation focused on the nuclear family because it appeared to be the first, the main and the most stable source of elderly support. But, the purpose behind was to identify the qualities of the

[20] In French: 'supporter' or 'soutenir' rather than 'aider' or 'soigner'; in Dutch: '(onder)steunen' rather than 'zorgen' or 'helpen'.

family support which could be 'transferred' to professionals, volunteers or non-kin 'supporters' in order to offer quality and long-term care to elderly who cannot or do not want to rely on family support. An important characteristic of the family support relationship highlighted by the analyses is its 'closeness'. The family supporters are geographically close to the elderly: when he lives in couple, the elderly is less likely to receive external support because the spouse is usually (or up to a certain point) able to assume the bulk of the support. Non-cohabiting children are more likely to provide (intensive) support when they live closer to their parent(s). The 'closeness' term can also refer to the affective bond linking the family members. Although, one cannot ask to a health professional or to a volunteer to develop affective bonds with the supported elderly, the idea of closeness can, to a certain extent, be transferred to non-kin support. This can be done, for instance, by favouring an organisation of the support plan at the very local level, trying to create a **proximity support network**[21] for the elderly (which can include the participation of the neighbours who may accept to give some occasional help to the elderly, e.g. putting the trash out or be the contact person in case of an urgent health problem if the family is not easily reachable).

The 'affective' closeness or rather the 'emotional security' of the elderly will be favoured it there is a relative **stability** in the professional or volunteers who are supporting him, if there is a good **communication** between the people involved in the support network and if there is someone who is in charge of **coordinating** the support plan. This role is often assumed by the spouse or a child but, if there are no family-members elderly included in the network, it is important to designate someone who will do that.

Therefore, I suggest using the expression **'close support'**. The advantages are the following:

- *First,* it does not make a distinction according to the type of supporter*:* anybody can be or could become close. There is no **normativity**: the family doesn't have to be the close caregiver if the elderly feels and is geographically closer to a friend.
- *Second,* closeness can evolve over time (it is not a structural aspect of a relationship): People can become more or less close. However the term also refers to a sense of **stability** (because associated with affectivity, emotional bonds).
- *Third,* the idea of closeness fits well with the terminology currently used in Belgium: in the French part, 'aidant proche' is the most used term to refer to the support provided by the social network while 'mantelzorg' is used in the Flemish part: it literally means 'care coat' and the coat is something that one wears, which is therefore close and keeps warmth (affection) and protects (security).

This proposal of a new terminology and, therefore, of a new way of approaching the study phenomenon marks the end of the dissertation. The topic of 'elderly family care' or rather 'elderly close support' is likely to be more and more studied and to remain a burning issue on the policy agenda for a few next years. Given the increasing number of elderly living in the community until very old age, most of us will experience providing and/or receiving elderly support.

[21] In the Nordic countries, the community care is already organised in 'care areas' which are characterised by the integrative, coordinated and proximal aspects of the support plan (Magnussen *et al.* 2009). The Belgian system suffers from the segmentation of professional care services. Moreover, the variety of services providers does not favour the organisation of care based on the proximity. Following Van Damme (2010), I do think that the organisation of care areas would be more efficient both for the professional (by reducing the distance between care-receivers and easing the coordination of coordinated his work with the other professionals acting in the same area) and for the elderly (because the reduction of distance and circulation problems imply that the professional may have more time to spend with the elderly and the opportunity to develop a closer relationship).

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# *CHAPTER I*

## Review of quantitative ageing studies using the Life Course approach

This appendix is based on the unpublished paper I prepared for the Workshop *Ageing Societies and the Welfare state* (11-12/12/2008, VUA, Amsterdam, NL). It is a copy of the part where I present how the reviewed articles were selected and what the main results are (how each of the reviewed articles operationalises the Life Course approach).

**Methodology of articles selection and analysis**

To be included in this review, published articles had to be written in English or French, to present a quantitative analysis on a topic related to ageing[1] in a Western country; to contain the terms 'Life Course approach'[2] or synonyms in the title, and to make reference to one of the Elder's contributions where the Life Course principles are made explicit[3].

Both multi-disciplinary and specialised databases were browsed from 1990 to 2007. The databases for the first group are *Blackwell, J-Stor, Ebsco,* and *Sage*. Those for the second group were more specialised in ageing: *Ageline, Gerolit, Agelib*; or in social sciences and medicine: *Sociological Abstract, ScienceDirect, PubMed*.

Only 10 articles survived the search strategy and were kept for in-depth analysis.

The purpose of the analysis is to assess how quantitative researches on ageing apply the Life Course framework to which they refer? And what this approach brings to the understanding of the ageing related issues? The definition of the Life Course as a theory by Elder is used to answer the first question: for each article, the question formulation, variables choice, design and strategy for analysis are identified and, whenever possible, associated with the Life Course principles. This detailed meta-analysis gives rise to a broader discussion, where the theoretical and the empirical parts of this paper are put face to face in order to answer the second question: to what extent is the theoretical framework operationalised in the selected studies? What are its advantages, limitations and future in this field?

[1] Articles may concern the personal experience of ageing or the relationship between the elderly and their social network (intergenerational relationships or caring). Given that the methodological criteria aforementioned were quite strict and led to a rather small corpus, no too strict criteria were put on the specific topic. The methodological aim of this part is to assess how the Life Course approach has been operationalised in research dealing with a topic close to ageing or caring.

[2] All the spelling of Life Course were accepted (in one, two words or hyphenised, with or without capital letters) and the cognates of the approach as well (theory, paradigm, research, framework, perspective). The second search strategy included the abstract and keywords. However, it was noticed that only the articles referring to the Life Course in the title also met the criteria of referencing Elder's article.

[3] The text of the candidate articles was browsed to ensure that the principles were made explicit. The rationale is that, if the author states clearly (in the title) that the research lies in the Life Course framework and references a contribution where Elder's states the principles of this approach, we may expect that the authors know those principles and will try to operationalise them in his 'Life Course' research.

**Analysis of the articles**

For each article, all the references to the Life Course approach were identified and classified (appendix table I-1) according to the elements of the definition of the Life Course as a middle-range theory (it orients the question formulation, the analysed variables, the design and the analytic strategy) and the referred Life Course principle. In the table, TP is used for 'Time and Place'; LS, for 'Lifespan'; TT for 'Timing of Transition'; LL for 'Linked Lives' and HA, 'Human Agency'.

**TABLE APPENDIX I-1:** Analysis of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication

| Ref. # | Author(s) date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[1]** | **Moen *et al.*(1992) US** | ***Research questions***<br>(TP): What is the relationship between social integration (multiple roles) in early adulthood and social integration and health in the later years? (TT): Does the duration of particular roles over the life-course, (rather than the mere sum of roles), influence subsequent social integration and health? (LL): Is the timing or sequencing of roles related to health and social integration in the later years of adulthood? (HA): Are role strains and psychological well-being in the form of life satisfaction and self-esteem in early adulthood related to social integration and health later in life?<br><br>***Justification for a Life Course approach***<br>The authors refer explicitly to 3 Life Course concepts:<br>(TT): 'Timing' relates to the incidence, duration, and sequence of roles throughout the life-course. For instance social integration at one life phase may or may not be conducive to social integration and health in the later years of adulthood.<br>(LS): 'Process' focuses on ageing as a series of role transitions rather than as a single event.<br>(TP): 'Context' in terms of the personal circumstances in which women live their education, marital status, and family size, as well as their age may have important repercussions for their social integration and health in the later years of adulthood. Age, in particular, may reflect not only physiological differences but also unique historical circumstances. | ***Variables*** *(roles of the Life Course related variables)*<br>As independent variables to measure the association between health trajectory, various social pathways and current health and social integration situation:<br>*Dependent health related variables:* Duration of serious illness, current functional ability, subjective health, objective health; dependent multiple roles variables: number of the following positions actively occupied currently: worker, church member, friend, neighbour, relative, club/organisation member.<br>*Independent variables:* Number of roles at the previous interview; health status at the previous interview and before; timing, duration, and number of spells in employment and volunteering; current marital status, current household composition, number of children; duration of marriage, duration of time spent caring for preschoolers; duration of time spent caring for other relatives<br><br>***Design***<br>*Population:* White women aged 55-81 in 1986 (current interview) (TP) who were spouses and mothers in 1956 (previous interview) (n=313)<br>*Analysed survey:* Women Roles Survey (1956; 1986). *Prospective data:* 2 waves and retrospective data: life history records. |

| | | | |
|---|---|---|---|
| | | Women from different cohorts were born into vastly different worlds, with different expectations regarding their roles and lives.<br>The two other Life Course principles are also, implicitly present:<br>(HA): Ageing is a differentiating process: some people are healthier than others. Even among those with health problems, there are inter-individual variations in coping strategies.<br>(LL): Social integration (multiple roles) is associated to the health status later in life.<br>***Other theoretical frameworks:*** multiple-role, successful ageing | ***Analysis***<br>Nested regression models to estimate the effects of multiple roles at the previous interview (LL), of the duration and the timing of particular roles throughout adulthood (TT) on multiple roles and health at the current interview time.<br><br>Event-history techniques to estimate the rate at which individuals who were healthy at the time of the previous interview (n = 271) experienced meanwhile (until the current interview) a severe illness or disability (LS). |

**TABLE APPENDIX I-1:** Analysis of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref.# | Author(s), date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[2]** | **Moen *et al.* (1994) US** | ***Research question***<br>What is the relationship between the prevalence and the timing of caring and paid work? Does this relationship vary across different birth cohorts?<br><br>***Life Course approach***<br>(LL): The Life Course approach encourages a view of caring as a life contingency, a consequence of the interdependence of life paths of family members and the situational imperatives concomitant with family crises or ongoing family strains.<br>(LL): The pathways leading to or steaming from care must be considered in the light of other pathways, such as the woman's paid work.<br>(TP, TT): It highlights trajectories and transitions – the dynamics of care in terms of its prevalence, timing, duration, and context. | ***Variables***<br>*As groups for comparison*<br>The effect of caring responsibilities on the probability of women's movements in and out of paid work and the reverse are analysed by age groups, birth cohort and educational level.<br><br>***Design***<br>*Population:* White women aged 23-50 in 1956 (t1) spouse and mother at that time and who answered the caring questions in 1986 (t2) (n=293)<br>*Analysed survey:* Women Roles Survey (1956; 1986).<br>*Prospective data:* 2 waves and retrospective data: life history records.<br><br>***Analysis***<br>Construction of a spell file for duration analysis: each spell is defined by a particular combination of work and care patterns. This file allowed calculating: (a) The percent of women engaged in care and or paid work for various age groups and by birth cohort (TP); (b) The duration of time spent in various work/care role combinations (TT, LL); (c) the probability of making a transition from one work/care role combination to any other (TT,LL); and (d) the relationship between educational level , paid work, and care. In addition, various age categories were examined to note age-related changes in roles across the course of women's lives. Because employment in particular is a function of age, when looking at both roles together they analysed the probability of paid work and care from ages 18 to 55. |

**TABLE APPENDIX I-1:** Analysis of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref. # | Author(s), date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[3]** | **Kaufman & Uhlenberg (1998) US** | ***Research question***<br>How do Life Course transitions experienced by each generation affect changes in the adult child-parent relationship?<br><br>***Life Course approach***<br>(LL): The lives of parents and their children are connected in significant ways as long as both generations are living. Because of linkages across generations, it is likely that Life Course transitions (related to health, marital status, childbearing, employment and geographic mobility) experienced by members of one generation will have consequences for members of the other. | ***Variable***<br>*As independent and dependent for measuring the association between previous changes/ transitions and changes in a current outcome:* Effect of the Life Course transitions on changes occurring in the child-parents relationship quality (LL).<br><br>***Design***<br>*Population:* Adults with at least one living parent at the time of the second wave. (With a mother alive: n=5,760; with a father alive: n=4,261).<br>*Analysed survey:* National Survey of Families and Households (1987-88; 1992-94). *Prospective data.*<br><br>***Analysis***<br>A multinomial logit model compares those who reported an improving relationship and those who reported a worsening relationship with those who reported no change. Transitions in independent variables are coded as dichotomous variables. Analyses are carried out separately for mothers and fathers of adult children. |

**TABLE APPENDIX I-1:** Analysis of the operationalisationation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref. # | Author(s), date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[5>4]** | **Kramer & Lambert (1999) US** | ***Research question***<br>To what extent will husbands who did the transition to a caring role show evidence of changes in various life aspects (the amount of time spent in household tasks, social integration, marital relationship, and psychological well-being)?<br><br>***Life Course approach***<br>(TT): The timing of the transition to the caring role is particularly difficult to identify because the conditions requiring care are chronic and progressive or because the caring activity (especially for a spouse) is considered as 'natural' and as a part of the relation. The caring transition can be viewed as a process.<br><br>***Other theoretical frameworks***<br>Social stress theory, role theory. | ***Variables***<br>*As independent and dependent for measuring the association between previous changes/ transitions and changes in a current outcome:*<br>Effect of the caring transitions on changes in various aspects of life.<br><br>***Design***<br>*Population:* Husbands aged 60+ in 1992-93 (current interview) who are not carer in 1987-88 (previous interview) (n=288). Those who did the transition to care constitute a first group (carers) and the others a second one (non-carers).<br>*Analysed survey:* National Survey of Families and Households (1987-88; 1992-93).<br>*Prospective data.*<br><br>***Analysis***<br>Analysis of covariance (ANCOVA) was used to test the mean differences (carers/non carers groups) on the various life aspects at the second interview controlling for the scores at the first interview [to assess changes over time] and covariates (TT) [to measure the effect of caring on differences on the type of change]. |

**TABLE APPENDIX I-1:** Analyse of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref. # | Author(s), date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[6>5]** | **White (2001) US** | ***Research questions***<br>How sibling relationships change over time? To what extent are the observed changes attributable to related family life-course changes, such as parental and marital statuses?<br><br>***Life Course approach***<br>(LS): The Life Course perspective suggests that the ageing experience may be analysed by considering the series of life-course transitions that structure the individual movements over time.<br>(HA): The Life Course theorists analyse transitions (such as leaving home, marriage, and childbearing) as variables that can be put together in various ways to create an individual trajectory.<br>(LL,HA): In the case of siblings, the Life Course approach suggests that if and when individuals get married, have children, or do their career, sibling relationships become less central. In the absence of these transitions (e.g. never marry) or if reversal transitions occur (e.g. lost of the partner), it is suggested that siblings should remain important.<br>(LL, LS): More generally, the family Life Course model of sibling relationships suggests that siblings are permanent but flexible members of the social networks, whose roles in the networks are renegotiated in the light of changing circumstances and competing obligations.<br><br>***Other theoretical frameworks***<br>Hierarchical-compensatory model, developmental theory | ***Variables***<br>*As independent and dependent variables for assessing the effect of transitions on the change in a relationship over time*<br>Effects of age and family life-course transitions on siblings relationships.<br><br>***Design***<br>*Population:* Individuals ages 16-85 in 1987 who reported a sibling at both waves. (n=8,838)<br>*Analysed survey:* National Survey of Families and Households (US, 1987-88; 1992-94)<br>*Prospective data.*<br><br>***Analysis***<br>The primary analytical technique is a random effects model that allows estimating the effect of characteristics that vary within as well as across individuals, for example age and family life-course. The dependent variable in these analyses is the change in sibling's relationships between waves regressed on changes in the age and the family life-course, with controls for time-invariant characteristics of individuals such as gender, race, and ethnicity. Relationship changes are measured in four areas: proximity, contact, giving support, and receiving support.<br>The hypothesis is that sibling relationships show a curvilinear relationship with age, declining in young adulthood and then resurfacing in old age is tested (LS: relationship changes over time). After that, control variables for life-course transitions (getting married, unmarried, adding children, geographically closer to siblings, becoming an orphan, and changing sibling number) are added. A reduction in the age effect when controlling for family life-course measures, will suggest that the observed age effects are attributable to new responsibilities (varying across individuals and siblings according to the choices they have made over their lifetime) (LL,HA,LS). |

**TABLE APPENDIX I-1:** Analyse of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref. # | Author(s), date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[4>6]** | **Crosnoe & Elder (2002) US** | ***Research question***<br>How both current circumstances and life histories predict different types of adaptation to ageing?<br><br>***Life Course approach***<br>(HA, LS): Ageing is viewed as a lifelong process. The style of adaptation to ageing at a point in time is not a mere summation of earlier events. Indeed, two people can be put in the same style category and have a completely different past history (supplemental approach of the Lifespan principle).<br>(LL) Stress is put on the value of linking life stages (individuals are involved in several and different roles).<br>(TT) Examining transitions.<br>(TP) Exploring agency within context.<br><br>***Other theoretical frameworks***<br>Successful ageing viewed as a multifaceted phenomenon that encompasses not only health but also psychological well-being, role integration, and social engagement (Baltes & Baltes 1991). | ***Variables***<br>*As independent and dependent for measuring the association between previous changes/ transitions and changes in a current outcome:* Effect of stable/disrupted trajectories on adaptation to ageing.<br><br>***Design***<br>*Population:* Men born between 1905 and 1914 still alive in the 70s (n=424)<br>*Analysed survey:* Stanford-Terman Study (1922-1980 with changing time intervals) [the population of the study consists in high Intellectual Quotient individuals]<br>These data were supplemented by qualitative life history records. *Prospective data.*<br><br>***Analysis***<br>Four styles of adaptation to ageing (according to the family involvement, assessment of occupational success, civil involvement, life satisfaction and vitality) are identified (LL).<br>Multinomial logistic regressions are performed to predict ageing styles by aspects of current life and by four sets of 'Life Course' factors: developmental trajectories (TT,LS), social pathways (TT,LL), social convoys (LL), and turning points: death of a family member (LL) combat experience during World War II (TP). These factors are 'Life Course' because they do not refer to the effect of predictors at a point in time (e.g. effect of the marital status at the retirement age) but they refer to the effect of the trajectory of those aspects (e.g. effect of the marital trajectory) and allow assessing the effect of a stable trajectory (e.g. always married to the same women) on ageing adaptation. Although turning points refer to specific moments in time (and not to a trajectory), they can be cumulated over time. |

**TABLE APPENDIX I-1:** Analyse of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref. # | Author(s), date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[7]** | **Silverstein *et al.* (2002) US** | ***Research questions***<br>How the parents' transfers of sentiment, time, and financial assets to their adolescent/young adult children affect the children's propensity in middle age to provide social support to their ageing parents? What is the best way to model the mechanism of long-term intergenerational exchange: as a return on investment, an insurance policy triggered by the longevity or physical frailty of the parents, or the result of altruistic (or other nonreciprocal) motivations on behalf of adult children?<br><br>***Life Course approach***<br>(LL,LS) The Life Course perspective provides a lens through which the interdependence of family members can be viewed. This paradigm considers human development as a relational process of 'Linked Lives' over time and stresses the importance of long-term relationships in shaping the resources and well-being of individuals as they age.<br><br>***Other theoretical frameworks***<br>Exchange theory, altruism, intergenerational solidarity. | ***Variables***<br>*As independent to measure the effect of the past relationships on the current ones*<br>Effect of parent-to-child support (when the latter move to adulthood) on current child-to-parent support (when the latter are ageing).<br><br>***Design***<br>*Population:* Children who participated in the 1971 survey and who had at least 1 parent surviving in 1985 (n= 501)<br>*Analysed survey:* Longitudinal Study of Generations (1971; 85; 88; 91; 94; 97) *Prospective data.*<br><br>***Analysis***<br>Growth curve modelling was applied to predict the average levels and rates of change in the social support provided to mothers and fathers between 1985 and 1997 as a function of early parental transfers of affection, association, and tangible resources to their children. (LS, LS). |

**TABLE APPENDIX I-1:** Analyse of the operationalisationation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref. # | Author(s), date, country | Use of the Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[8]** | **Henz (2004) UK** | ***Research question***<br>What is the effect of informal care on paid-work participation?<br><br>***Life Course approach***<br>(TT) Caring often extends over a long period of a person's life, and some people provide several episodes of care during their lifetime.<br>(TT) The effects of caring on employment can be either sudden and in other cases develop gradually.<br>(LS) A past caring experience affects a person's attitude to prospective caring.<br>(LL) The Life Course approach emphasises the inter-relatedness of different role trajectories. The effect of informal care on employment depends on other aspects of the carers' lives. (e. g. family configuration).<br>(LL) The life trajectories of the dependent and the potential carer are linked. When the care need arises, the potential carer is at a specific life stage associated with specific resources and constraints enabling and inhibiting the informal care.<br><br>***Other theoretical framework***<br>Multiple roles theory | ***Variables***<br>*As dependent in bivariate exploratory analyses*: a) timing (age) at the first transition to care by gender (LL); b) total caring duration (TT) by care intensity or need (LL); c) Continuity of caring trajectory (whether or not there is a period of non-caring between 2 caring spells) by gender (LL).<br>*As independent in multivariate main analyses:* Effect of a first transition to care and continuity of the care trajectory on employment (TT) controlling for family configuration and work characteristics at the moment of the first caring transition (LL).<br>*As independent and dependent for measuring the association between previous changes/transitions and changes in a current outcome*<br>Effect of the employment outcome of the first caring transition on the probability of a second caring transition [transition=change](LS).<br><br>***Design***<br>*Population:* People who experiment a transition to caring between the age of 15 and 60 years (working age) (n=1,259)<br>*Analysed survey:* Family and Working Lifes Survey (1994-95) includes questions on employment and caring histories (objective aspect) and a question on the assessment of the effect of caring on employment (subjective aspect).<br>Retrospective data.<br><br>***Analysis***<br>The event-history analysis allows computing the probability of caring for the first time at each year of age, the time spent in caring and the caring trajectory until the moment of the survey. The distributions are displayed by gender and by care intensity (bivariate analysis). They are further introduced in a logistic regression on various employment features (cease working, fewer hours, etc.). |

**TABLE APPENDIX I-1:** Analyse of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication (continued)

| Ref. # | Author(s), date, country | Use of the Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[9]** | **Poortman & Van Tilburg (2005) NL** | ***Research questions***<br>How people's experiences through (almost) the entire life span relate to their attitudes late in life? What is the relationship between elderly' attitudes and the Life Course experiences of their parents and children?<br><br>***Life Course approach***<br>(LS) Elderly' attitudes may change due to experiences later in their lifetime or in reaction to their children's lifetime experiences.<br>(TP) The study examines people's work and family experiences and related attitudes (towards gender roles and moral issues). Those areas of the social life were chosen because the changes in these areas have been particularly important and exemplify the trends towards greater equality, freedom and autonomy.<br>(LL) The focus is on the relationship between the attitudes of the respondent and the experience of their parents, children and themselves. | ***Variables***<br>*As independent to measure the effect of the family members experiences on current attitudes*<br>Effect of parental background, the respondents' own marital and work histories, and their children's marital history and work characteristics on the current attitude toward gender roles and moral issues.<br><br>***Design***<br>*Population:* Respondents aged 55+ (n=1,689 for moral attitudes; n=1,680 for gender-role attitudes)<br>*Analysed survey:* The survey Living Arrangements and Social Networks of Older Adults in The Netherlands and the Longitudinal Aging Study Amsterdam-LASA (1992)<br>Retrospective data.<br><br>***Analysis***<br>Ordinary least-squares regression was used to assess the relationships between the elderly gender roles and, on the one hand, moral attitudes, and on the other hand, the indicators of their parental background, their children's lifetime (LL) and their own lifetime experiences (LS). The respondent's educational attainment, age, church membership and the level of urbanisation of the area of residence are introduced as control variables to reflect the broader or societal influences (TP). |

**TABLE APPENDIX I-1:** Analyse of the operationalisation of the Life Course approach in the reviewed articles, by chronological order of publication (end)

| Ref. # | Author(s), date, country | Use of Life Course principles and concepts for **problem definition** | Operationalisation of the Life Course approach: **Variables selection, design strategy** and **analysis** |
|---|---|---|---|
| **[10]** | **London & Wilmoth (2006) US** | ***Research questions***<br>Whether military service (and age at enlistment) mediates or moderates the effects of early-life disadvantage on later-life mortality and whether mid- to late-life marital status, socioeconomic status, health status, and health behaviour mediate the effects of military service on mortality.<br><br>***Life Course approach***<br>A Life Course approach is adopted to study later-life mortality in relation to early-life disadvantage and military service.<br>(LS) The experiences of veterans may be different from those of non-veterans in ways that would affect subsequent life-course trajectories and experiences and, ultimately, mortality. It can create cumulative advantages: more disciplined healthy lifestyles, easier access to health care thanks to the veterans' status. But it can also create cumulative disadvantages: the experience of combats can let the veterans, physically or psychologically, impaired. Also the military experience may affect both the marital transition and its trajectory.<br>(TT) Hypothesis that the direction of the effect of military service on health in later life depends on the timing of this event: early mobilisation (positive turning point) versus late entry (life-course disruption). | ***Variables***<br>*As independent and dependent for measuring the association between previous changes/ transitions and changes in a current outcome (mortality is considered as the last life-course event)*<br>Direct and indirect effects of military service (turning point) and its timing on mortality in later life.<br><br>***Design***<br>*Population:* Men aged 51-61 in 1992, n=5,639 (a), 70+ in 1993, n=2,899 (b) information on death given by proxies<br>*Analysed surveys:* (a) Health and Retirement Study (US, 1992; 94; 96; 98; 2000; 2002) and (b) the Study of Assets and Health Dynamics Among the Oldest-Old (1993; 95; 98; 2000 ; 2002)<br>*Prospective data.*<br><br>***Analysis***<br>Use of hierarchical logistic regression models to predict the likelihood of death as a function of early-life background characteristics (i.e., race and father's education), age, and military service (as a turning point). Mid- to late-life marital status, socioeconomic status, health status, and health behaviour are control variables (LS). Separated models are tested to measure the effect of the timing of army enlistment (TT). |

***Formulation of the problem***

The three main aspects studied in the selected articles are: the evolution of the family relationships in later life [3,5,7,9], the caring relationships [2,4,8], the effect of past experience in later life [1,6,10]. The studies justify their choice for a Life Course approach by the changing nature of the phenomenon. Emphasis is put on the fact that ageing should be studied as a 'life-long process' or 'trajectory' and that the events and the lifestyle in the later life are partly explained by the accumulation and the combination of earlier events. Therefore, accounting for the time is of first importance but it can be done in various ways: by studying the effect of the past on the present situation [1,3,6,9,10], evolution of a relationship over time [5,7], or concurrent evolutions [2,4,8]. In the problem definition, the authors quoted one or two concepts of the Life Course framework that they attempt to operationalise (duration, Timing of Transition, trajectory, pathway, turning point, etc.).

The second key aspect of the Life Course is to situate the individual phenomena in their multiple contexts. In this regard, the selected studies tend only to consider the familial context or, more generally, the social network (associated to the 'Linked Lives' principle, typical to sociological studies). The studies articulate the Life Course approach with roles theories allowing considering individuals in their multiple social roles[4]. Not so much attention is given to account for the interdependence between the individual and macro contexts. Only one study [10] considers the effect of an historical event (World War II) on later life. Some studies [2,4,10], account somehow for the cultural and historical contexts by studying specific cohorts .But none addresses the possible effect of the individual changes on the macro contexts.[5] Finally, the Human Agency principle appears to be the most difficult to use in quantitative research because it is exactly the residual individual variation that cannot be explained by the model. Indeed, this principle is more used in the psychological studies. In the sociological approach of the Life Course, it seems often mixed with the Lifespan principle. For instance, the supplementary approach of the Lifespan principle [4] allows inter-individual variations among people having similar backgrounds. Also, it is accounted for when Life Course studies examine the intra-cohort variations of the effect of specific events on subjective or life-style aspects controlling for socio-demographic characteristics: showing that people with the same background can cope differently with them. Qualitative studies are maybe more able to study that.

***Variables choice, design and analysis***

In their methodological handbook on Life Course, Giele & Elder (1998) insist on the need for longitudinal data for doing Life Course research. They also show a preference for prospective data following individuals over a long period. However, this kind of data is not so common and few of them follow the individuals until their later years. Among the selected studies, only one [6] deals with such data, but the sample is highly selected (comprising only men with very high IQ) which could create problems for the generalisibility of the results. In the others studies, the data may be prospective but over a short period [10] or with few waves of data collection [1,2,3,4,5,7] (the two first are completed with retrospective information). Finally, the two European studies [8,9] use retrospective data. Another interesting point to notice concerns the study population: half of the selected studies (mainly those on the effect of previous life experience) restrict their sample to one gender [1,2,4,6,10] suggesting that the prevalence or the effect of earlier events differs across gender. The other five studies concern the effect or evolution of a relationship [3,4,7,8,9]. Hence, the

[4] This combination is particularly fruitful when studying pathways (the roles theories highlight the multiple social spheres to consider while the Life Course approach adds the time dimension).

[5] We may think that ageing, because of the importance of biological and personal factors and their variety, is more often studied from a micro-level point of view.

sample is selected according to the existence of this relationship (e.g. having siblings, being a carer, etc.) regardless of the gender.

Although the choice of variables and methods vary across studies, some regularities appear and thus may be considered as specific to the Life Course approach: in most cases, Life Course variables (variables referring to Life Course concepts or any measure of change) are used as dependent and independent variables: the transition will be used to predict a change, the evolutions of two trajectories are studied simultaneously, etc. The statistical method used will depend on the nature of data and the specificity of the research question (transition, duration, factors from different levels).

To sum up, in most selected studies, the authors refer only to a part of the principles and concepts of the Life Course approach. We usually find some concern for both time and contexts but we never see the five Life Course principles articulated together in the same study. The theoretical framework appears to be a conceptual 'toolkit' rather than a number of guidelines to follow.

The authors adopt a Life Course approach because they consider that for gaining in understanding of the phenomenon it is needed to consider the effect of time and/or some specifics contexts.

# *CHAPTER II*

## Systematic literature review: methodology

The first stage of any scientific research is to become familiar with the available literature on the study topic. The purpose is twofold (1) knowing what was done, where and how, to not repeat exactly the same; (2) knowing what was proved, what was conceptualized, what is still unclear, what needs further investigation, to learn from the experience of the previous researchers. Those two aims refer to the principle of cumulative knowledge (Popper, 1959 [1934]).

To follow systematic rules for selecting the reviewed articles avoids certain caveats of a subjective literature review that leads to miss important contributions: (1) the 'quotation circle' bias (a group of authors are quoting each other without considering other relevant contributions in the research area). (2) The 'common knowledge' bias (maybe more important in social sciences than wherever else): if a research of all the relevant keywords, synonymous, cognates and translations is not done, a great deal of contributions can be discarded (for instance only the publications containing 'institution' were considered, while many contributions on the topic refer to 'placement'). Doing a 'systematic' literature review does not mean to be systematic at one point (like searching systematically all the contributions with 'institution' in the title available in the library). The systematic attitude should be applied at each step and at each decision to be taken as far as possible. Moreover, the decisions to take when doing a systematic literature review help to delineate the research topic.

Because the systematic literature review is not so frequent in social sciences, the main textbook about how to do it refers to medical sciences. The methodology used here is an adaptation of the method proposed by Fink (2005) and the detailed guidelines of the KCE (Cleemput *et al.* 2007).

The systematic search was done in January 2008 (for the period 1990-2007) and updated in February 2011 (for the period 2008-2010).

**Stage one: Preparing the search tools**

*Step 1: defining the research question*

Who is cared? What are the characteristics of elderly family care? How and why do they remain stable, change or stop over time?

*Step 2: defining the kind of contributions searched*

The main purpose of the systematic search is to identify the quantitative studies dealing with family care. However, other kinds of contributions (theoretical, methodological, qualitative, review) that could be useful later on (for the empirical analysis, the interpretation, etc.) are kept but not considered for the meta-analysis.

*Step 3: defining the inclusion criteria (see the main text of chapter II)*

*Step 4: identifying the databases*

The electronic databases available at the UCL (http://bib.sipr.ucl.ac.be/cgi-bin2/db/list_db.cgi) or at the KUL (http://metalib.libis.be ) and classified as 'multi-disciplinary' (UCL), 'sciences humaines[6]/humanities', 'sciences sociales'(UCL) or

[6] Index, facts book and encyclopedia were excluded.

'sociologie/sociology' were listed. The list was completed with other databases advised by librarians or found out through net search. The various databases were sorted by type (general, gerontology, sociology, etc.) in order to allocate them in the different steps of search suggested by the KCE guidelines.

*Step 5: defining the keywords*

Based on the three keywords ('elderly', 'family' and 'informal care'), a draft list was drawn out of my own knowledge of the phenomenon. The list was enriched with synonyms and all the titles, abstracts, and keywords of the articles I have already gathered on informal care were checked to discover related terms used by the authors. I went through recent conference proceedings related to the care of elderly and organised by different social disciplines: the European Sociological Association-ESA conference 2007 (sociology - ENG), the Forschungsinstitut zur Zukunft der Arbeit-IZA conference 2007 (economy – ENG), the International Union for the Scientific Study of Population-IUSSP congres 2005 (demography – ENG/FR), associations and networks: Centre interdisciplinaire de recherche sur le vieillissement – GIC (psychology, gerontology FR-ENG), the thematic network 'Vieillesses, vieillissement et parcours de vie' (sociology FR), and a final check was made with the Thesaurus of *Ageline* (a databasis specialised in ageing concerns).

Particular attention was paid in considering both the US and the UK spellings (e.g. carer (UK) and caregiver (US)) and in identifying the specific wordings used only in French or in English (e.g. 'aidant proche' which is not used in English, helper and carer which are both translated into French by 'aidant' )

In addition to the three main keywords (appendix table II-1: lines 1 to 3), an ordered list of terms referring to particular aspects of the research (change, longitudinal approach, formal care, mortality etc.) was drawn. The entire list was used when a fourth keyword criterion could be added to the databases query. This allowed sorting out more directly the articles of interest.

**APPENDIX TABLE II-1:** Keywords list

| | | English | Français |
|---|---|---|---|
| ( | 1 | (Parent, mother, father, primary/main, child/children, daughter /son, spouse/ spousal / couple/partner/relative/family/ informal) | (Parent, mère, père, principal, enfant, fille/fils/époux/épouse/femme/mari/couple/ naturel-le/familial-e/informel-le/ proche/proximité) |
| AND | 2 | (Carer/nursing/caregiver/caregiving/ help/instrumental support/assistance/ care) | (Accompagnement/ prise en charge/entraide aidant/aidante/soignant/aide/soin/aide instrumentale/aidé/dépendant de soin) |
| AND | 3 | (Senior/ old aged/old adult/aging/ageing/ elderly/older adult/old people/elder) | (Senior, personne âgée/ aîné / quatrième âge/ grand âge/vieux/ vieillard/sujet âgé/vieillissement/vieillesse) |
| ) AND | | | |
| *(* | *4* | *Adapt, adjust, substitute, complement, compensate, sequence, change, process, evolution, dynamic, transition,* | *Adapter, ajuster, substituer, complément, compenser, séquence, changer, processus, évolution, dynamique, transition* |
| *OR* | *5* | *Generation/cohort, longitudinal, event history, biographic(al), survival, panel)+ (data,study,analysis) over time* | *Génération/cohorte, longitudinale, biographique, de survie, panel +(Analyse/étude/données) à travers/dans/avec le temps* |
| *OR* | *6* | *Lifecourse/ life course /life span, life stage, pathway, trajectory, career* | *Parcours de vie, trajectoire, carrière* |
| *OR* | *7* | *Configuration, (living/care)+ (arrangements/setting)* | *Configuration, situation d'aide,* |

| | | | |
|---|---|---|---|
| | | *(residential/household/family/housing)+ (context/composition/dynamic/formation /structure), live alone, widow, married single* | *(ménage/famille) + (composition/dynamique/ formation/ structure), vivre seul veuf/veuve marié célibataire* |
| *OR* | *8* | *Institution*/rest home/ residential care, care homes, nursing homes, home care , placement* | *Maison de retraite, institution, institutionnalisation, résidence, placement, home, hospice* |
| *OR* | *9* | *Formal/community dwelling/day/ home nursing/home-based care delivery, care, professional support, service system, supportive/ in-home services* | *Aide formelle, soins à domicile, centre de jour* |
| *OR…)* | *10* | *Death/die, Mortality, life expectancy, longevity, survival* | *Mort/mourir, mortalité, espérance de vie, longévité, survie* |

Each database has its own query form. Although some principles are similar, a great variety was found in the numbers of keywords that can be combined and the fields that can be searched. Therefore, the search was adapted to each database, trying to be as close as possible to the original query: one keyword of each of the three first boxes 'care' 'family' 'elderly' in the title or abstract.
Appendix table II-2 gives the following pieces of information for each database: type (multidisciplinary, specialised on ageing or on a discipline), access (through the web or the UCL intranet), whether the database includes journals written in English and/or in French, period covered by the database, description of the initial[7] search 'query'.

**Stage two: the search**

*Step 1: Search in multi-disciplinary databases that allow accurate queries*

Blackwell, Ebscohost, J-Stor, Sage

*Step 2: Search in databases specialised in the disciplines related to the topic*

PubMed, ScienceDirect, Sociological abstract

*Step 3: Search in databases specialised in the topic (ageing)*

Ageline, Agelib, Gerolit , IUGM[8]

Other databases were browsed: MuseProject, SpringerLink, Directory of Open Access Journals, Web of Science, Wiley InterScience**,** Sudoc, Francis, Scirus, Intute, websites of research centres on ageing, Proquest. Some of them provided interesting reports, dissertation or working papers but no additional relevant published article.

All the articles identified by the computer or by the manual search were further examined to verify if they really meet all the criteria and can be kept for the systematic literature review.

[7] It is the one used in 2008 for the 'initial' search (1990-2007). Some modifications may have been needed for the update in 2010.

[8] These databases differ from the previous ones. There are hosted by universities (IUGM, Gerolit) or ageing association (Ageline, Agelib). They have the advantage to be specific on ageing but they have the disadvantage to be a less 'stable' (e.g. the Ageline website was accessible in 2011 for the literature review update) and to include only a small percentage of journal articles (books, working papers, reports etc. are more frequent). Indeed, all the articles (except one) which were identified by those databases and kept for the review were also identified by other datasets. For this reason, Ageline, Gerolit, Uqam and Agelib databases were not browsed in 2011 for the review update.

**APPENDIX TABLE II-2:** Presentation of the searched databases

| Database information | Initial search query |
|---|---|
| **Blackwell**<br>(multi-disciplinary)<br>*Access*: UCL intranet<br>*Covered period*: 1998-<br>*Language(s) of the included journals*: English<br>*Note:* Since June 2009, Blackwell has merged with Wiley. The included journals may have changed but the same query is accepted. | ABSTRACT: ( ( ( ( ( ( ( ( ( ( care or caregiver ) or caregiving ) or caring ) or help ) or instrumental support ) or nursing ) or carer ) or assistance ) **AND** ( ( ( ( ( ( ( ( ( ( ( (parent or mother) or father ) or primary ) or main ) or spousal ) or couple ) or partner ) or relative ) or informal ) or family ) or child ) or spouse ) or daughter ) or son ) ) **AND** ( ( ( ( ( ( ( ( elderly or old aged ) or senior ) or old adult ) or older ) or elder ) or aging ) or ageing ) or old people ) ) **AND NOT** ( ( ( ( ( ( ( ( ( ( ( childcare or pediatric ) or assessment ) or chinese ) or Taiwan ) or Korea ) or baby ) or therapy ) or teenage ) or abuse ) or policy ) or migrant ) or japanese ) or cancer ) ). |
| **Ebscohost**<br>(multi-disciplinary)<br>*Access*: UCL intranet<br>*Covered period*: 1861-<br>*Language(s) of the included journals*: English-French | ( TEXT ( care or caregiver or caregiving or caring or help or instrumental support or nursing or carer or assistance ) **AND** TEXT ( (elderly or old aged or senior or old adult or older or elder or aging or ageing or old people) ) **AND** TEXT ( (parent or mother or father or primary or main or spousal or couple or partner or relative or informal or family or child or spouse or daughter or son) ) **AND** TITLE ( (adapt* OR adjust OR substitute OR complement OR compensate OR sequence OR change OR process OR evolution OR dynamic OR transition& OR generation OR cohort OR longitudinal OR event history OR biographic OR survival OR panel OR over time OR lifecourse OR life course OR life span OR life stage OR pathway OR trajectory OR career OR configuration OR living arrangement OR living setting OR household OR institution* OR rest home OR residential OR care home OR nursing home OR home care OR placement OR formal care OR community care OR in-home services OR death OR die OR mortality OR life expectancy OR longevity) ) )<br>*Filter:* age group=65+; theme= Care; the sub-databases browsed are: Academic Search Elite , Academic Search Premier, EconLit , EconLit with Full Text , MLA Directory of Periodicals , MLA International Bibliography , PsycARTICLES, PsycINFO, SocINDEX, SocINDEX with Full Text. |
| **J-Stor**<br>(multi-disciplinary)<br>*Access*: UCL intranet<br>*Covered period*: 1600-<br>*Language(s) of the included journals*: English-French<br>*Note:* in 2010, it was not possible to rerun the same query. I had to divide the query into more simple ones. Therefore, I cannot tell how many articles have been browsed as some of them might be counted manifold if they satisfy to more than one sub-query. | « (care* OR caring OR help OR "instrumental support" OR nursing OR assistance) **AND** (parent* mother OR father OR primary OR main OR spouse OR spousal OR couple OR partner OR relative& OR informal OR famil* OR child& OR daughter& OR son&) **AND** (elderly OR "old aged" OR senior OR "old adult" OR older OR elder OR aging OR ageing OR "old people") **AND** TITLE:(adaption OR adjust OR substitute OR complement OR compensate OR sequence OR change OR process OR evolution OR dynamic OR transition& OR generation OR cohort OR longitudinal OR "event history" OR biographic OR survival OR panel OR "over time" OR lifecourse OR "life course" OR "life span" OR "life stage" OR pathway OR trajectory OR career OR configuration OR "living arrangement" OR "living setting" OR household OR institution OR "rest home" OR residential OR "care home" OR "nursing home" OR "home care" OR "placement" OR "formal care" OR "community care" OR "in-home services" OR death OR die OR mortality OR "life expectancy" OR longevity) ».<br>*Filter*: journals |

| | |
|---|---|
| **Sage**<br>(multidisciplinary)<br>*Access*: UCL intranet<br>*Covered period*: depends on journals<br>*Language(s) of the included journals*: English-French<br>*Note*: in 2010, the query options have been enhanced compared to 2008. However, it was decided to keep the same search strategy (combination of simple query and journals browsing). | care* **AND** family in ABSTRACT **AND** elderly in ABSTRACT.<br>+ Browse the journals listed in the discipline 'Gerontology & Aging'. |
| **PubMed**<br>(medicine)<br>*Access*: UCL intranet<br>*Covered period*: depends on journal<br>*Language(s) of the included journals*: English | informal[ABSTRACT] **AND** care[ABSTRACT] elderly[ABSTRACT])<br>*Filter:* population= humans; language=English OR French; age group="middle aged" OR "middle aged" OR "aged" OR "aged" OR "aged, 80 and over" |
| **ScienceDirect**<br>(medicine & social sciences)<br>*Access*: UCL intranet<br>*Covered period*: 1995-<br>*Language(s) of the included journals*: English | ABSTRACT( ( care or caregiver or caregiving or caring or help or instrumental support or nursing or carer or assistance )) **AND** ABSTRACT((elderly or old aged or senior or old adult or older or elder or aging or ageing or old people)) **AND** ABSTRACT ( (parent or mother or father or primary or main or spousal or couple or partner or relative or informal or family or child or spouse or daughter or son) ) |
| **Sociological Abstract**<br>(sociology)<br>*Access*: UCL intranet<br>*Covered period*: 1963-<br>*Language(s) of the included journals*: English | TITLE=(car* or help or support) **AND** TITLE=(informal or family or primary) **AND** (elderly or old* or parent)<br>*Filter*: social sciences, journals. |
| **Agelib**<br>*Access*: free (online)<br>http://www.uncioa.org/agelib/index.asp<br>*Period*: na<br>*Language(s) of the included journals*: English-French | Browse the topic 'caregiver' |

| | |
|---|---|
| **Ageline**<br>(gerontology)<br>*Access:* free (online)<br>http://star.aarp.org/starweb/ageline/servlet.starweb?path=ageline/ageline.web<br>*Covered period*: na<br>*Language(s) of the included journals*: English-French<br>*Note:* Elderly related keywords not used because the databasis is specialised on ageing. In 2010, the database is no longer active. Therefore, the search only covers the period 1990-2008. | Care*; caring; help ; instrumental support; nursing ; assistance<br>**AND** mother ; father ; primary; main; spousal ; couple; partner ; relative ; informal ; family ; child ; spouse ; daughter ; son **AND** adapt*; adjust*; substitute; complement; compensate; sequence; chang* ; process ; evolution ; dynamic ; transition; generation ; cohort ; longitudinal ; event history; biographic ; survival ; panel ; over time ; lifecourse ; life course ; life span ; life stage ; pathway ; trajectory ; career ; configuration ; living arrangement ; living setting ; household ; institution* ; rest home ; institutional; residential ; care home ; nursing home ; home care ; placement ; formal care ; community care ; in-home services ; death ; die ; mortality ; life expectancy ; longevity<br>*Filter*: academic only, paper, full-text available only. |
| **Gerolit**<br>(gerontology)<br>*Access*: free (online)<br>http://vzlbs2.gbv.de:8080/DB=41/LNG=EN/ *Covered period*: na<br>*Language(s) of the included journals*: English-French | (((FULLTEXT=(care* ; caring ; help ; instrumental support ; nursing ; assistance ) **AND** FULLTEXT =(mother ; father ; primary ; main ; spousal ; couple ; partner ; relative ; informal ; family ; child ; spouse ; daughter ; son )) **AND** FULLTEXT =(adapt* ; adjust* ; substitute ; complement ; compensate ; sequence ; chang* ; process ; evolution ; dynamic ; transition ; generation ; cohort ; longitudinal ; event history ; biographic ; survival ; panel ; over time ; lifecourse ; life course ; life span ; life stage ; pathway ; trajectory ; career ; configuration ; living arrangement ; living setting ; household ; institution* ; rest home ;residential ; care home ; nursing home ; home care ; placement ; formal care ; community care ; in-home services ; death ; die ; mortality ; life expectancy ; longevity )) **AND** FULLTEXT =("elderly" ; "old aged" ; "senior" ; "old adult" ; "older" ; "elder" ; "aging" ; "ageing" ; "old people" ))<br>*Filter:* language=ENGLISH OR FRENCH; population=human |
| **IUGM database**<br>(gerontology)<br>*Access*: free (online)<br>http://catalogue.iugm.qc.ca/<br>*Period* : na<br>*Language(s) of the included journals*: English-French | Browse the file 'Aidants naturels' |

*Note*: Symbols vary from one database to another. However, the most common are 'AND'; 'OR' (or ';'); 'AND NOT'; '*' which indicates a truncation, '&' meaning that the word is considered in its singular and plural forms; and '"…"' meaning that the exact expression should be searched.

## *CHAPTER III*

**APPENDIX TABLE III-1:** Population by age group and gender, Belgium (1900, 1930, 2007, *2050*)

| AGE GROUPS | 1900 | | 1930 | | 2007 | | *2050* | |
|---|---|---|---|---|---|---|---|---|
| | **Men** | **Women** | **Men** | **Women** | **Men** | **Women** | **Men** | **Women** |
| **0-4** | 394,057 | 389,497 | 335,872 | 331,615 | 301,840 | 288,316 | *333,340* | *318,045* |
| **5-9** | 346,770 | 345,001 | 348,672 | 342,637 | 302,160 | 289,700 | *336,937* | *321,646* |
| **10-14** | 324,670 | 322,503 | 252,427 | 247,960 | 314,678 | 301,035 | *337,250* | *321,928* |
| **15-19** | 323,804 | 320,975 | 326,485 | 323,427 | 328,310 | 315,090 | *339,128* | *325,282* |
| **20-24** | 304,651 | 301,614 | 357,159 | 346,499 | 319,982 | 317,150 | *351,210* | *347,080* |
| **25-29** | 276,439 | 274,505 | 366,363 | 354,023 | 340,168 | 338,195 | *367,101* | *366,913* |
| **30-34** | 241,932 | 240,488 | 335,918 | 335,633 | 348,958 | 342,423 | *374,741* | *375,076* |
| **35-39** | 210,727 | 210,719 | 286,408 | 301,114 | 386,354 | 376,643 | *382,822* | *382,946* |
| **40-44** | 186,236 | 188,908 | 262,831 | 273,346 | 413,681 | 403,075 | *377,060* | *378,450* |
| **45-49** | 155,849 | 159,650 | 255,429 | 261,293 | 399,335 | 393,835 | *358,820* | *362,928* |
| **50-54** | 135,075 | 141,993 | 233,820 | 240,620 | 364,663 | 363,189 | *357,421* | *366,060* |
| **55-59** | 128,207 | 135,630 | 204,313 | 213,297 | 335,595 | 337,210 | *367,978* | *379,600* |
| **60-64** | 105,513 | 114,216 | 164,714 | 175,858 | 271,301 | 281,586 | *350,509* | *364,704* |
| **65-69** | 79,506 | 88,132 | 122,978 | 137,786 | 223,375 | 248,394 | *334,424* | *353,243* |
| **70-74** | 56,636 | 65,113 | 83,344 | 99,578 | 205,247 | 249,887 | *307,453* | *332,963* |
| **75-79** | 34,855 | 42,428 | 43,953 | 58,422 | 165,601 | 233,919 | *284,806* | *328,764* |
| **80-84** | 14,532 | 19,340 | 19,348 | 28,339 | 105,579 | 183,385 | *234,999* | *308,080* |
| **85+/85-89** | 5,375 | 8,353 | 7,384 | 13,139 | 41,122 | 91,946 | *153,433* | *254,510* |
| **90-94** | | | | | 11,309 | 37,286 | *65,485* | *147,605* |
| **95-99** | | | | | 1,999 | 9,675 | *18,450* | *53,367* |
| **100+** | | | | | 151 | 1,187 | *5,283* | *11,295* |
| **TOTAL** | 3,324,834 | 3,369,065 | 4,007,418 | 4,084,586 | **5,181,408** | **5,403,126** | ***6,038,650*** | ***6,400,485*** |

*Sources:* **1900, 1930**: INS/NIS 1951b; **2007, 2050**: BFP/FPB & INS/NIS (2008).
*Note:* figures from 2050 are italicised because they are based on projections.

**APPENDIX TABLE III-2:** Population aged 65+ (%), by region, Belgium (1900-2060)

| YEAR | Belgium | REGION Flanders | Wallonia | Brussels |
|---|---|---|---|---|
| **1900** | 6.2 | Na | Na | Na |
| **1910** | 6.4 | Na | Na | Na |
| **1920** | 6.5 | Na | Na | Na |
| **1930** | 7.6 | Na | Na | Na |
| **1947** | 10.7 | Na | Na | Na |
| **1961** | 12.2 | Na | Na | Na |
| **1970** | 13.4 | 12.2 | 14.6 | 16.0 |
| **1981** | 14.4 | 13.6 | 14.8 | 17.6 |
| **1991** | 15.0 | 14.5 | 15.3 | 17.4 |
| **1994** | 15.6 | 15.1 | 15.9 | 17.4 |
| **2000** | 16.8 | 16.7 | 16.8 | 16.8 |
| **2007** | 17.1 | 17.8 | 16.5 | 14.8 |
| ***2010*** | *17.2* | *18.2* | *16.4* | *14.3* |
| ***2020*** | *19.2* | *20.5* | *18.7* | *14.0* |
| ***2030*** | *22.7* | *24.3* | *22.1* | *15.6* |
| ***2040*** | *23.0* | *26.7* | *24.3* | *17.7* |
| ***2050*** | *25.7* | *27.3* | *25.0* | *19.0* |
| ***2060*** | *26.3* | *27.7* | *25.9* | *19.7* |

*Sources*: **1900-1961**: INS/NIS 1985:13; **1970**: INS/NIS 1974b; **1981:** INS/NIS 1985; **1990, 1994**: INS/NIS (2011); **2000-2060**: BFP/FPB & INS/NIS (2008).
*Note:* figures from 2010 to 2060 are italicised because they are based on projections.

**APPENDIX TABLE III-3:** Population aged 80+ (%), by region, Belgium (1900-2060)

| YEAR | Belgium | REGION Flanders | Wallonia | Brussels |
|---|---|---|---|---|
| **1900** | 0.7 | 0.8 | 0.7 | 0.5 |
| **1910** | 0.7 | 0.8 | 0.7 | 0.5 |
| **1920** | 0.7 | 0.7 | 0.8 | 0.6 |
| **1930** | 0.8 | 0.8 | 0.9 | 0.7 |
| **1947** | 1.3 | 1.2 | 1.5 | 1.3 |
| **1961** | 1.9 | 1.7 | 2.2 | 2.4 |
| **1970** | 2.1 | 1.8 | 2.3 | 2.8 |
| **1981** | 2.7 | 2.5 | 2.8 | 3.7 |
| **1991** | 3.5 | 3.4 | 3.5 | 4.7 |
| **1994** | 3.7 | 3.6 | 3.6 | 4.9 |
| **2000** | 3.5 | 3.4 | 3.4 | 4.3 |
| **2007** | 4.6 | 4.5 | 4.6 | 4.7 |
| ***2010*** | 4.9 | 5.0 | 4.9 | 4.7 |
| ***2020*** | 5.5 | 6.0 | 5.1 | 4.2 |
| ***2030*** | 6.5 | 7.0 | 6.1 | 4.7 |
| ***2040*** | 8.5 | 9.2 | 8.1 | 5.9 |
| ***2050*** | 10.1 | 11.0 | 9.5 | 7.0 |
| ***2060*** | 10.4 | 11.1 | 10.0 | 7.6 |

*Sources*: **1900-1991**: *Debuisson et al.* (2000); **1994**: INS/NIS (2011); **2010-2060**: BFP/FPB & INS/NIS (2008).
*Note:* figures from 2010 to 2060 are italicised because they are based on projections.

**APPENDIX TABLE III-4:** Life expectancy at birth, 65 years and 80 years, by gender, Belgium (1900-2050)

| | LIFE EXPECTANCY | | | | | |
|---|---|---|---|---|---|---|
| | AT BIRTH | | AT 65 YEARS | | AT 80 YEARS | |
| YEAR | Men | Women | Men | Women | Men | Women |
| **1900** | 49.2 | 55.9 | 10.3 | 11.3 | 4.4 | 4.7 |
| **1910** | 52.8 | 59.4 | 11.1 | 12.2 | 4.6 | 5.0 |
| **1920** | 56.7 | 63.7 | 11.5 | 12.5 | 4.9 | 5.3 |
| **1930** | 59.9 | 67.0 | 11.7 | 13.0 | 5.1 | 5.6 |
| **1940** | 62.2 | 69.3 | 11.0 | 12.4 | 4.3 | 4.9 |
| **1950** | 62.0 | 67.3 | 12.4 | 14.0 | 5.2 | 5.8 |
| **1960** | 67.7 | 73.5 | 12.3 | 14.6 | 5.2 | 5.9 |
| **1970** | 67.8 | 74.2 | 12.2 | 15.3 | 5.5 | 6.3 |
| **1980** | 70.0 | 76.9 | 12.9 | 16.7 | 5.7 | 7.0 |
| **1990** | 73.0 | 79.8 | 14.3 | 18.5 | 6.2 | 8.0 |
| **2000** | 75.1 | 81.4 | 15.5 | 19.6 | 6.7 | 8.5 |
| **2007** | 76.7 | 82.2 | 16.7 | 20.2 | 7.2 | 8.9 |
| **2009** | 77.2 | 82.4 | 17.1 | 20.7 | 7.5 | 9.3 |
| **2020** | *79.6* | *85.5* | *18.3* | *22.4* | *8.0* | *10.2* |
| ***2030*** | *81.2* | *87.0* | *19.4* | *23.4* | *8.6* | *10.9* |
| ***2040*** | *82.6* | *88.4* | *20.5* | *24.4* | *9.2* | *11.5* |
| ***2050*** | *84.0* | *89.7* | *21.5* | *25.3* | *9.8* | *12.1* |

*Sources for life expectancy at birth:* **1898-1902 to 1943-1945**: Schoen *et al.* (1984); **1946-1949 to 2009**: INS/NIS (2011).
*Sources for life expectancy at 65 and 80***: 1900-2007**: Human mortality database; **2009**: INS/NIS (2011); **2020-2050**: Mestdagh & Lambrecht (2003a).
*Note:* figures from 2010 to 2060 are italicised because they are based on projections.

**APPENDIX TABLE III- 5:** Population, live births, extramarital births, marriages and deaths, Belgium (1900-2009)

| YEAR | POPULATION | LIVE BIRTHS | DEATHS <1YEAR | EXTRA MARITAL BIRTHS | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTHS | DEATH <1YEAR | EXTRA MARITAL BIRTHS | MARRIAGES | DEATHS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1900*** | 6,693,548 | 195,354 | 34,813 | 14,596 | 57,711 | 126,633 | **1927** | 7,932,077 | 146,296 | 14,389 | 6,614 | 71,921 | 107,772 |
| **1901** | 6,799,999 | 201,608 | 29,976 | 14,284 | 57,131 | 113,144 | **1928** | 8,003,269 | 148,071 | 13,931 | 6,506 | 71,485 | 107,005 |
| **1902** | 6,896,079 | 197,389 | 29,700 | 13,743 | 56,157 | 116,075 | **1929** | 8,060,189 | 147,311 | 16,272 | 6,235 | 71,811 | 121,887 |
| **1903** | 6,985,219 | 193,722 | 31,203 | 13,034 | 54,946 | 115,884 | **1930*** | 8,092,004 | 152,530 | 15,181 | 6,164 | 71,624 | 108,592 |
| **1904** | 7,074,910 | 193,205 | 30,569 | 12,792 | 56,740 | 117,097 | **1931** | 8,159,185 | 149,657 | 13,366 | 5,589 | 66,168 | 109,136 |
| **1905** | 7,160,547 | 188,807 | 28,780 | 12,536 | 56,679 | 115,486 | **1932** | 8,213,449 | 145,835 | 13,653 | 5,188 | 62,186 | 109,226 |
| **1906** | 7,238,622 | 187,754 | 30,005 | 12,084 | 58,388 | 115,514 | **1933** | 8,247,950 | 136,757 | 12,585 | 4,323 | 65,098 | 109,365 |
| **1907** | 7,317,561 | 186,610 | 25,994 | 12,140 | 58,660 | 112,656 | **1934** | 8,275,552 | 133,514 | 11,013 | 3,936 | 62,692 | 101,677 |
| **1908** | 7,386,444 | 185,363 | 28,582 | 11,474 | 57,564 | 118,997 | **1935** | 8,299,940 | 128,432 | 10,866 | 3,767 | 63,160 | 107,253 |
| **1909** | 7,451,903 | 177,870 | 25,708 | 10,966 | 57,126 | 115,027 | **1936** | 8,330,959 | 127,751 | 10,994 | 3,441 | 64,749 | 107,231 |
| **1910*** | 7,423,784 | 177,864 | 25,097 | 10,976 | 58,776 | 110,403 | **1937** | 8,361,220 | 128,696 | 10,651 | 3,253 | 63,435 | 110,330 |
| **1911** | 7,490,411 | 173,139 | 29,945 | 10,894 | 59,370 | 119,896 | **1938** | 8,386,553 | 133,610 | 10,862 | 3,359 | 61,549 | 110,896 |
| **1912** | 7,571,387 | 172,522 | 21,860 | 11,240 | 61,278 | 109,405 | **1939** | 8,396,276 | 130,019 | 10,718 | 3,200 | 54,871 | 116,847 |
| **1913** | 7,638,757 | 172,376 | 23,510 | 11,101 | 61,096 | 108,296 | **1940** | 8,294,674 | 112,497 | 10,485 | 3,487 | 35,685 | 134,695 |
| **1914** | 7,684,492 | 156,389 | 20,333 | Na | 41,095 | 108,720 | **1941** | 8,257,392 | 100,616 | 9,216 | 3,008 | 52,697 | 121,945 |
| **1915** | 7,709,411 | 124,291 | 15,544 | Na | 24,654 | 100,674 | **1942** | 8,235,527 | 108,603 | 9,115 | 2,592 | 61,834 | 122,112 |
| **1916** | 7,692,617 | 99,360 | 11,552 | Na | 30,458 | 101,044 | **1943** | 8,246,862 | 123,349 | 9,192 | 3,186 | 52,056 | 111,873 |
| **1917** | 7,642,054 | 86,675 | 12,147 | Na | 32,974 | 124,824 | **1944** | 8,334,276 | 127,122 | 10,502 | 4,363 | 45,352 | 132,248 |
| **1918** | 7,555,576 | 85,056 | 11,377 | Na | 43,558 | 157,340 | **1945** | 8,344,534 | 130,526 | 13,002 | 5,560 | 83,077 | 123,870 |
| **1919** | 7,577,027 | 124,273 | 13,588 | 8,457 | 97,084 | 112,986 | **1946** | 8,388,526 | 152,962 | 11,439 | 5,791 | 90,909 | 113,732 |
| **1920*** | 7,465,782 | 164,950 | 18,172 | 11,648 | 106,514 | 103,717 | **1947** | 8,512,195 | 150,227 | 10,322 | 4,730 | 83,665 | 112,289 |
| **1921** | 7,541,306 | 164,603 | 20,103 | 10,640 | 88,456 | 104,178 | **1948** | 8,602,611 | 150,416 | 8,888 | 4,527 | 79,737 | 108,016 |
| **1922** | 7,598,806 | 154,781 | 17,607 | 9,338 | 82,806 | 107,785 | **1949** | 8,625,084 | 147,854 | 8,462 | 3,940 | 73,453 | 111,104 |
| **1923** | 7,666,055 | 156,600 | 15,609 | 8,809 | 79,786 | 101,210 | **1950** | 8,653,653 | 145,672 | 7,786 | 3,777 | 72,023 | 108,236 |
| **1924** | 7,744,259 | 154,083 | 14,563 | 8,166 | 80,088 | 100,598 | **1951** | 8,703,119 | 142314 | 7,121 | 3,315 | 70,541 | 109,763 |
| **1925** | 7,811,876 | 155,330 | 15,485 | 7,752 | 74,761 | 103,221 | **1952** | 8,757,691 | 146064 | 6,547 | 3,396 | 67,340 | 104,178 |
| **1926** | 7,874,601 | 151,009 | 15675 | 7,101 | 72,517 | 105,808 | **1953** | 8,798,055 | 146125 | 6,120 | 3,261 | 67,742 | 105,863 |

**APPENDIX TABLE III-5:** Population, live births, extra-marital births, marriages and deaths, Belgium (1900-2009) (continued)

| YEAR | POPULATION | LIVE BIRTHS | DEATHS <1YEAR | EXTRA-MARITAL BIRTHS | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTH | DEATHS <1YEAR | EXTRA-MARITAL BIRTHS | MARRIAGES | DEATHS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1954** | 8,840,704 | 148,538 | 6,147 | 3,085 | 67,931 | 105,033 | **1982** | 9,858,017 | 120,241 | 1,329 | 6,207 | 62,341 | 111,871 |
| **1955** | 8,896,246 | 149,195 | 6,077 | 3,169 | 68,881 | 108,743 | **1983** | 9,853,023 | 117,145 | 1,240 | 6,707 | 59,629 | 114,562 |
| **1956** | 8,951,443 | 150,210 | 5,912 | 3,119 | 68,700 | 108,761 | **1984** | 9,857,721 | 115,651 | 1,158 | 7,277 | 58,962 | 110,687 |
| **1957** | 9,026,778 | 152,871 | 5,488 | 3,084 | 68,338 | 107,840 | **1985** | 9,858,895 | 114,092 | 1,120 | 8,067 | 57,559 | 111,612 |
| **1958** | 9,078,635 | 155,048 | 4,858 | 3,115 | 67,193 | 105,746 | **1986** | 9,864,751 | 117,114 | 1,124 | 9,190 | 56,780 | 111,343 |
| **1959** | 9,128,824 | 158,237 | 4,803 | 3,282 | 65,135 | 103,513 | **1987** | 9,875,716 | 117,354 | 1,133 | 10,722 | 56,563 | 105,426 |
| **1960** | 9,178,154 | 154,784 | 4,824 | 3,200 | 65,220 | 113,938 | **1988** | 9,927,612 | 119,779 | 1,075 | 12,784 | 59,075 | 104,577 |
| **1961*** | 9,189,741 | 158,431 | 4,448 | 3,185 | 62,371 | 106,985 | **1989** | 9,947,782 | 120,904 | 1,031 | 13,681 | 63,511 | 107,336 |
| **1962** | 9,251,414 | 155,061 | 4,270 | 3,262 | 62,086 | 111,545 | **1990** | 9,986,975 | 123,776 | 9,86 | 14,373 | 64,554 | 104,130 |
| **1963** | 9,328,126 | 159,192 | 4,328 | 3,491 | 62,449 | 115,618 | **1991*** | 10,021,997 | 125,924 | 1,050 | 15,894 | 60,740 | 104,137 |
| **1964** | 9,428,100 | 160,838 | 4,077 | 3,680 | 65,008 | 109,342 | **1992** | 10,068,319 | 124,774 | 1,023 | 16,956 | 58,156 | 104,181 |
| **1965** | 9,499,234 | 155,496 | 3,684 | 3,677 | 66,535 | 115,045 | **1993** | 10,100,631 | 120,848 | 968 | 17,583 | 54,112 | 106,723 |
| **1966** | 9,556,380 | 151,096 | 3,737 | 3,750 | 68,330 | 115,613 | **1994** | 10,130,574 | 116,513 | 880 | 18,575 | 51,962 | 103,653 |
| **1967** | 9,605,601 | 146,193 | 3,355 | 3,722 | 68,309 | 115,212 | **1995** | 10,143,047 | 115,542 | 694 | 19,961 | 51,402 | 104,685 |
| **1968** | 9,631,910 | 141,984 | 3,084 | 3,770 | 69,713 | 121,744 | **1996** | 10,170,226 | 116,442 | 647 | 22,185 | 50,552 | 104,186 |
| **1969** | 9,660,154 | 141,799 | 3,013 | 3,779 | 72,330 | 120,471 | **1997** | 10,192,264 | 116,213 | 610 | 24,377 | 47,759 | 103,816 |
| **1970*** | 9,650,944 | 142,168 | 2,999 | 3,941 | 73,261 | 118,660 | **1998** | 10,213,752 | 114,259 | 561 | 26,397 | 44,393 | 104,561 |
| **1971** | 9,695,379 | 141,527 | 2,882 | 4,198 | 73,644 | 119,471 | **1999** | 10,239,085 | 114,170 | 560 | 29,079 | 44,171 | 104,911 |
| **1972** | 9,726,850 | 136,304 | 2,565 | 4,111 | 74,352 | 117,424 | **2000** | 10,263,414 | 115,577 | 531 | 32,717 | 45,123 | 104,903 |
| **1973** | 9,756,590 | 129,424 | 2,291 | 3,879 | 73,664 | 118,254 | **2001** | 10,309,725 | 114,172 | 508 | 34,890 | 42,110 | 103,447 |
| **1974** | 9,788,248 | 123,674 | 2,149 | 3,777 | 73,567 | 116,159 | **2002** | 10,355,844 | 111,225 | 493 | 36,868 | 40,434 | 105,642 |
| **1975** | 9,813,152 | 119,693 | 1,932 | 3,730 | 71,736 | 119,425 | **2003** | 10,396,421 | 112,149 | 459 | 39,684 | 41,777 | 107,039 |
| **1976** | 9,823,302 | 121,034 | 1,848 | 3,777 | 71,142 | 118,641 | **2004** | 10,445,852 | 115,618 | 470 | 43,546 | 43,296 | 101,946 |
| **1977** | 9,836,013 | 121,852 | 1,656 | 3,766 | 69,073 | 112,672 | **2005** | 10,511,382 | 118,002 | 494 | 47,228 | 43,141 | 103,278 |
| **1978** | 9,841,654 | 122,592 | 1,626 | 4,121 | 67,127 | 115,388 | **2006** | 10,584,534 | 121,382 | 508 | 50,170 | 44,813 | 101,587 |
| **1979** | 9,855,110 | 123,825 | 1,521 | 4,646 | 65,429 | 112,010 | **2007** | 10,666,866 | 123,305 | 647 | 53,727 | 45,561 | 100,658 |
| **1980** | 9,863,374 | 124,398 | 1,510 | 5,126 | 66,369 | 113,698 | **2008** | 10,753,080 | 128,049 | na | na | 45,746 | 104,587 |
| **1981*** | 9,854,589 | 123,792 | 1,418 | 5,557 | 64,380 | 112,326 | **2009** | 10,839,905 | 127,297 | na | na | 44,255 | 104,509 |

*Source:* Belgium vital registration data. Live birth counts and infant deaths include 'live born babies dying before registration'.
*Note:* *= Census figures.

**APPENDIX TABLE III-6:** Population, live births, marriages and deaths. Flanders (1920-2009)

| YEAR | POPULATION | LIVE BIRTHS | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTHS | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTHS | MARRIAGES | DEATHS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1920*** | 3,499,824 | 88,721 | na | 49,265 | **1950** | 4,360,864 | 82,298 | na | 48,184 | **1980** | 5,634,152 | 72,206 | 38,862 | 58,743 |
| **1921** | 3,543,501 | 89,012 | na | 50,421 | **1951** | 4,387,043 | 80,641 | na | 49,010 | **1981*** | 5,641,579 | 71,957 | 38,164 | 58,117 |
| **1922** | 3,578,625 | 84,960 | na | 51,903 | **1952** | 4,419,011 | 83,682 | na | 46,414 | **1982** | 5,654,964 | 69,650 | 37,091 | 58,402 |
| **1923** | 3,623,580 | 87,738 | na | 47,273 | **1953** | 4,445,605 | 83,324 | na | 47,337 | **1983** | 5,662,336 | 68,117 | 35,910 | 60,228 |
| **1924** | 3,664,240 | 85,634 | na | 46,669 | **1954** | 4,476,429 | 83,366 | na | 46,470 | **1984** | 5,669,879 | 65,668 | 35,383 | 58,263 |
| **1925** | 3,702,626 | 86,039 | na | 47,600 | **1955** | 4,507,842 | 84,231 | na | 48,862 | **1985** | 5,676,194 | 64,066 | 34,620 | 58,885 |
| **1926** | 3,743,349 | 84,063 | na | 48,459 | **1956** | 4,540,808 | 84,464 | 37,507 | 48,490 | **1986** | 5,685,601 | 65,321 | 34,750 | 58,739 |
| **1927** | 3,780,064 | 81,974 | na | 48,865 | **1957** | 4,578,393 | 85,653 | 37,277 | 48,394 | **1987** | 5,696,051 | 65,525 | 34,543 | 55,681 |
| **1928** | 3,830,586 | 84,037 | na | 49,099 | **1958** | 4,614,370 | 86,594 | 36,948 | 46,985 | **1988** | 5,722,344 | 66,075 | 35,810 | 55,443 |
| **1929** | 3,866,635 | 83,958 | na | 56,818 | **1959** | 4,653,478 | 89,181 | 35,696 | 46,522 | **1989** | 5,739,736 | 66,690 | 37,550 | 56,698 |
| **1930*** | 3,885,935 | 87,646 | na | 49,853 | **1960** | 4,688,851 | 86,602 | 36,326 | 52,059 | **1990** | 5,767,856 | 69,330 | 38,257 | 55,977 |
| **1931** | 3,927,155 | 86,555 | na | 50,666 | **1961*** | 4,647,980 | 89,095 | 34,385 | 48,640 | **1991*** | 5,794,857 | 70,324 | 35,777 | 55,775 |
| **1932** | 3,967,733 | 85,319 | na | 50,011 | **1962** | 4,686,454 | 87,931 | 34,318 | 50,758 | **1992** | 5,824,628 | 70,036 | 34,412 | 56,384 |
| **1933** | 4,000,663 | 81,118 | na | 50,443 | **1963** | 5,160,595 | 95,471 | 37,026 | 56,503 | **1993** | 5,847,022 | 68,301 | 32,123 | 58,188 |
| **1934** | 4,032,929 | 79,883 | na | 46,963 | **1964** | 5,217,691 | 96,047 | 38,369 | 53,381 | **1994** | 5,866,106 | 65,280 | 30,681 | 56,365 |
| **1935** | 4,055,276 | 77,598 | na | 49,583 | **1965** | 5,264,558 | 92,245 | 39,569 | 56,425 | **1995** | 5,880,357 | 64,619 | 30,667 | 56,960 |
| **1936** | 4,084,396 | 77,540 | na | 49,415 | **1966** | 5,308,299 | 89,313 | 40,435 | 56,825 | **1996** | 5,898,824 | 64,386 | 30,228 | 56,804 |
| **1937** | 4,110,936 | 78,597 | na | 50,724 | **1967** | 5,348,039 | 86,492 | 40,343 | 57,085 | **1997** | 5,912,382 | 64,441 | 28,328 | 56,570 |
| **1938** | 4,136,494 | 80,985 | na | 51,395 | **1968** | 5,373,578 | 83,456 | 40,819 | 60,534 | **1998** | 5,926,838 | 62,845 | 25,631 | 57,054 |
| **1939** | 4,157,661 | 78,712 | na | 53,760 | **1969** | 5,403,377 | 82,665 | 41,768 | 60,236 | **1999** | 5,940,251 | 62,035 | 24,749 | 57,431 |
| **1940** | 4,163,171 | 69,396 | na | 65,788 | **1970*** | 5,416,583 | 82,586 | 42,355 | 59,832 | **2000** | 5,952,552 | 62,571 | 24,994 | 57,502 |
| **1941** | 4,157,447 | 61,969 | na | 57,046 | **1971** | 5,451,329 | 80,999 | 42,042 | 59,968 | **2001** | 5,972,781 | 60,645 | 23,191 | 56,521 |
| **1942** | 4,158,087 | 67,431 | na | 57,236 | **1972** | 5,477,727 | 77,231 | 42,622 | 59,494 | **2002** | 5,995,553 | 59,725 | 22,269 | 57,925 |
| **1943** | 4,177,169 | 75,332 | na | 52,349 | **1973** | 5,501,306 | 72,753 | 42,390 | 59,368 | **2003** | 6,016,024 | 59,964 | 23,291 | 58,910 |
| **1944** | 4,191,713 | 77,356 | na | 61,877 | **1974** | 5,527,094 | 70,062 | 42,321 | 58,974 | **2004** | 6,043,161 | 62,374 | 24,151 | 56,199 |
| **1945** | 4,205,435 | 79,124 | na | 57,207 | **1975** | 5,548,967 | 67,381 | 41,477 | 60,752 | **2005** | 6,078,600 | 63,906 | 24,046 | 56,890 |
| **1946** | 4,231,022 | 87,033 | na | 51,639 | **1976** | 5,565,991 | 69,224 | 41,235 | 60,470 | **2006** | 6,117,440 | 65,655 | 25,278 | 56,179 |
| **1947** | 4,272,185 | 84,803 | na | 50,752 | **1977** | 5,583,447 | 70,744 | 40,665 | 57,461 | **2007** | 6,161,600 | 66,369 | 25,919 | 55,644 |
| **1948** | 4,317,533 | 84,052 | na | 47,635 | **1978** | 5,600,903 | 71,847 | 39,501 | 59,591 | **2008** | 6,208,877 | 69,928 | 26,277 | 57,760 |
| **1949** | 4,336,205 | 83,519 | na | 49,796 | **1979** | 5,618,952 | 72,731 | 38,270 | 57,761 | **2009** | 6,251,983 | 68,925 | 25,048 | 58,332 |

*Sources:* Dufrasne (1943) and compilation of INS/NIS bulletins.
*Note:* *= Census figures.

**APPENDIX TABLE III-7:** Population, live births, marriages and deaths. Wallonia (1920-2009)

| YEAR | POPULATION | LIVE BIRTH S | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTH S | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTH S | MARRIAGES | DEATHS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1920*** | 2,888,316 | 55,433 | na | 40,776 | **1950** | 2,988,862 | 46,621 | na | 44,074 | **1980** | 3,229,001 | 39,570 | 21,779 | 41,638 |
| **1921** | 2,904,681 | 55,771 | na | 39,827 | **1951** | 3,004,934 | 44,856 | na | 44,330 | **1981*** | 3,218,236 | 39,279 | 20,665 | 41,025 |
| **1922** | 2,913,613 | 51,173 | na | 41,637 | **1952** | 3,010,650 | 45,344 | na | 41,979 | **1982** | 3,213,176 | 38,365 | 19,992 | 40,683 |
| **1923** | 2,925,133 | 50,273 | na | 40,328 | **1953** | 3,012,207 | 45,746 | na | 42,779 | **1983** | 3,208,253 | 37,124 | 18,701 | 41,166 |
| **1924** | 2,947,189 | 50,048 | na | 40,241 | **1954** | 3,026,242 | 47,072 | na | 42,248 | **1984** | 3,207,646 | 37,794 | 18,688 | 40,130 |
| **1925** | 2,961,556 | 51,508 | na | 41,431 | **1955** | 3,038,819 | 46,419 | na | 43,000 | **1985** | 3,206,165 | 38,056 | 18,165 | 39,998 |
| **1926** | 2,969,615 | 49,399 | na | 42,406 | **1956** | 3,062,554 | 46,979 | 21,368 | 43,197 | **1986** | 3,205,651 | 39,216 | 17,412 | 40,106 |
| **1927** | 2,977,225 | 47,808 | na | 44,125 | **1957** | 3,065,939 | 47,756 | 21,074 | 42,349 | **1987** | 3,209,319 | 39,145 | 17,500 | 37,702 |
| **1928** | 2,981,131 | 47,251 | na | 43,259 | **1958** | 3,067,686 | 49,494 | 20,547 | 41,844 | **1988** | 3,234,767 | 40,664 | 18,247 | 37,335 |
| **1929** | 2,988,617 | 46,461 | na | 47,970 | **1959** | 3,064,765 | 50,665 | 19,948 | 40,712 | **1989** | 3,243,661 | 40,908 | 20,051 | 38,480 |
| **1930*** | 3,001,479 | 47,321 | na | 43,225 | **1960** | 3,102,972 | 47,707 | 19,551 | 43,788 | **1990** | 3,258,795 | 40,864 | 20,265 | 36,678 |
| **1931** | 3,010,501 | 46,209 | na | 43,024 | **1961*** | 3,112,174 | 48,438 | 18,970 | 40,941 | **1991*** | 3,275,923 | 41,993 | 19,295 | 37,020 |
| **1932** | 3,011,021 | 43,937 | na | 43,424 | **1962** | 3,127,008 | 46,191 | 18,556 | 42,575 | **1992** | 3,293,352 | 41,108 | 18,469 | 36,592 |
| **1933** | 3,004,960 | 39,689 | na | 42,875 | **1963** | 3,152,486 | 48,386 | 18,893 | 44,975 | **1993** | 3,304,539 | 39,399 | 17,211 | 37,577 |
| **1934** | 2,997,023 | 38,243 | na | 40,218 | **1964** | 3,168,755 | 49,604 | 19,648 | 42,421 | **1994** | 3,312,888 | 38,038 | 16,513 | 36,383 |
| **1935** | 2,986,473 | 36,068 | na | 42,298 | **1965** | 3,173,495 | 48,245 | 19,747 | 44,473 | **1995** | 3,314,568 | 37,743 | 16,150 | 36,972 |
| **1936** | 2,979,375 | 35,321 | na | 42,347 | **1966** | 3,178,381 | 46,736 | 20,751 | 44,430 | **1996** | 3,320,805 | 38,723 | 15,968 | 36,924 |
| **1937** | 2,974,660 | 35,223 | na | 43,742 | **1967** | 3,181,297 | 44,942 | 21,005 | 43,812 | **1997** | 3,326,707 | 38,354 | 15,065 | 36,761 |
| **1938** | 2,968,766 | 37,219 | na | 43,360 | **1968** | 3,183,666 | 44,157 | 21,904 | 46,182 | **1998** | 3,332,454 | 37,905 | 14,492 | 37,126 |
| **1939** | 2,960,768 | 36,140 | na | 45,720 | **1969** | 3,159,225 | 44,933 | 23,192 | 45,346 | **1999** | 3,339,516 | 37,993 | 14,717 | 36,924 |
| **1940** | 2,857,092 | 29,768 | na | 51,003 | **1970*** | 3,169,324 | 44,888 | 23,793 | 44,299 | **2000** | 3,346,457 | 39,380 | 15,100 | 37,188 |
| **1941** | 2,834,604 | 26,680 | na | 46,094 | **1971** | 3,180,118 | 45,988 | 24,330 | 44,814 | **2001** | 3,358,560 | 39,014 | 14,151 | 36,750 |
| **1942** | 2,817,652 | 27,942 | na | 45,858 | **1972** | 3,192,010 | 44,809 | 24,598 | 43,715 | **2002** | 3,368,250 | 37,571 | 13,353 | 37,423 |
| **1943** | 2,808,996 | 32,220 | na | 42,726 | **1973** | 3,206,184 | 43,167 | 24,334 | 44,353 | **2003** | 3,380,498 | 37,517 | 13,184 | 37,786 |
| **1944** | 2,875,632 | 33,631 | na | 51,673 | **1974** | 3,213,398 | 40,936 | 24,418 | 43,129 | **2004** | 3,395,942 | 38,071 | 13,583 | 35,901 |
| **1945** | 2,856,661 | 35,426 | na | 48,452 | **1975** | 3,215,259 | 39,887 | 23,628 | 44,269 | **2005** | 3,413,978 | 38,604 | 13,788 | 36,691 |
| **1946** | 2,866,970 | 46,823 | na | 45,381 | **1976** | 3,223,594 | 39,392 | 23,387 | 44,006 | **2006** | 3,435,879 | 39,513 | 14,185 | 35,863 |
| **1947** | 2,940,085 | 47,327 | na | 44,936 | **1977** | 3,225,041 | 38,649 | 22,089 | 42,029 | **2007** | 3,456,775 | 39,441 | 14,270 | 35,863 |
| **1948** | 2,976,247 | 48,834 | na | 44,874 | **1978** | 3,227,443 | 38,350 | 21,767 | 42,436 | **2008** | 3,475,671 | 40,391 | 14,270 | 37,310 |
| **1949** | 2,971,837 | 47,455 | na | 45,356 | **1979** | 2,988,862 | 38,698 | 21,486 | 41,389 | **2009** | 3,498,384 | 40,196 | 14,137 | 36,743 |

*Sources:* Dufrasne (1943) and compilation of INS/NIS bulletins.
*Note:* *= Census figures.

**APPENDIX TABLE III-8:** Population, live births, marriages and deaths, Brussels (1920-2009)

| YEAR | POPULATION | LIVE BIRTH S | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTH S | MARRIAGES | DEATHS | YEAR | POPULATION | LIVE BIRTH S | MARRIAGES | DEATHS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1920*** | 1,077,642 | 20,796 | na | 13,676 | **1950** | 1,323,394 | 16,753 | na | 15,978 | **1980** | 1,000,221 | 12,622 | 5,728 | 13,317 |
| **1921** | 1,093,124 | 19,820 | na | 13,930 | **1951** | 1,327,214 | 16,817 | na | 16,423 | **1981*** | 994,774 | 12,556 | 5,551 | 13,184 |
| **1922** | 1,106,568 | 18,648 | na | 14,245 | **1952** | 1,333,746 | 17,038 | na | 15,785 | **1982** | 989,877 | 12,226 | 5,258 | 12,786 |
| **1923** | 1,117,342 | 18,589 | na | 13,609 | **1953** | 1,341,800 | 17,055 | na | 15,747 | **1983** | 982,434 | 11,904 | 5,018 | 13,168 |
| **1924** | 1,132,830 | 18,401 | na | 13,688 | **1954** | 1,352,068 | 18,100 | na | 16,315 | **1984** | 980,196 | 12,189 | 4,891 | 12,294 |
| **1925** | 1,147,694 | 17,783 | na | 14,190 | **1955** | 1,362,162 | 18,545 | na | 16,881 | **1985** | 976,536 | 11,970 | 4,774 | 12,729 |
| **1926** | 1,161,637 | 17,547 | na | 14,943 | **1956** | 1,371,816 | 18,867 | 9,825 | 17,074 | **1986** | 973,499 | 12,577 | 4,618 | 12,498 |
| **1927** | 1,174,788 | 16,514 | na | 14,782 | **1957** | 1,385,831 | 19,462 | 9,987 | 17,097 | **1987** | 970,346 | 12,684 | 4,520 | 12,043 |
| **1928** | 1,191,552 | 16,783 | na | 14,647 | **1958** | 1,398,326 | 19,806 | 9,698 | 16,917 | **1988** | 970,501 | 13,040 | 5,018 | 11,799 |
| **1929** | 1,204,937 | 16,892 | na | 17,099 | **1959** | 1,407,660 | 20,816 | 9,491 | 16,279 | **1989** | 964,385 | 13,306 | 5,910 | 12,158 |
| **1930*** | 1,204,590 | 17,563 | na | 15,514 | **1960** | 1,424,538 | 20,475 | 9,343 | 18,091 | **1990** | 960,324 | 13,582 | 6,032 | 11,475 |
| **1931** | 1,221,529 | 16,893 | na | 15,446 | **1961*** | 1,438,789 | 20,729 | 9,016 | 17,404 | **1991*** | 951,217 | 13,607 | 5,668 | 11,341 |
| **1932** | 1,234,695 | 16,579 | na | 15,791 | **1962** | 1,452,786 | 20,216 | 9,212 | 18,212 | **1992** | 950,339 | 13,630 | 5,275 | 11,205 |
| **1933** | 1,242,327 | 15,950 | na | 16,047 | **1963** | 1,040,523 | 14,389 | 6,530 | 14,140 | **1993** | 949,070 | 13,148 | 4,778 | 10,957 |
| **1934** | 1,245,600 | 15,388 | na | 14,496 | **1964** | 1,057,923 | 14,720 | 6,991 | 13,550 | **1994** | 951,580 | 13,195 | 4,768 | 10,905 |
| **1935** | 1,258,191 | 14,766 | na | 15,372 | **1965** | 1,065,921 | 15,006 | 7,219 | 14,147 | **1995** | 948,122 | 13,180 | 4,585 | 10,753 |
| **1936** | 1,267,188 | 14,890 | na | 15,469 | **1966** | 1,074,586 | 15,047 | 7,144 | 14,358 | **1996** | 950,597 | 13,333 | 4,356 | 10,458 |
| **1937** | 1,275,624 | 14,876 | na | 15,864 | **1967** | 1,079,181 | 14,759 | 6,961 | 14,315 | **1997** | 953,175 | 13,418 | 4,366 | 10,485 |
| **1938** | 1,281,293 | 15,406 | na | 16,141 | **1968** | 1,077,035 | 14,371 | 6,990 | 15,028 | **1998** | 954,460 | 13,509 | 4,270 | 10,380 |
| **1939** | 1,277,847 | 15,167 | na | 17,367 | **1969** | 1,073,111 | 14,201 | 7,370 | 14,889 | **1999** | 959,318 | 14,142 | 4,705 | 10,556 |
| **1940** | 1,274,411 | 13,333 | na | 17,904 | **1970*** | 1,075,136 | 14,694 | 7,113 | 14,529 | **2000** | 964,405 | 13,626 | 5,029 | 10,213 |
| **1941** | 1,265,341 | 11,967 | na | 18,805 | **1971** | 1,074,726 | 14,540 | 7,272 | 14,689 | **2001** | 978,384 | 14,513 | 4,768 | 10,176 |
| **1942** | 1,259,788 | 13,230 | na | 19,018 | **1972** | 1,069,005 | 14,264 | 7,132 | 14,215 | **2002** | 992,041 | 13,929 | 4,812 | 10,294 |
| **1943** | 1,260,697 | 15,797 | na | 16,798 | **1973** | 1,063,274 | 13,504 | 6,940 | 14,533 | **2003** | 999,899 | 14,668 | 5,302 | 10,343 |
| **1944** | 1,266,931 | 16,135 | na | 18,698 | **1974** | 1,054,970 | 12,676 | 6,828 | 14,056 | **2004** | 1,006,749 | 15,173 | 5,562 | 9,846 |
| **1945** | 1,282,438 | 15,976 | na | 18,211 | **1975** | 1,050,787 | 12,425 | 6,631 | 14,404 | **2005** | 1,018,804 | 15,492 | 5,307 | 9,697 |
| **1946** | 1,290,534 | 19,106 | na | 16,712 | **1976** | 1,042,052 | 12,418 | 6,520 | 14,165 | **2006** | 1,031,215 | 16,214 | 5,350 | 9,545 |
| **1947** | 1,299,925 | 18,097 | na | 16,601 | **1977** | 1,028,972 | 12,459 | 6,319 | 13,182 | **2007** | 1,048,491 | 17,495 | 5,372 | 9,151 |
| **1948** | 1,308,831 | 17,530 | na | 15,507 | **1978** | 1,015,710 | 12,395 | 5,859 | 13,361 | **2008** | 1,068,532 | 17,730 | 5,199 | 9,517 |
| **1949** | 1,317,042 | 16,880 | na | 15,952 | **1979** | 1,008,715 | 12,396 | 5,673 | 12,860 | **2009** | 1,089,538 | 18,176 | 5,070 | 9,434 |

*Sources:* Dufrasne (1943) and compilation of INS/NIS bulletins.

*Note:* *= Census figures; Brussels corresponds to the Brussels arrondissement until 1962.

**APPENDIX TABLE III-9:** Ability to read and write. Population aged 21 to 60, by gender and region, Belgium: Census 1947

| | MEN | | WOMEN | |
|---|---|---|---|---|
| **REGION** | **% literate** | **Total n** | **% literate** | **Total n** |
| **Flanders** | 97.63 | 1,030,397 | 97.77 | 1,042,271 |
| **Wallonia** | 97.53 | 785,948 | 98.09 | 760,809 |
| **Brussels** | 98.04 | 493,526 | 97.89 | 535,714 |
| **Belgium** | 97.68 | 2,309,871 | 97.90 | 2,338,794 |

*Source*: INS/NIS 1951a.

**APPENDIX TABLE III-10:** Education level of the population aged 14+ who are no longer enrolled in school, by gender and region, Belgium: Census 1961

| | | | MEN | | |
|---|---|---|---|---|---|
| **REGION** | **Primary** | **Incomplete Secondary** | **Upper secondary** | **Higher education** | **Total** |
| **Flanders** | 69.22 | 20.91 | 6.48 | 3.39 | 1,633,520 |
| **Wallonia** | 67.31 | 21.92 | 7.03 | 3.75 | 1,071,045 |
| **Brussels** | 55.24 | 25.22 | 12.23 | 7.31 | 502,117 |
| **Belgium** | 66.39 | 21.92 | 7.56 | 4.12 | 3,206,682 |
| | | | **WOMEN** | | |
| **REGION** | **Primary** | **Incomplete secondary** | **Upper secondary** | **Higher education** | **Total** |
| **Flanders** | 72.47 | 21.66 | 4.02 | 1.84 | 1,725,854 |
| **Wallonia** | 73.18 | 21.03 | 3.87 | 1.91 | 1,172,301 |
| **Brussels** | 61.31 | 29.10 | 6.48 | 3.10 | 597,480 |
| **Belgium** | 70.80 | 22.72 | 4.39 | 2.08 | 3,495,635 |

*Source:* INS/NIS 1966a.

*Notes:* incomplete higher education, artistic education and (completed) secondary are regrouped under 'upper secondary'; university and non-university higher education are regrouped under 'higher education'; Brussels = 'province of Brabant'.

**APPENDIX TABLE III-11:** Education level of the population aged 45-64 by gender and region, Belgium: Census 1970

| | MEN | | | | WOMEN | | | |
|---|---|---|---|---|---|---|---|---|
| **REGION** | **Low educated** | **Middle educated** | **High educated** | **Total** | **Low educated** | **Middle educated** | **High educated** | **Total** |
| **Flanders** | 73.10 | 20.84 | 6.07 | 475,555 | 78.73 | 17.21 | 4.07 | 498,544 |
| **Wallonia** | 67.53 | 25.18 | 7.30 | 334,530 | 75.81 | 19.57 | 4.61 | 358,530 |
| **Brussels** | 62.20 | 26.50 | 11.30 | 245,881 | 70.90 | 23.00 | 6.10 | 271,948 |
| **Belgium** | 68.79 | 23.53 | 7.68 | 1,055,966 | 75.92 | 19.35 | 4.73 | 1,129,022 |

*Sources*: for the distribution of education level (%): INS/NIS 1975; for the total population 45-64 in 1970 by gender and provinces: INS/NIS (1974b).
*Notes:* Low educated (= primary or less); Middle educated (=secondary: general, technical, professional or artistic); High educated (=university, teacher training college, college for further education). Brussels = 'province of Brabant'.

**APPENDIX TABLE III-12:** Women employment rate by age group and region, Belgium: Census 1947

| | AGE GROUPS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REGION** | **<15** | **15-19** | **20-24** | **25-29** | **30-34** | **35-39** | **40-44** | **45-49** | **50-54** | **55-59** | **60-64** | **65+** |
| **Flanders** | 0.9 | 42.2 | 41.6 | 28.6 | 23.5 | 22.9 | 22.0 | 20.0 | 18.0 | 15.9 | 12.6 | 5.5 |
| **Wallonia** | 1.0 | 38.3 | 33.7 | 25.5 | 23.8 | 23.5 | 22.2 | 20.0 | 18.0 | 15.7 | 11.8 | 5.0 |
| **Brussels** | 1.2 | 41.0 | 46.7 | 35.7 | 31.5 | 31.1 | 29.6 | 28.0 | 25.1 | 21.8 | 16.8 | 5.9 |

*Source:* INS/NIS (1966b).
*Note:* Brussels = 'province of Brabant'.

**APPENDIX TABLE III-13:** Frequency of marriage and its various endings for the birth cohorts 1892-1902 to 1946-1951, by gender, Belgium

| | MEN | | | | WOMEN | | | |
|---|---|---|---|---|---|---|---|---|
| **BIRTH COHORTS** | % ever married | % marriages ending in divorce | % marriages ending in widowhood | % marriages ending in death | % ever married | % marriages ending in divorce | % marriages ending in widowhood | % marriages ending in death |
| **1888-1892(a)** | 83.6 | 4.1 | 35.8 | 60.0 | 81.5 | 4.0 | 59.8 | 36.2 |
| **1893-1897(a)** | 83.1 | 4.5 | 35.0 | 60.5 | 82.5 | 4.2 | 60.1 | 35.7 |
| **1898-1902(a)** | 83.2 | 5.1 | 33.6 | 61.3 | 84.5 | 4.6 | 61.1 | 34.3 |
| **1903-1907(a)** | 84.1 | 5.7 | 33.2 | 61.1 | 86.1 | 5.4 | 60.8 | 33.8 |
| **1908-1912(a)** | 85.3 | 6.8 | 32.6 | 60.7 | 88.0 | 6.3 | 60.7 | 32.9 |
| **1913-1917(a)** | 87.5 | 7.9 | 32.3 | 59.8 | 89.0 | 7.6 | 60.6 | 31.8 |
| **1918-1922(a)** | 88.4 | 8.3 | 32.6 | 59.1 | 90.6 | 8.2 | 60.1 | 31.7 |
| **1923-1927(a)** | 88.9 | 8.8 | 31.8 | 59.4 | 92.6 | 8.5 | 59.5 | 32.0 |
| **1928-1932(a)** | 90.2 | 10.1 | 31.3 | 58.6 | 94.1 | 9.4 | 59.3 | 31.3 |
| **1933-1937(a)** | 89.7 | 11.7 | 30.7 | 57.6 | 94.4 | 11.1 | 58.2 | 30.7 |
| **1938-1942(a)** | 88.8 | 13.3 | 30.1 | 56.6 | 94.2 | 12.7 | 57.2 | 30.1 |
| **1943-1945(a)** | 88.4 | 14.6 | 29.7 | 55.7 | 94.1 | 14.0 | 56.4 | 29.7 |
| **1946-1951(b)** | 88.2 | Na | Na | Na | 94.7 | Na | Na | Na |
| **1952-1957(b)** | 89.6 | Na | Na | Na | 93.1 | Na | Na | Na |

*Sources:* **1888-1945:** Schoen *et al.* (1984): (a) ever married computed on those surviving to age 15; **1946-1957:** INS/NIS (2011) (b) ever married = 1-proportion of single for age group 50-54 in 2001 for birth cohorts 1946-1951 and in 2006 for birth cohorts 1952-1957.

**APPENDIX TABLE III-14:** Mean age at first marriage, by gender, Belgium

| BIRTH COHORTS | MEN | WOMEN |
|---|---|---|
| **1898-1902** | 26.4 | 24.6 |
| **1903-1907** | 26.3 | 24.1 |
| **1908-1912** | 26.4 | 23.9 |
| **1913-1917** | 26.5 | 24.4 |
| **1918-1922** | 26.1 | 24.2 |
| **1923-1927** | 25.7 | 23.6 |
| **1928-1932** | 25.2 | 23.0 |
| **1933-1937** | 24.8 | 22.6 |
| **1938-1942** | 24.5 | 22.4 |
| **1943-1945** | 24.2 | 22.3 |

*Source*: Schoen *et al.* (1984).

**APPENDIX TABLE III-15:** Final offspring of birth cohorts 1893-1902 to 1964, Belgium

| BIRTH COHORTS | MEAN NUMBER OF CHILDREN |
|---|---|
| **1900** | 2.05 |
| **1910** | 2.07 |
| **1915** | 2.13 |
| **1920** | 2.17 |
| **1925** | 2.21 |
| **1930** | 2.27 |
| **1935** | 2.24 |
| **1940** | 2.16 |
| **1945** | 1.93 |
| **1950** | 1.83 |
| **1955** | 1.83 |
| **1960** | 1.86 |
| **1964** | 1.79 |

*Sources*: **1893-1902 to 1925**: Festy (1979: 63); **1930 to 1964**: Sardon (2006).

**APPENDIX TABLE III-16:** Final offspring of marriage cohorts 1921-1925 to 1941-1945, by region, Belgium, Belgians only

| MARRIAGE COHORTS | REGION | | |
|---|---|---|---|
| | Flanders | Wallonia | Brussels |
| **1921-1925** | 2.72 | 1.78 | 1.67 |
| **1926-1930** | 2.65 | 1.78 | 1.61 |
| **1931-1935** | 2.65 | 1.77 | 1.62 |
| **1936-1940** | 2.65 | 1.81 | 1.71 |
| **1941-1945** | 2.54 | 1.91 | 1.72 |

*Source:* Jadin (1967).

**APPENDIX TABLE III-17:** Population by age group and gender in 1994, by region, Belgium, Belgians only

| | REGION | | | | | |
|---|---|---|---|---|---|---|
| | Flanders | | Wallonia | | Brussels | |
| AGE GROUPS | Men | Women | Men | Women | Men | Women |
| **0-4** | 168,165 | 160,485 | 101,054 | 96,334 | 20,235 | 19,475 |
| **5-9** | 161,478 | 153,550 | 97,584 | 93,023 | 17,006 | 15,995 |
| **10-14** | 173,828 | 164,518 | 94,295 | 89,966 | 16,268 | 15,535 |
| **15-19** | 169,596 | 161,941 | 94,884 | 90,824 | 15,465 | 15,580 |
| **20-24** | 191,648 | 184,438 | 103,697 | 100,132 | 20,367 | 21,690 |
| **25-29** | 215,802 | 207,486 | 102,626 | 101,653 | 24,600 | 25,372 |
| **30-34** | 227,714 | 221,091 | 107,669 | 110,163 | 23,191 | 23,933 |
| **35-39** | 216,512 | 210,679 | 106,002 | 109,846 | 21,372 | 22,774 |
| **40-44** | 199,056 | 192,589 | 104,486 | 106,693 | 20,564 | 22,612 |
| **45-49** | 188,295 | 184,013 | 96,432 | 98,921 | 20,235 | 22,760 |
| **50-54** | 151,091 | 151,552 | 67,885 | 72,314 | 16,277 | 18,586 |
| **55-59** | 159,125 | 164,116 | 71,371 | 78,659 | 16,627 | 19,634 |
| **60-64** | 155,775 | 168,069 | 76,775 | 88,443 | 17,706 | 22,689 |
| **65-69** | 132,644 | 152,859 | 70,198 | 89,134 | 17,270 | 24,239 |
| **70-74** | 104,116 | 133,076 | 56,375 | 81,624 | 16,141 | 25,349 |
| **75-79** | 52,154 | 80,395 | 26,581 | 46,659 | 8,296 | 16,283 |
| **80-84** | 42,233 | 79,797 | 20,181 | 46,083 | 7,124 | 17,060 |
| **85-89** | 17,888 | 44,398 | 8,202 | 26,248 | 3,159 | 10,360 |
| **90-94** | 4,844 | 15,100 | 2,169 | 9,108 | 946 | 3,996 |
| **95-99** | 809 | 2,685 | 283 | 1,622 | 144 | 806 |
| **100+** | 64 | 211 | 18 | 137 | 14 | 90 |
| **Total** | 2,732,837 | 283,3048 | 1,408,767 | 1,537,586 | 303,007 | 364,818 |

*Source:* INS/NIS (1994).

**APPENDIX TABLE III-18:** Living arrangement of the 65+, by region and age group, Belgium: Census 1991

| | REGION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Flanders | | | Wallonia | | | Brussels | | |
| **LIVING ARRANGEMENTS** | **65-74** | **75-84** | **85+** | **65-74** | **75-84** | **85+** | **65-74** | **75-84** | **85+** |
| | (n=465,362) | (n=290,651) | (n=77,508) | (n=287,083) | (n=167,585) | (n=45,302) | (n=87,293) | (n=60,611) | (n=19,286) |
| **Living alone** | 22.5 | 39.3 | 43.3 | 26.3 | 43.3 | 45.6 | 39.3 | 57.5 | 69.7 |
| **With partner (and children)** | 67.6 | 40.5 | 14.1 | 63.2 | 36.3 | 12.2 | 55.0 | 34.6 | 13.9 |
| **In intergenerational cohabitation** | 5.2 | 10.2 | 19.4 | 6.1 | 10.8 | 19.7 | 3.5 | 3.9 | 6.4 |
| **With other person(s)** | 3.0 | 3.6 | 4.5 | 2.9 | 3.7 | 5.1 | 1.5 | 1.4 | 1.4 |
| **In collective household** | 1.8 | 6.4 | 18.7 | 1.5 | 5.9 | 17.4 | 0.7 | 2.6 | 8.5 |

*Source*: de Koker *et al.* 2007, based on Census 1991

**APPENDIX TABLE III-19:** Proportion of 80+ in the population (by region) and dependency ratio, Belgium (1900-2060)

| | AGE GROUP (n) | | | DEPENDENCY RATIO (%) | |
|---|---|---|---|---|---|
| **YEAR** | **20-64** | **65+** | **80+** | **(65+/20-64)*100** | **(80+/20-64)*100** |
| **1900** | 3,512,001 | 414,262 | 47,592 | 12.00 | 1.00 |
| **1910** | 3,996,770 | 473,064 | 55,143 | 11.84 | 1.38 |
| **1920** | 4,341,668 | 480,414 | 54,140 | 11.07 | 1.25 |
| **1930** | 4,968,638 | 614,218 | 68,157 | 12.36 | 1.37 |
| **1947** | 5,199,258 | 909,889 | 111,857 | 17.50 | 2.15 |
| **1961** | 5,270,713 | 1,123,144 | 178,650 | 21.31 | 3.39 |
| **1970** | 5,354,724 | 1,295,708 | 203,825 | 24.20 | 3.81 |
| **1981** | 5,666,355 | 1,415,293 | 267,755 | 24.98 | 4.73 |
| **1990** | 6,002,620 | 1,474,059 | 345,478 | 24.56 | 5.76 |
| **2000** | 6,104,028 | 1,715,093 | 356,498 | 28.10 | 5.84 |
| **2007** | 6,333,343 | 1,810,062 | 483,639 | 28.58 | 7.64 |
| ***2010*** | 6,474,478 | 1,856,259 | 529,978 | 28.67 | 8.19 |
| ***2020*** | 6,703,241 | 2,220,166 | 637,574 | 33.12 | 9.51 |
| ***2030*** | 6,595,082 | 2,714,429 | 773,488 | 41.16 | 11.73 |
| ***2040*** | 6,550,889 | 3,054,009 | 1,036,283 | 46.62 | 15.82 |
| ***2050*** | 6,611,419 | 3,194,160 | 1,252,507 | 48.31 | 18.94 |
| ***2060*** | 6,655,904 | 3,326,205 | 1,313,752 | 49.97 | 19.74 |

*Sources*: 1900-1981: INS/NIS (1985); 1990-2007: INS/NIS (2011); 2010-2060: BFP/FPB & INS/NIS (2008).
*Note:* figures from 2010 are italicised because they are based on projections.

**APPENDIX TABLE III-20:** Marital status of the 75-84, by gender, Belgium (2001,2031)

| | MARITAL STATUSES (2001 and 2031) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | % Single | | % Married | | % Divorced | | % Widowed | |
| **GENDER** | **2001** | ***2031*** | **2001** | ***2031*** | **2001** | ***2031*** | **2001** | ***2031*** |
| **Men** | 5.60 | *6.18* | 67.16 | *64.48* | 2.61 | *11.78* | 24.63 | *17.57* |
| **Women** | 7.33 | *5.16* | 25.25 | *38.89* | 3.05 | *14.15* | 64.36 | *41.80* |

*Source*: Kalogirou & Murphy (2006).
*Note:* figures from 2031 are italicised because they are based on projections.

# *CHAPTER IV*

**APPENDIX FRAME IV-1:** Additional information on the **EB 1992, 1997, 2002, 2007**

**Data availability:** most of the EB data are available for free at http://zacat.gesis.org/webview/index.jsp [06/08/2010]. in few cases, the data are only available on individual request (with charge), the form can be completed at http://www.gesis.org/en/services/data/survey-data/eurobarometer-data-service/data-access/order-form-www/ [06/08/2010].

**More information:** Data and documentation related to the EB are archived at the GESIS center. See their website: http://www.gesis.org/en/services/data/survey-data/eurobarometer-data-service/news/. For more general Infor-mation: http://europa.eu.int/comm/public_opinion.

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**APPENDIX FRAME IV-2:** Additional information on the **PSBH 1992-2002**

**Data availability:** The data are free and available for external researcher. A request form can be completed on http://webhost.ua.ac.be/*psbh*/studiedag/commande_du_cd.html [17/07/2010].

**More information:** The publication "*Onze ans de vie en Belgique"* (Doutrelepont et al. 2004) includes studies on various themas (work, poverty, intergenerational relationships, etc.) based on the PSBH. The methodology of the survey is presented in the first book chapters. A list of the other PSBH publications can be consulted on line at http://www.psbh.ulg.ac.be/index.htm (in French) or at http://www.psbh.be (in Dutch). The two website have the same contents (methodological reports, interviewer guidelines, questionnaires, preliminary tests, newsletters, and formats to apply to the variables, data bank of questions and related variables over waves – the QNFE).

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**APPENDIX FRAME IV-3:** Additional information on the **ECHP 1994-2001**

**Data availability:** The ECHP data can be purchased for research purpose. More information on http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/documents/EN-ECHP-MICRODATA.pdf [17/07/2010]

**More information:** For technical information on ECHP (variables description, methodological reports, etc.) see http://circa.europa.eu/irc/dsis/echpanel/info/data/information.html [17/07/2010]; for research publications and users forum, see http://epunet.essex.ac.uk/echp.php [17/07/2010]. More information on the SILC (which is the continuation of the ECHP) can be found at: http://epp.eurostat.ec.europa.eu/portal/page/portal/living_conditions_and_social_protection/introduction/income_social_inclusion_living_conditions [17/07/2010]

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**APPENDIX FRAME IV-4:** Additional information on the **Census 2001**

**Data availability:** Data from the Census 2001 can be purchase for research purpose. However the access conditions are very strict and the process can be quite long.

**More information:** Deboosere et al. (2006) give a descriptive analysis of the questions on health and informal care asked in the Census 2001. This monography and others can be downloading at http://statbel.fgov.be/fr/statistiques/collecte_donnees/census/2001/index.jsp (in French) [28/08/2010] http://statbel.fgov.be/nl/statistieken/gegevensinzameling/census/2001/index.jsp (in Dutch) [28/08/2010].For the census 2011, go on http://statbel.fgov.be/fr/statistiques/collecte_donnees/census /census_2011/index.jsp [17/07/2010].

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**APPENDIX FRAME IV-5:** Questions on care available in the **Census 2001** (original version) [1]

**Informal care provided (individual questionnaire, French version)**

***4a.*** *Apportez-vous au moins une fois par semaine, en dehors de votre profession, une aide ou des soins à une ou plusieurs personnes ayant une maladie, affection ou handicap durable (ex. mobilité réduite)? (OUI/NON)*

***4b.*** *Si OUI, cette ou ces personnes sont (cochez plusieurs cases si nécessaire)*
*- membre(s) de votre ménage*
*- membre(s) de la famille n'appartenant pas à votre ménage*
*- voisin(s)*
*- ami(s), connaissance(s), etc.*

***4c.*** *Si OUI, combien de temps consacrez-vous à cette aide ou à ces soins?*
*Au moins une fois par semaine (mais pas tous les jours)*
*- tous les jours, moins de 30 minutes*
*- tous les jours, de 30 minutes à moins de 2 heures*
*- tous les jours, de 2 à moins de 4 heures*
*- tous les jours, 4 heures ou plus*

**Informal care provided (individual questionnaire, Dutch version)**

***4a.*** *Staat u tenminste een keer per week niet-beroepsmatig in voor hulp of verzorging van één of meerdere personen met langdurige ziekten, aandoeningen of handicaps (bv. Beperkte mobiliteit)? (JA/NEE)*

***4b.*** *Indien JA,deze persoon of personen zijn (kruis indien nodig meerdere vakken aan)*
*- iemand uit het huishouden*
*-familielid(leden), niet behorend tot het huishouden*
*- buur (buren)*
*- vriend(enà, kennis(sen), enz.*

***4c.*** *Indien JA, hoeveel tijd besteedt u gewoonlijk aan deze hulp of verzorging?*
*- minstens een keer per week (maar niet elke dag)*
*- dagelijks, minder dan 30 minuten*
*- dagelijks, van 30 minuten tot minder dan 2 uur*
*- dagelijks, van 2 uur tot minder dan 4 uur*
*- dagelijks, 4 uur of meer*

**Other information on care:** no

*Source:* INS/NIS (2001a,b)

[1] Questionnaire also available in German

**APPENDIX FRAME IV-6:** Additional information on the **HIS 2004, 2008**

**Data availability:** Researchers can purchase the HIS data (more information on http://www.iph.fgov.be/epidemio/epifr/crospfr/hisfr/his04fr/aanvraagformulier_fr.pdf [13/08/2010])

**More information:** main results, methodological reports, and bibliography, etc. can be consulted the ISP/VIW website http://www.iph.fgov.be/epidemio/epifr/index4.htm. [13/08/2010]
Moreover, it is possible to do interactive analyses for free on this website.

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**APPENDIX FRAME IV-7:** Additional information on the **SHARE 2004-2006**

**Data availability:** the SHARE data are available for free. Researchers who want to use then have just to fill-in a form at http://www.share-project.org/ [18/07/2010]. Newsletters and messages posted on the general website inform the users on updated or availability of 'generated variables' (e.g. imputed variables).

**More information:** main results for the first two waves, methodological reports, newsletters and international conferences information can be found on the general website http://www.share-project.org [18/07/2010]. Each country has one own website including information on national users meeting and other country specific aspects. For Belgium, go to http://www.share-project.be [18/07/2010].

**More information on SHARELIFE** at http://www.share-project.org/sharelife/ [18/07/2010]

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**APPENDIX FRAME IV-8:** Additional information on the **LFS 2001**

**Data availability:** external researchers can purchase the data. More information on http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/documents/EN-LFS-MICRODATA.pdf [20/07/2010]

**More information on the LFS:** see http://circa.europa.eu/irc/dsis/employment/info/data/eu_lfs/index.htm [20/07/2010]

**References:**

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**APPENDIX FRAME IV-9:** Questions on care available in the **LFS 2005** (original version) [2]

**Care provided asked (adhoc module added to the individual questionnaire, French version)**

A compléter pour chaque membre du ménage âgé de 15 à 64 ans.
**95.** M_ s'occupe t-il / elle régulièrement d'autres enfants ou de personnes dépendantes (malades, handicapées, âgées) de 15 ans et plus ?

- Oui, d'autres enfants de moins de 15 ans
- Oui, de membres de la famille ou amis de 15 ans ou plus ayant besoin d'aide ou de soins
- Oui, d'autres enfants de moins de 15 ans et de parents/ amis de 15 ans et plus ayant besoin d'aide ou de soins
- Non

**Care provided asked (adhoc module added to the individual questionnaire, Dutch version)**

In te vullen voor alle personen van minstens 15 jaar en jonger dan 65 jaar:
**95.** Zorgt M_ regelmatig voor andere kinderen jonger dan 15 jaar of voor zorgbehoevende (zieke, gehandicapte, oudere) familieleden / vrienden van 15 jaar of ouder ?

- Ja, voor andere kinderen jonger dan 15 jaar
- Ja, voor zorgbehoevende familieleden of vrienden van 15 jaar of ouder
- Ja, voor andere kinderen jonger dan 15 jaar en voor zorgbehoevende familieleden / vrienden van 15 jaar of ouder
- Neen

*Source:* European Commission Eurostat (2009a)

**APPENDIX FRAME IV-10:** Additional information on the **GGPS 2008/09**

**Data availability**: more information on http://www.ggp-i.org/data/data-access.html [13/08/2010]

**More information on the GGPS project:** the general website of the UNECE provides information on the context and the objectives of the project and first publications and documentation can be downloaded on this site: http://www.unece.org/pau/ggp/Welcome.html [21/07/2010]. For information on the data collected (see http://www.ggp-i.org/ [21/07/2010]), for information on the Belgian GGPS can be found on the INS/NIS w*eb* page, http://statbel.fgov.be/fr/statistiques/collecte_donnees/enquetes/ggps/index.jsp [13/08/2010]

**References:**

INS/NIS, PSF/FW, Vlaamse overheid, IWEPS (2008). *Enquête Générations et Genre: Questionnaire (vague 1 – 2008).* Non publié.

**APPENDIX FRAME IV-11:** Additional information on the **CRIV° 1992**

**Data availability**: the data can be used with the agreement of the authors: contact Xavier.leroy@uclouvain.be

**More information on the data:** There is not website on the survey. The main results are presented in Leroy & Neirynck (1994).

**References:**

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[2] Questionnaire also available in German

**APPENDIX FRAME IV-12:** Questions on at-home elderly care available in the **CRIV° (1992)** (original version)

| **Questions sur l'aide reçue (peut provenir d'aidants formels ou informels)**<br>**22.** Capacités et incapacités dans la vie quotidienn | | | |
|---|---|---|---|
| | Pourquoi y-a-t-il un problème ? | Quelles sont les personnes aidantes ? | Combien de fois aident-elles ? |
| **22.1** Faites vous votre toilette quotidienne seul(e) ?(1) | | | |
| **22.2** Vous habillez-vous seul€ ? (1) | | | |
| **22.3** Vous levez-vous de votre lit ou de votre fauteuil et vous déplacez-vous seul(e) à l'intérieur? (1) | | | |
| **22.4** Vous débrouillez-vous seul(e) aux toilettes ? (1) | | | |
| **22.5** Vous nourrissez-vous seul(e) (manger et boire) ? (1) | | | |
| **22.6** Sortez-vous de votre habitation seul(e) ou accompagné(e) et jusqu'où ?<br>**1.** Sorties illimitées<br>**2.** Sorties limitées au voisinage<br>**3.** Déplacement limités à l'intérieur de la maison<br>**4.** Déplacement limités à la chambre | | | |
| **22.7** Préparez-vous vos repas seul(e)?(2) | | | |
| **22.8** Habituellement, où prenez-vous vos repas principaux ?<br>**1.** Chez vous<br>**2.** Chez l'un de vos proches<br>**3.** Dans un home ou restaurant pour personnes âgées<br>**4.** Dans un restaurant commercial<br>**5.** Autre : … | | | |
| **22.9** Vous occupez-vous seul(e) de l'entretien quotidien de la maison ? (2) | | | |
| **22.10** Vous occupez-vous seul(e) de l'entretien hebdomadaire de la maison ? (2) | | | |
| **22.11** Faites-vous vos courses vous-même ? (2) | | | |
| **22.12** *Si vous ne pouvez pas faire vos courses vous-même,* faites-vous la liste des courses ?<br>**1.** Vous-même<br>**2.** Avec la personne qui vous aide (cohabitante)<br>**3.** Avec la personne qui vous aide (non-cohabitante)<br>**4.** Vous n'y participez pas du tout | | | |
| **23. Avez-vous besoin d'aide …** | | | |
| | Pourquoi y-a-t-il un problème ? | Quelles sont les personnes aidantes ? | Combien de fois aident-elles ? |
| **23.1** Pour vos soins des pieds | | | |
| **23.2** Pour remplir vos papiers administratifs | | | |
| **23.3** Pour s'occuper des paiements que vous devez effectuer | | | |
| **23.4** Pour le chauffage | | | |
| **23.5** Pour les petites réparations dans la maison ou travaux à l'extérieur | | | |
| **Questions sur les services d'aide à domicile :**<br>Parmi les services suivant, pourriez-vous nous dire ceux que vous connaissez et ceux dont vous avez déjà bénéficié ?<br>**1.** Service 'repas chauds à domicile'…(3)<br>'Restaurant pour PA ou sans but lucratif …(3)<br>**2.** Service d'aides familiales (aide senior) (A.F.) …(3)<br>Services d'aides ménagères (A.M.) …(3) | | | |

Femme de ménage privée …(3)
**3.** Infirmièr(e) …(3)
**4.** Service télé assistance…(3)
**5.** Service aménagement des locaux, dépannage…(3)
**6.** Service de prêt de matériel…(3)
**7.** Service de garde ('malade', de nuit, de jour) …(3)
**8.** Maison de repos pour un 'court séjour'…(3)

(1) **1.**Oui, sans aide ; **2.** Oui, moyennant stimulation ou préparation ; **3.** Non, besoin d'aide partielle ; **4.** Non, aide complète.
(2) **1.** Oui, sans aide ou pourrait le faire ; **2.** Non, besoin d'aide partielle ; **4.** Non, aide complète
(3) **1.** Y a recours actuellement ; **2.** Y a déjà eu recours dans le passé mais plus actuellement ; **3.** Connu mais jamais utilisé ; **4.** Ne connait pas le service.

**APPENDIX FRAME IV-13:** Additional information on the **LOVO 2001/2002**

**Data availability**: The LOVO data are available to external researchers (free of charge). More information can be found at www.kenniscentrumwvg.be [30/07/2010]

**More information:** There is no specific website. The main results are presented in Jacobs et al. (2004a) and Deven & Jacobs (2006).

**References:**


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Vanden Boer, L. (2006). Tien vragen over zorg, vanuit ouderenperspectief. In Deven, F., Jacobs, T. (red.). *Vooruitdenken over zorg in Vlaanderen*. Antwerpen/Apeldoorn, Garant: 225-245.

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**APPENDIX FRAME IV-14:** Additional information on the MVE° and the ZVE° 2003

**Data availability:** No specific policy has been defined (to make the data available or not). More information for individual research use can be asked to lut.vandenboer@wvg.vlaanderen.be

**More information:** There is no a specific website for the surveys. Main descriptive results can be found in Jacobs & Lodewijckx (2004) and multivariate results in Jacobs & Lodewijckx (2006).

**References:**


CBGS (2003a). *Questionnaire 'Care in Flanders': Postal survey of respondents aged 25 to 64*. Brussels, CBGS. Niet gepubliceerd.

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Jacobs, T., Lodewijckx, E. (red.) (2004). *Zicht op zorg: Studie van de mantelzorg in Vlaanderen in 2003*. CBGS-Werkdocument 2004/11, CBGS, Brussel, België.

Vanbrabant, A. (2006). Portret van geregistreerde mantelzorgers. In Jacobs, T., Lodewijckx, E. (red.). *Grenzen aan mantelzorg: Sociaaldemografische hypothesen over de toekomst van de zorg*. Antwerpen/Apeldoorn, Garant: 127-160.

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**APPENDIX FRAME IV-15:** Additional information on the FRB/KBS° 2006

**Data availability:** the data are not available for external researchers

**More information:** see
http://www.kbs-frb.be/publication.aspx?id=219398&LangType=2060 [13/08/2010]

**References:**


Casman, M.-T., dir. (2007). *Écouter les aidants proches pour mieux les soutenir : Aperçus quantitatif et qualitatif de la question,* Bruxelles, FRB/KBS. Disponible en ligne : http://www.kbs-frb.be/uploadedFiles/KBS-FRB/05)_Pictures,_documents_and_external_sites/09)_Publications/PUB2007_1754_EcouterLesAidants_Proches.pdf [consulté le03/06/2009].

ULg, FRB/KBS (2006). *Questionnaire relatif aux aidants proches.* Enquête postale réalisée par l'ULg à la demande de la FRB/KBS dans le cadre de l'action 'Aider les aidants proches' de 2006. Non publié.

**APPENDIX FRAME IV-16:** Questions on care available in the **FRB/KBS° 2006** (original version)

**Definition of the *'aidant proche' :*** *L'aidant proche est « un intervenant non professionnel auprès d'une personne fragilisée de son entourage qui, en raison d'une maladie et/ou d'une déficience physique, mentale ou psychique, requiert une disponibilité permanente et souvent aussi une assistance personnalisée pour les actes de la vie quotidienne ».*

**Identification of the *'personne aidée'* :** *Un individu peut venir en aide à plusieurs personnes dépendantes ou limitées dans leurs activités quotidiennes. Pouvez-vous remplir le questionnaire en ne tenant compte que de la personne pour qui vous intervenez le plus souvent.*

***1.*** *La personne aidée est-elle :*
*- Votre enfant*
*- Votre petit-enfant*
*- Votre conjoint(e) ou compagnon (compagne)*
*- L'un de vos parents*
*- L'un de vos beaux-parents*
*- Votre frère ou soeur*
*- Autre personne de la famille (Précisez)*
*- Autre personne extérieure à la famille (Précisez)*

***2.*** *Cette personne fait-elle partie du ménage ? (réponse: Oui/Non)*
*[Si 2=Non]*

***3.*** *La personne aidée vit-elle :*
*- Seule*
*- Avec un ou des membre(s) de sa famille*
*- Avec une ou des personne(s) extérieure(s) à sa famille*
*- En institution*
*- Autre (Précisez)*

***4.*** *De quel sexe est la personne à qui vous venez en aide ? : (réponse: Masculin/Féminin)*

***5.*** *Quel est l'âge de la personne à qui vous venez en aide ?*

***9.*** *Quelles tâches prenez-vous en charge ?*

| | *Totalement* | *Partiellement* | *Pas du tout* |
|---|---|---|---|
| *- Des soins personnels, c'est-à-dire pour s'habiller, se laver, manger, entrer ou sortir du lit, aller aux toilettes* | | | |
| *- Une aide ménagère, c'est-à-dire pour faire des petits travaux tels que de la réparation, du jardinage, des déplacements, des courses ou des tâches ménagères* | | | |
| *- Une aide relative aux tâches administratives, telle que remplir des formulaires, régler des questions financières ou juridiques* | | | |

***10.*** *Combien d'heures par semaine consacrez-vous en moyenne à vous occuper de la personne ?*

**At-home care services used (in addition to informal care)**

**18.** *A quel(s) service(s) d'aide professionnelle(s) avez-vous recours (de façon régulière)*
*- Soins médicaux (Réponse: Oui/Non)*
*- Services de soins infirmiers (Réponse: Oui/Non)*
*- Kinésithérapie (Réponse: Oui/Non)*
*- Logopédie (Réponse: Oui/Non)*
*- Services de gardes malades (Réponse: Oui/Non)*
*- Services de soins à domicile (ex : toilette) (Réponse: Oui/Non)*
*- Coordination d'aide et de soins à domicile (Réponse: Oui/Non)*
*- Equipe de soins palliatifs (Réponse: Oui/Non)*
*- Assistant sociaux (Réponse: Oui/Non)*
*- Psychologue (Réponse: Oui/Non)*
*- Service de concertation psycho-médico-sociaux-PMS (Réponse: Oui/Non)*
*- Autre (Précisez) (Réponse: Oui/Non)*

**Other information on care:** no

*Source:* ULg & FRB/KBS (2006)

**APPENDIX FRAME IV-17:** Additional information on the **SCV 2008**

**Data availability:** contact the research team or go on the website http://www.gelijkekansenportaal.be/doc/databankengids/sociaal-culturele-verschuivingen-in-vlaanderen-scv-international-social-survey-programme-issp/

**More information:** on the website abovementioned or read the report of Vanderleyden & Moons (2010).

**References:**

Vanderleyden, L., Moons, D. (2010). *Informele zorg in Vlaanderen*. SVR report n° 2010/3. Brussel, Studiedienst van de Vlaamse Regering. Online beschikbaar: http://www4.vlaanderen.be/dar/svr/publicaties/Publicaties/ svr-studies/2010-06-23-svrrapport2010-3-informele-zorg.pdf [referentie van 20/07/2010].

**APPENDIX FRAME IV-18:** Question on care available in the **SCV 2008**

**Informal care provided**

*Hoe dikwijls heeft u tijdens de afgelopen 12 maanden zieke, gehandicapte of bejaarde familieleden, kennissen of buren geholpen of verzorgd? (nooit, één keer per jaar, meerdere keren per jaar, maandelijks, meerdere keren per maand, wekelijks, dagelijks).*

*Source:* Vanderleyden & Moons (2009:4-5)

## *CHAPTER V*

**APPENDIX TABLE V-1:** Reasons for 'not reached' households at the baseline (1992), by region

| | REGION | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Belgium** | | **Flanders** | | **Wallonia** | | **Brussels** | |
| **REASONS FOR BEING 'NOT REACHED'** | n | % | n | % | N | % | n | % |
| **Address information** | | | | | | | | |
| Nobody lives there | 96 | 5.12 | 19 | 4.95 | 41 | 6.26 | 36 | 4.31 |
| Other people live there | 235 | 12.54 | 32 | 8.33 | 84 | 12.82 | 119 | 14.25 |
| People have moved out | 311 | 16.60 | 63 | 16.41 | 80 | 12.21 | 168 | 20.12 |
| **Absence** | | | | | | | | |
| Temporarily absent | 190 | 10.14 | 61 | 15.89 | 46 | 7.02 | 83 | 9.94 |
| Never at home | 534 | 28.50 | 165(*) | 42.97 | 128 | 19.54 | 241 | 28.86 |
| **Reliability** | | | | | | | | |
| Not reliable | 495 | 26.41 | 39 | 10.16 | 273 | 41.68 | 183 | 21.92 |
| The interviewer knows the respondent(s) | 3 | 0.16 | 3 | 0.78 | 0 | 0.00 | 0 | 0.00 |
| Language problem | 4 | 0.21 | 2 | 0.52 | 0 | 0.00 | 2 | 0.24 |
| **Other reasons**(*) | 6 | 0.32 | 0 | 0.00 | 3 | 0.46 | 3 | 0.36 |
| **Total non-responses** | 1,874 | | 384 | | 655 | | 835 | |

*Source:* based on Jacobs & Marynissen 1993: 23

*Notes*: In order to find the same totals as those observed in table V-1 under '5. not-reached', two corrections were brought to the initial table: as the non-response total was lower than in table V-1 for Brussels and Wallonia, an additional category 'other reasons' was added. The second correction (*) concerns the number of 'never at home' in Flanders: when summing the number of each 'non-response' reason over the three regions, the results correspond to the numbers observed for Belgium except for the 'never at home'. In this case, the sum made over the regions was higher. The problem seems to be in Flanders because, in this region, the total non-responses was also too high (compared to table V-1). Therefore, the number of 'never at home' in Flanders was corrected to reach the right total (241 become 165).

**APPENDIX TABLE V-2:** Belgians born before 1930 by region and gender

| | REGION | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Belgium** | | **Flanders** | | **Wallonia** | | **Brussels** | |
| **GENDER** (Region=100%) | **Census 1991** (n=1,728,905) | **PSBH 1992** (n=1,123) | **Census 1991** (n=990,666) | **PSBH 1992** (n=520) | **Census 1991** (n=560,619) | **Census 1991** (n=990,666) | **PSBH 1992** (n=520) | **Census 1991** (n=560,619) |
| **Man** | 40.68 | 43.72 | 42.25 | 43.33 | 39.28 | 42.25 | 43.33 | 39.28 |
| **Woman** | 59.32 | 56.28 | 57.75 | 56.67 | 60.72 | 57.75 | 56.67 | 60.72 |
| **BOTH GENDER** (Belgium =100%) | 100.00 | 100.00 | 57.30 | 45.41 | 32.43 | 57.30 | 45.41 | 32.43 |

**APPENDIX TABLE V-3:** Belgians born before 1930 by cohort, gender and region (a given gender and region= 100%)

| PSBH 1992 | Men, Flanders (n=221) | Men, Wallonia (n=199) | Men, Brussels (n=71) | Men, all (n=491) | Women, Flanders (n=289) | Women, Wallonia (n=266) | Women, Brussels (n=77) | Women, all (n=632) |
|---|---|---|---|---|---|---|---|---|
| **1925-1929** | 35.29 | 38.19 | 40.85 | 37.27 | 30.45 | 33.46 | 23.38 | 30.85 |
| **1920-1924** | 33.48 | 31.16 | 25.35 | 31.36 | 26.64 | 33.83 | 32.47 | 30.38 |
| **1915-1919** | 11.76 | 18.59 | 15.49 | 15.07 | 19.38 | 18.05 | 14.29 | 18.20 |
| **1910-1914** | 14.93 | 9.05 | 14.08 | 12.42 | 13.84 | 8.27 | 19.48 | 12.18 |
| **Before 1910** | 4.52 | 3.02 | 4.23 | 3.87 | 9.69 | 6.39 | 10.39 | 8.39 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| **Census 1991** | **Men, Flanders** (n=418,515) | **Men, Wallonia** (n=220,186) | **Men, Brussels** (n=64,692) | **Men, all** (n=703,393) | **Women, Flanders** (n=572,151) | **Women, Wallonia** (n=340,433) | **Women, Brussels** (n=119,928) | **Women, all** (n=1,025,512) |
| **1925-1929** | 33.84 | 34.45 | 29.60 | 33.64 | 27.52 | 26.95 | 22.46 | 26.77 |
| **1920-1924** | 28.06 | 29.47 | 28.78 | 28.56 | 24.81 | 25.77 | 24.32 | 25.08 |
| **1915-1919** | 14.94 | 14.71 | 15.60 | 14.93 | 15.30 | 14.99 | 15.79 | 15.25 |
| **1910-1914** | 13.71 | 12.87 | 15.08 | 13.57 | 16.77 | 16.46 | 18.46 | 16.85 |
| **Before 1910** | 9.46 | 8.50 | 10.94 | 9.30 | 15.60 | 15.84 | 18.97 | 16.05 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

**APPENDIX TABLE V-4:** Belgians born before 1930 by education level, gender and region (a given gender and region= 100%)

| PSBH 1992 | Men, Flanders (n=221) | Men, Wallonia (n=199) | Men, Brussels (n=71) | Men, all (n=491) | Women, Flanders (n=289) | Women, Wallonia (n=266) | Women, Brussels (n=77) | Women, all (n=632) |
|---|---|---|---|---|---|---|---|---|
| **Primary or less** | 56.11 | 33.17 | 22.54 | 41.96 | 61.25 | 45.11 | 23.38 | 49.84 |
| **Lower** | 17.65 | 20.10 | 18.31 | 18.74 | 18.69 | 27.82 | 29.87 | 23.89 |
| **Upper** | 17.65 | 22.61 | 35.21 | 22.20 | 13.49 | 16.54 | 29.87 | 16.77 |
| **Higher** | 8.60 | 24.12 | 23.94 | 17.11 | 6.57 | 10.53 | 16.88 | 9.49 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| **Census 1991** | **Men, Flanders** (n=418,515) | **Men, Wallonia** (n=220,186) | **Men, Brussels** (n=64,692) | **Men, all** (n=703,393) | **Women, Flanders** (n=572,151) | **Women, Wallonia** (n=340,433) | **Women, Brussels** (n=119,928) | **Women, all** (n=1,025,512) |
| **Primary** | **67.56** | **57.09** | **40.42** | 61.78 | **73.86** | **66.90** | **48.70** | 68.78 |
| **Lower** | **9.65** | **16.43** | **12.98** | 12.08 | **8.02** | **14.17** | **13.45** | 10.66 |
| **Upper** | **10.06** | **11.73** | **15.22** | 11.06 | **6.40** | **6.31** | **11.64** | 6.95 |
| **Higher** | **6.37** | **8.38** | **16.16** | 7.90 | **3.92** | **4.48** | **7.57** | 4.51 |
| **Invalid** | **6.36** | **6.37** | **15.21** | 7.18 | **7.80** | **8.14** | **18.63** | 9.10 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

**APPENDIX TABLE V-5:** Belgian born before 1930 by marital status, gender and region (a given gender and region= 100%)

| PSBH 1992 | Men, Flanders (n=221) | Men, Wallonia (n=199) | Men, Brussels (n=71) | Men, all (n=491) | Women, Flanders (n=289) | Women, Wallonia (n=266) | Women, Brussels (n=77) | Women, all (n=632) |
|---|---|---|---|---|---|---|---|---|
| **Married** | **75.57** | **76.88** | **71.83** | 75.56 | **50.52** | **45.86** | **37.66** | 46.99 |
| **Separated** | **0.45** | **1.01** | **1.41** | 0.81 | **1.38** | **0.75** | **3.90** | 1.42 |
| **Divorced** | **0.45** | **2.51** | **7.04** | 2.24 | **1.73** | **2.63** | **6.49** | 2.69 |
| **Widowed** | **17.65** | **15.08** | **18.31** | 16.70 | **42.21** | **45.86** | **42.86** | 43.83 |
| **Single** | **5.88** | **4.52** | **1.41** | 4.68 | **4.15** | **4.89** | **9.09** | 5.06 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| **Census 1991** | **Men, Flanders** (n=418,515) | **Men, Wallonia** (n=220,186) | **Men, Brussels** (n=64,692) | **Men, all** (n=703,393) | **Women, Flanders** (n=572,151) | **Women, Wallonia** (n=340,433) | **Women, Brussels** (n=119,928) | **Women, all** (n=1,025,512) |
| **Married** | **75.76** | **75.03** | **72.99** | 75.27 | **45.99** | **40.29** | **36.32** | 43.03 |
| **Separated** | **0.03** | **0.13** | **0.13** | 0.07 | **0.02** | **0.08** | **0.09** | 0.05 |
| **Divorced** | **2.07** | **3.54** | **5.87** | 2.88 | **2.05** | **3.29** | **7.74** | 3.09 |
| **Widowed** | **15.20** | **15.18** | **14.70** | 15.15 | **43.88** | **50.55** | **46.49** | 46.38 |
| **Single** | **6.94** | **6.12** | **6.31** | 6.63 | **8.05** | **5.80** | **9.36** | 7.45 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

**APPENDIX TABLE V-6:** Attrition of the study sample over waves by attrition reason (initial n=1,123)

| | ATTRITION REASON (n) | | | | | |
|---|---|---|---|---|---|---|
| **WAVES** | **Non-attritor** | **Refusal** | **Sick** | **Institutionalised** | **Death** | **Other reason** |
| **W3** (1994) | 1,123 | 0 | 0 | 0 | 0 | 0 |
| **W4** (1995) | 1003 | 54 | 6 | 7 | 36 | 17 |
| **W5** (1996) | 910 | 43 | 13 | 7 | 19 | 11 |
| **W6** (1997) | 777 | 60 | 11 | 7 | 34 | 21 |
| **W7** (1998) | 691 | 20 | 14 | 7 | 23 | 22 |
| **W8** (1999) | 614 | 25 | 11 | 10 | 29 | 2 |
| **W9** (2000) | 550 | 19 | 16 | 6 | 15 | 8 |
| **W10** (2001) | 473 | 19 | 14 | 5 | 27 | 12 |
| **W11** (2002) | 420 | 21 | 10 | 2 | 13 | 7 |

**APPENDIX TABLE V-7:** Proportion of respondents having already received family care by attrition status (includes only respondents having ever received family care).

| | ATTRITION STATUS | |
|---|---|---|
| | **Non-attritors** | **Attritors** |
| **WAVES** | (n=173) | (n=208) |
| **W3** (1994) | 32.95 | 46.15 |
| **W4** (1995) | 47.40 | 62.50 |
| **W5** (1996) | 58.38 | 70.67 |
| **W6** (1997) | 74.57 | 88.46 |
| **W7** (1998) | 75.14 | 90.87 |
| **W8** (1999) | 83.24 | 97.60 |
| **W9** (2000) | 90.17 | 98.56 |
| **W10** (2001) | 93.64 | 100.00 |
| **W11** (2002) | 100.00 | 100.00 |

# *CHAPTER VI*

**APPENDIX TABLE VI-1:** Observed combination of daughters and sons

| NUMBER OF DAUGHTERS | NUMBER OF SONS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **Total** |
| **0** | 191 | 105 | 62 | 22 | 13 | 0 | 2 | 0 | 0 | 395 |
| **1** | 153 | 110 | 72 | 24 | 2 | 9 | 2 | 0 | 1 | 373 |
| **2** | 88 | 54 | 41 | 15 | 8 | 2 | 0 | 0 | 0 | 208 |
| **3** | 31 | 28 | 18 | 9 | 2 | 6 | 1 | 2 | 0 | 97 |
| **4** | 11 | 3 | 6 | 2 | 8 | 1 | 4 | 0 | 0 | 35 |
| **5** | 1 | 4 | 3 | 0 | 2 | 1 | 0 | 0 | 0 | 11 |
| **6** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **7** | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| **10** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **Total** | 476 | 306 | 203 | 72 | 35 | 19 | 9 | 2 | 1 | 1123 |

**APPENDIX FRAME VI-1:** Specific cases of imputation of care provided by non-cohabiting children

1. **No care from non-cohabitant is declared for more than two consecutive waves but cohabitant care is declared at least at one of these waves** (e.g. ADL care from non-cohabitant is declared at waves 4 and 8 and spouse care is declared at waves 5, 7 and 8), **if there are children meeting the visit frequency criterion at waves 5, 7 and/or 8, ADL care is imputed.**
2. **The available values of non-cohabitant care varies over waves** (e.g. non-cohabitant care for IADL is declared at wave 4 and non-cohabitant care for IADL+ADL is declared at wave 8), the imputed value depends on the child visit frequency (e.g. children visiting the parent often enough to provide IADL and ADL care then (*C-CONTACT*=1 or *C-CONTACT* =2 with possibility of sharing care), *C-FAMILYCARE1* = 3 (IADL+ADL), otherwise, if *C-CONTACT* =2 without possibility of sharing care, then *C-FAMILYCARE1* = 1 (IADL only).
3. Non-cohabiting children care is not declared at the last (two) waves (no possibility of between-waves imputation). If non-cohabiting children care is provided at the wave before the (two) last(s), forward imputation is made (e.g. for instance, the elderly respondent received ADL care at wave 6 did and leave the panel after wave 8. No information on care received is available for waves 7 and 8). However, one can think that ***the care is more likely to continue than to stop (especially at the last waves due to the ageing process) (care imputation hypothesis 6)***.

# *CHAPTER VII*

**APPENDIX TABLE VII-1A:**
Study sample by gender over the study waves (PSBH 1994-2002)

| | GENDER | |
|---|---|---|
| | **Man** | **Woman** |
| **SAMPLE SIZE** | | |
| **W3** (n=1,123) | 43.72 | 56.28 |
| **W4** (n=1,003) | 43.87 | 56.13 |
| **W5** (n=910) | 43.96 | 56.04 |
| **W6** (n=777) | 43.50 | 56.50 |
| **W7** (n=691) | 42.84 | 57.16 |
| **W8** (n=614) | 42.83 | 57.17 |
| **W9** (n=550) | 42.73 | 57.27 |
| **W10** (n=473) | 41.86 | 58.14 |
| **W11** (n=420) | 43.10 | 56.90 |
| **TEST** | **Chi²** | **p value** |
| **Pearson Chi²** | 0.98 | 0.9984 |

**APPENDIX TABLE VII-1B:**
Survival function by gender (PSBH 1994-2002)

| | GENDER | |
|---|---|---|
| | **Man** | **Woman** |
| **WAVE** | (initial n=491) | (initial n=632) |
| **W3** | 100.00 | 100.00 |
| **W4** | 89.61 | 89.08 |
| **W5** | 81.47 | 80.70 |
| **W6** | 68.84 | 69.46 |
| **W7** | 60.29 | 62.50 |
| **W8** | 53.56 | 55.54 |
| **W9** | 47.86 | 49.84 |
| **W10** | 40.33 | 43.51 |
| **W11** | 36.86 | 37.82 |
| **TEST** | **Chi²** | **p value** |
| **Log-Rank** | 0.10 | 0.7525 |
| **Wilcoxon** | 0.01 | 0.9340 |

**APPENDIX TABLE VII-2:** Marital status of men and women over the study waves (PSBH 1994-2002)

| | | MARITAL STATUS | | | | |
|---|---|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **GENDER** | **Married** | **Separated** | **Divorced** | **Widowed** | **Single** |
| W3*** | **Man** (n=491) | 74.75 | 0.61 | 2.24 | 17.52 | 4.89 |
| | **Woman** (n=632) | 44.62 | 0.63 | 3.16 | 46.52 | 5.06 |
| W4*** | **Man** (n=440) | 73.41 | 0.68 | 2.73 | 18.18 | 5.00 |
| | **Woman** (n=563) | 43.16 | 0.89 | 3.02 | 47.25 | 5.68 |
| W5*** | **Man** (n=400) | 72.75 | 0.75 | 2.75 | 18.75 | 5.00 |
| | **Woman** (n=510) | 42.94 | 0.98 | 3.14 | 47.84 | 5.10 |
| W6*** | **Man** (n=338) | 71.60 | 0.59 | 2.66 | 19.53 | 5.62 |
| | **Woman** (n=439) | 41.46 | 0.91 | 2.96 | 49.43 | 5.24 |
| W7*** | **Man** (n=296) | 71.96 | 0.68 | 2.70 | 18.92 | 5.74 |
| | **Woman** (n=395) | 40.51 | 1.01 | 3.29 | 49.62 | 5.57 |
| W8*** | **Man** (n=263) | 71.48 | 0.38 | 2.66 | 19.77 | 5.70 |
| | **Woman** (n=351) | 39.89 | 0.85 | 3.42 | 50.43 | 5.41 |
| W9*** | **Man** (n=235) | 72.34 | 0.43 | 2.55 | 18.30 | 6.38 |
| | **Woman** (n=315) | 39.37 | 0.63 | 3.49 | 51.11 | 5.40 |
| W10*** | **Man** (n=198) | 72.22 | 0.51 | 3.03 | 18.18 | 6.06 |
| | **Woman** (n=275) | 38.18 | 0.36 | 3.27 | 53.45 | 4.73 |
| W11*** | **Man** (n=181) | 70.72 | 0.55 | 3.31 | 19.34 | 6.08 |
| | **Woman** (n=239) | 38.91 | 0.42 | 3.35 | 52.72 | 4.60 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-3:** Birth cohorts of men and woman over the study waves (PSBH 1994-2002)

| | | BIRTH COHORT | | | | |
|---|---|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **GENDER** | **1925-1929** | **1920-1924** | **1915-1919** | **1910-1914** | **Before 1910** |
| **W3*** ** | **Man** (n=491) | 37.27 | 31.36 | 15.07 | 12.42 | 3.87 |
| | **Woman** | 30.85 | 30.38 | 18.20 | 12.18 | 8.39 |
| **W4*** ** | **Man** (n=440) | 39.32 | 31.14 | 14.77 | 12.05 | 2.73 |
| | **Woman** | 32.68 | 31.08 | 17.58 | 11.55 | 7.10 |
| **W5** ** | **Man** (n=400) | 40.50 | 31.50 | 14.25 | 11.50 | 2.25 |
| | **Woman** | 33.33 | 31.37 | 18.43 | 11.37 | 5.49 |
| **W6*** | **Man** (n=338) | 42.01 | 31.66 | 13.31 | 10.95 | 2.07 |
| | **Woman** | 35.54 | 30.30 | 19.13 | 10.71 | 4.33 |
| **W7*** | **Man** (n=296) | 41.89 | 32.09 | 13.85 | 10.81 | 1.35 |
| | **Woman** | 36.46 | 30.89 | 19.24 | 9.62 | 3.80 |
| **W8** | **Man** (n=263) | 41.44 | 33.08 | 14.07 | 10.27 | 1.14 |
| | **Woman** | 37.89 | 33.33 | 17.95 | 8.83 | 1.99 |
| **W9** | **Man** (n=235) | 42.55 | 34.47 | 13.19 | 8.94 | 0.85 |
| | **Woman** | 38.41 | 33.65 | 18.10 | 8.57 | 1.27 |
| **W10** | **Man** (n=198) | 43.43 | 35.86 | 11.11 | 8.59 | 1.01 |
| | **Woman** | 40.00 | 32.36 | 20.00 | 6.91 | 0.73 |
| **W11*** | **Man** (n=181) | 41.99 | 36.46 | 11.60 | 8.84 | 1.10 |
| | **Woman** | 42.26 | 32.64 | 19.25 | 5.86 | 0.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-4:**
Birth year of the study sample (PSBH 1992)

| BIRTH YEAR | N | % |
|---|---|---|
| **1896** | 1 | 0.09 |
| **1899** | 1 | 0.09 |
| **1900** | 3 | 0.27 |
| **1901** | 3 | 0.27 |
| **1902** | 6 | 0.53 |
| **1903** | 9 | 0.80 |
| **1904** | 10 | 0.89 |
| **1905** | 12 | 1.07 |
| **1906** | 1 | 0.09 |
| **1907** | 8 | 0.71 |
| **1908** | 9 | 0.80 |
| **1909** | 9 | 0.80 |
| **1910** | 13 | 1.16 |
| **1911** | 22 | 1.96 |
| **1912** | 31 | 2.76 |
| **1913** | 29 | 2.58 |
| **1914** | 43 | 3.83 |
| **1915** | 38 | 3.38 |
| **1916** | 35 | 3.12 |
| **1917** | 31 | 2.76 |
| **1918** | 26 | 2.32 |
| **1919** | 59 | 5.25 |
| **1920** | 69 | 6.14 |
| **1921** | 64 | 5.70 |
| **1922** | 67 | 5.97 |
| **1923** | 63 | 5.61 |
| **1924** | 83 | 7.39 |
| **1925** | 81 | 7.21 |
| **1926** | 67 | 5.97 |
| **1927** | 68 | 6.06 |
| **1928** | 69 | 6.14 |
| **1929** | 93 | 8.28 |
| **Total** | 1123 | 100 |

**APPENDIX TABLE VII-5A:** Study sample by birth cohort over the study waves (PSBH 1994-2002)

| | BIRTH COHORT | | | | |
|---|---|---|---|---|---|
| **SAMPLE SIZE** | **1925-1929** | **1920-1924** | **1915-1919** | **1910-1914** | **Before 1910** |
| **W3** (n=1,123) | 33.66 | 30.81 | 16.83 | 12.29 | 6.41 |
| **W4 (**n=1,003) | 35.59 | 31.11 | 16.35 | 11.76 | 5.18 |
| **W5** (n=910) | 36.48 | 31.43 | 16.59 | 11.43 | 4.07 |
| **W6** (n=777) | 38.35 | 30.89 | 16.60 | 10.81 | 3.35 |
| **W7** (n=691) | 38.78 | 31.40 | 16.93 | 10.13 | 2.75 |
| **W8** (n=614) | 39.41 | 33.22 | 16.29 | 9.45 | 1.63 |
| **W9** (n=550) | 40.18 | 34.00 | 16.00 | 8.73 | 1.09 |
| **W10** (n=473) | 41.44 | 33.83 | 16.28 | 7.61 | 0.85 |
| **W11** (n=420) | 42.14 | 34.29 | 15.95 | 7.14 | 0.48 |

| **TEST** | **Chi$^2$** | **p value** |
|---|---|---|
| **Pearson Chi$^2$** | 105.85 | <.0001 |

**APPENDIX TABLE VII-5B:** Survival function by birth cohort (PSBH 1994-2002)

| | BIRTH COHORT | | | | |
|---|---|---|---|---|---|
| **WAVE** | **1925-1929** (initial n=378) | **1920-1924** (initial n=346) | **1915-1919** (initial n=189) | **1910-1914** (initial n=138) | **Before 1910** (initial n=72) |
| **W3** | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| **W4** | 94.44 | 90.17 | 86.77 | 85.51 | 72.22 |
| **W5** | 87.83 | 82.66 | 79.89 | 75.36 | 51.39 |
| **W6** | 78.84 | 69.36 | 68.25 | 60.87 | 36.11 |
| **W7** | 70.90 | 62.72 | 61.90 | 50.72 | 26.39 |
| **W8** | 64.02 | 58.96 | 52.91 | 42.03 | 13.89 |
| **W9** | 58.47 | 54.05 | 46.56 | 34.78 | 8.33 |
| **W10** | 51.85 | 46.24 | 40.74 | 26.09 | 5.56 |
| **W11** | **46.83** | 41.62 | 35.45 | 21.74 | **2.78** |

| **TEST** | **Chi$^2$** | **p value** |
|---|---|---|
| **Log-Rank** | 62.27 | <.0001 |
| **Wilcoxon** | 62.71 | <.0001 |

**APPENDIX TABLE VII-6:** Subjective health of birth cohorts over the study waves (PSBH 1994-2002)

| | | SUBJECTIVE HEALTH | | |
|---|---|---|---|---|
| **WAVE AND CHI$^2$ SIG.** | **BIRTH COHORT** | **Good** | **Fair** | **Bad** |
| **W3**** | 1925-1929 (n=378) | 51.06 | 38.36 | 10.58 |
| | 1920-1924 (n=346) | 46.82 | 41.33 | 11.85 |
| | 1915-1919 (n=189) | 38.62 | 46.56 | 14.81 |
| | 1910-1914 (n=138) | 36.23 | 41.30 | 22.46 |
| | Before 1910 (n=72) | 47.22 | 36.11 | 16.67 |
| **W4** | 1925-1929 (n=357) | 47.34 | 41.74 | 10.92 |
| | 1920-1924 (n=312) | 46.15 | 39.10 | 14.74 |
| | 1915-1919 (n=164) | 37.20 | 50.00 | 12.80 |
| | 1910-1914 (n=118) | 36.44 | 50.00 | 13.56 |
| | Before 1910 (n=52) | 42.31 | 42.31 | 15.38 |
| **W5*** | 1925-1929 (n=332) | 48.19 | 41.27 | 10.54 |
| | 1920-1924 (n=286) | 46.50 | 38.46 | 15.03 |
| | 1915-1919 (n=151) | 43.05 | 37.75 | 19.21 |
| | 1910-1914 (n=104) | 35.58 | 50.96 | 13.46 |
| | Before 1910 (n=37) | 37.84 | 51.35 | 10.81 |
| **W6** | 1925-1929 (n=298) | 43.62 | 42.28 | 14.09 |
| | 1920-1924 (n=240) | 46.25 | 38.33 | 15.42 |
| | 1915-1919 (n=129) | 44.19 | 38.76 | 17.05 |
| | 1910-1914 (n=84) | 46.43 | 41.67 | 11.90 |
| | Before 1910 (n=26) | 38.46 | 53.85 | 7.69 |
| **W7** | 1925-1929 (n=268) | 44.40 | 41.79 | 13.81 |
| | 1920-1924 (n=217) | 48.39 | 41.47 | 10.14 |
| | 1915-1919 (n=117) | 35.04 | 46.15 | 18.80 |
| | 1910-1914 (n=70) | 38.57 | 42.86 | 18.57 |
| | Before 1910 (n=19) | 47.37 | 42.11 | 10.53 |
| **W8** | 1925-1929 (n=242) | 48.35 | 38.02 | 13.64 |
| | 1920-1924 (n=204) | 39.71 | 45.59 | 14.71 |
| | 1915-1919 (n=100) | 48.00 | 35.00 | 17.00 |
| | 1910-1914 (n=58) | 41.38 | 41.38 | 17.24 |
| | Before 1910 (n=10) | 10.00 | 70.00 | 20.00 |
| **W9** | 1925-1929 (n=221) | 40.27 | 43.44 | 16.29 |
| | 1920-1924 (n=187) | 41.18 | 46.52 | 12.30 |
| | 1915-1919 (n=88) | 42.05 | 42.05 | 15.91 |
| | 1910-1914 (n=48) | 37.50 | 50.00 | 12.50 |
| | Before 1910 (n=6) | 50.00 | 50.00 | 0.00 |
| **W10** invalid | 1925-1929 (n=196) | 42.86 | 44.39 | 12.76 |
| | 1920-1924 (n=160) | 50.00 | 40.00 | 10.00 |
| | 1915-1919 (n=77) | 38.96 | 41.56 | 19.48 |
| | 1910-1914 (n=36) | 44.44 | 38.89 | 16.67 |
| | Before 1910 (n=4) | 25.00 | 50.00 | 25.00 |
| **W11** invalid | 1925-1929 (n=177) | 44.07 | 45.20 | 10.73 |
| | 1920-1924 (n=144) | 43.75 | 38.89 | 17.36 |
| | 1915-1919 (n=67) | 34.33 | 43.28 | 22.39 |
| | 1910-1914 (n=30) | 30.00 | 46.67 | 23.33 |
| | Before 1910 (n=2) | 100.00 | 0.00 | 0.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-7:** Disability of birth cohorts over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | BIRTH COHORT | DISABILITY None | Moderate | Severe |
|---|---|---|---|---|
| **W3**** | 1925-1929 (n=378) | 81.48 | 9.26 | 9.26 |
| | 1920-1924 (n=346) | 82.66 | 6.65 | 10.69 |
| | 1915-1919 (n=189) | 72.49 | 15.87 | 11.64 |
| | 1910-1914 (n=138) | 76.09 | 9.42 | 14.49 |
| | Before 1910 (n=72) | 80.56 | 4.17 | 15.28 |
| **W4***** | 1925-1929 (n=357) | 73.95 | 12.89 | 13.17 |
| | 1920-1924 (n=312) | 70.83 | 12.82 | 16.35 |
| | 1915-1919 (n=164) | 68.90 | 17.07 | 14.02 |
| | 1910-1914 (n=118) | 57.63 | 16.10 | 26.27 |
| | Before 1910 (n=52) | 50.00 | 15.38 | 34.62 |
| **W5***** | 1925-1929 (n=332) | 70.48 | 14.46 | 15.06 |
| | 1920-1924 (n=286) | 70.28 | 13.64 | 16.08 |
| | 1915-1919 (n=151) | 62.25 | 13.91 | 23.84 |
| | 1910-1914 (n=104) | 56.73 | 17.31 | 25.96 |
| | Before 1910 (n=37) | 62.16 | 2.70 | 35.14 |
| **W6**** | 1925-1929 (n=298) | 65.44 | 18.79 | 15.77 |
| | 1920-1924 (n=240) | 70.42 | 16.25 | 13.33 |
| | 1915-1919 (n=129) | 62.02 | 19.38 | 18.60 |
| | 1910-1914 (n=84) | 60.71 | 19.05 | 20.24 |
| | Before 1910 (n=26) | 42.31 | 19.23 | 38.46 |
| **W7**** | 1925-1929 (n=268) | 61.19 | 22.01 | 16.79 |
| | 1920-1924 (n=217) | 61.75 | 18.43 | 19.82 |
| | 1915-1919 (n=117) | 50.43 | 26.50 | 23.08 |
| | 1910-1914 (n=70) | 45.71 | 32.86 | 21.43 |
| | Before 1910 (n=19) | 36.84 | 21.05 | 42.11 |
| **W8** | 1925-1929 (n=242) | 62.81 | 19.83 | 17.36 |
| | 1920-1924 (n=204) | 63.24 | 20.10 | 16.67 |
| | 1915-1919 (n=100) | 64.00 | 18.00 | 18.00 |
| | 1910-1914 (n=58) | 62.07 | 22.41 | 15.52 |
| | Before 1910 (n=10) | 40.00 | 10.00 | 50.00 |
| **W9** | 1925-1929 (n=221) | 63.35 | 21.72 | 14.93 |
| | 1920-1924 (n=187) | 65.78 | 18.72 | 15.51 |
| | 1915-1919 (n=88) | 64.77 | 17.05 | 18.18 |
| | 1910-1914 (n=48) | 58.33 | 27.08 | 14.58 |
| | Before 1910 (n=6) | 66.67 | 0.00 | 33.33 |
| **W10** | 1925-1929 (n=196) | 62.76 | 22.45 | 14.80 |
| | 1920-1924 (n=160) | 63.13 | 20.63 | 16.25 |
| | 1915-1919 (n=77) | 57.14 | 16.88 | 25.97 |
| | 1910-1914 (n=36) | 66.67 | 11.11 | 22.22 |
| | Before 1910 (n=4) | 75.00 | 0.00 | 25.00 |
| **W11** | 1925-1929 (n=177) | 63.84 | 18.64 | 17.51 |
| | 1920-1924 (n=144) | 58.33 | 23.61 | 18.06 |
| | 1915-1919 (n=67) | 56.72 | 17.91 | 25.37 |
| | 1910-1914 (n=30) | 53.33 | 13.33 | 33.33 |
| | Before 1910 (n=2) | 100.00 | 0.00 | 0.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-8A:**
Study sample by religiosity over the study waves (PSBH 1994-2002)

| | RELIGIOSITY | |
|---|---|---|
| | **Non-religious** | **Religious** |
| **W3** (n=1,123) | 22.35 | 77.65 |
| **W4** (n=1,003) | 22.43 | 77.57 |
| **W5** (n=910) | 22.31 | 77.69 |
| **W6** (n=777) | 22.91 | 77.09 |
| **W7** (n=691) | 22.58 | 77.42 |
| **W8** (n=614) | 22.96 | 77.04 |
| **W9** (n=550) | 23.82 | 76.18 |
| **W10** (n=473) | 23.68 | 76.32 |
| **W11** (n=420) | 24.29 | 75.71 |
| **TEST** | **Chi²** | **p value** |
| **Pearson Chi²** | 1.41 | 0.9941 |

**APPENDIX TABLE VII-8B:**
Survival function by religiosity (PSBH 1994-2002)

| | RELIGIOSITY | |
|---|---|---|
| | **Non-religious** (initial n=251) | **Religious** (initial n=872) |
| **W3** | 100.00 | 100.00 |
| **W4** | 89.64 | 89.22 |
| **W5** | 80.88 | 81.08 |
| **W6** | 70.92 | 68.69 |
| **W7** | 62.15 | 61.35 |
| **W8** | 56.18 | 54.24 |
| **W9** | 52.19 | 48.05 |
| **W10** | 44.62 | 41.40 |
| **W11** | 40.64 | 36.47 |
| **TEST** | **Chi²** | **p value** |
| **Log-Rank** | 1.92 | 0.1662 |
| **Wilcoxon** | 2.03 | 0.1539 |

**APPENDIX TABLE VII-9:**
Religiosity of men and women over the study waves (PSBH 1994-2002)

| | | RELIGIOSITY | |
|---|---|---|---|
| **WAVE AND CHI² SIG.** | **GENDER** | **Non-religious** | **Religious** |
| **W3*** | **Man** (n=491) | 29.74 | 70.26 |
| | **Woman** (n=632) | 16.61 | 83.39 |
| **W4*** | **Man** (n=440) | 29.55 | 70.45 |
| | **Woman** (n=563) | 16.87 | 83.13 |
| **W5*** | **Man** (n=400) | 29.50 | 70.50 |
| | **Woman** (n=510) | 16.67 | 83.33 |
| **W6*** | **Man** (n=338) | 31.07 | 68.93 |
| | **Woman** (n=439) | 16.63 | 83.37 |
| **W7*** | **Man** (n=296) | 30.74 | 69.26 |
| | **Woman** (n=395) | 16.46 | 83.54 |
| **W8*** | **Man** (n=263) | 30.80 | 69.20 |
| | **Woman** (n=351) | 17.09 | 82.91 |
| **W9*** | **Man** (n=235) | 32.34 | 67.66 |
| | **Woman** (n=315) | 17.46 | 82.54 |
| **W10*** | **Man** (n=198) | 32.83 | 67.17 |
| | **Woman** (n=275) | 17.09 | 82.91 |
| **W11*** | **Man** (n=181) | 34.25 | 65.75 |
| | **Woman** (n=239) | 16.74 | 83.26 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-10:**
Religiosity by region over the study waves (PSBH 1994-2002)

| | | RELIGIOSITY | |
|---|---|---|---|
| **WAVE AND CHI² SIG.** | **GENDER** | **Non-religious** | **Religious** |
| **W3***** | **Flanders** (n=510) | 17.45 | 82.55 |
| | **Wallonia** (n=465) | 21.72 | 78.28 |
| | **Brussels** (n=148) | 41.22 | 58.78 |
| **W4***** | **Flanders** (n=447) | 17.00 | 83.00 |
| | **Wallonia** (n=420) | 21.90 | 78.10 |
| | **Brussels** (n=136) | 41.91 | 58.09 |
| **W5***** | **Flanders** (n=403) | 16.13 | 83.87 |
| | **Wallonia** (n=380) | 22.37 | 77.63 |
| | **Brussels** (n=127) | 41.73 | 58.27 |
| **W6***** | **Flanders** (n=342) | 17.54 | 82.46 |
| | **Wallonia** (n=335) | 22.99 | 77.01 |
| | **Brussels** (n=100) | 41.00 | 59.00 |
| **W7***** | **Flanders** (n=306) | 17.97 | 82.03 |
| | **Wallonia** (n=293) | 21.50 | 78.50 |
| | **Brussels** (n=92) | 41.30 | 58.70 |
| **W8***** | **Flanders** (n=271) | 18.45 | 81.55 |
| | **Wallonia** (n=260) | 21.15 | 78.85 |
| | **Brussels** (n=83) | 43.37 | 56.63 |
| **W9***** | **Flanders** (n=246) | 19.51 | 80.49 |
| | **Wallonia** (n=230) | 21.30 | 78.70 |
| | **Brussels** (n=74) | 45.95 | 54.05 |
| **W10***** | **Flanders** (n=225) | 20.00 | 80.00 |
| | **Wallonia** (n=190) | 21.58 | 78.42 |
| | **Brussels** (n=58) | 44.83 | 55.17 |
| **W11***** | **Flanders** (n=206) | 19.42 | 80.58 |
| | **Wallonia** (n=161) | 23.60 | 76.40 |
| | **Brussels** (n=53) | 45.28 | 54.72 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-11A:** Study sample by education level over the study waves (PSBH 1994-2002)

| SAMPLE SIZE | EDUCATION LEVEL: Primary or less | Lower secondary | Upper secondary | Higher education |
|---|---|---|---|---|
| **W3** (n=1,123) | 46.39 | 21.64 | 19.15 | 12.82 |
| **W4** (n=1,003) | 44.57 | 22.13 | 20.14 | 13.16 |
| **W5** (n=910) | 43.41 | 22.53 | 20.33 | 13.74 |
| **W6** (n=777) | 43.11 | 22.78 | 20.33 | 13.77 |
| **W7** (n=691) | 41.68 | 23.30 | 21.27 | 13.75 |
| **W8** (n=614) | 40.72 | 23.29 | 21.99 | 14.01 |
| **W9** (n=550) | 40.55 | 23.64 | 22.18 | 13.64 |
| **W10** n=473) | 39.11 | 24.52 | 22.62 | 13.74 |
| **W11** n=420) | 39.52 | 24.52 | 21.43 | 14.52 |
| **TEST** | **Chi²** | **p value** | | |
| **Pearson Chi²** | 15.31 | 0.9114 | | |

**APPENDIX TABLE VII-11B:** Survival function by education level (PSBH 1994-2002)

| WAVE | EDUCATION LEVEL: Primary or less (initial n=521) | Lower secondary (initial n=243) | Upper secondary (initial n=215) | Higher education (initial n=144) |
|---|---|---|---|---|
| **W3** | 100.00 | 100.00 | 100.00 | 100.00 |
| **W4** | 85.80 | 91.36 | 93.95 | 91.67 |
| **W5** | 75.82 | 84.36 | 86.05 | 86.81 |
| **W6** | 64.30 | 72.84 | 73.49 | 74.31 |
| **W7** | 55.28 | 66.26 | 68.37 | 65.97 |
| **W8** | 47.98 | 58.85 | 62.79 | 59.72 |
| **W9** | 42.80 | 53.50 | 56.74 | 52.08 |
| **W10** | 35.51 | 47.74 | 49.77 | 45.14 |
| **W11** | 31.86 | 42.39 | 41.86 | 42.36 |
| **TEST** | **Chi²** | **p value** | | |
| **Log-Rank** | 4.54 | 0.2087 | | |
| **Wilcoxon** | 5.46 | 0.1409 | | |

**APPENDIX TABLE VII-12:**
Education level of men and women over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | GENDER | EDUCATION LEVEL: Primary or less | Lower secondary | Upper secondary | Higher education |
|---|---|---|---|---|---|
| **W3*** ** | **Man** (n=491) | 41.96 | 18.74 | 22.20 | 17.11 |
| | **Woman** (n=632) | 49.84 | 23.89 | 16.77 | 9.49 |
| **W4*** ** | **Man** (n=440) | 40.45 | 19.09 | 23.18 | 17.27 |
| | **Woman** (n=563) | 47.78 | 24.51 | 17.76 | 9.95 |
| **W5*** ** | **Man** (n=400) | 38.25 | 20.25 | 23.25 | 18.25 |
| | **Woman** (n=510) | 47.45 | 24.31 | 18.04 | 10.20 |
| **W6*** ** | **Man** (n=338) | 38.46 | 19.53 | 23.37 | 18.64 |
| | **Woman** (n=439) | 46.70 | 25.28 | 18.00 | 10.02 |
| **W7*** ** | **Man** (n=296) | 36.82 | 19.93 | 25.00 | 18.24 |
| | **Woman** (n=395) | 45.32 | 25.82 | 18.48 | 10.38 |
| **W8*** ** | **Man** (n=263) | 36.12 | 19.77 | 25.48 | 18.63 |
| | **Woman** (n=351) | 44.16 | 25.93 | 19.37 | 10.54 |
| **W9*** ** | **Man** (n=235) | 35.32 | 21.28 | 24.68 | 18.72 |
| | **Woman** (n=315) | 44.44 | 25.40 | 20.32 | 9.84 |
| **W10*** ** | **Man** (n=198) | 33.84 | 21.72 | 24.75 | 19.70 |
| | **Woman** (n=275) | 42.91 | 26.55 | 21.09 | 9.45 |
| **W11**** | **Man** (n=181) | 33.70 | 22.10 | 24.31 | 19.89 |
| | **Woman** (n=239) | 43.93 | 26.36 | 19.25 | 10.46 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-13:** Education level of birth cohorts over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | BIRTH COHORT | EDUCATION LEVEL | | | |
|---|---|---|---|---|---|
| | | Primary or less | Lower secondary | Upper secondary | Higher education |
| **W3**** | **1925-1929** (n=378) | 39.95 | 25.93 | 18.52 | 15.61 |
| | **1920-1924** (n=346) | 43.64 | 23.70 | 22.54 | 10.12 |
| | **1915-1919** (n=189) | 50.79 | 16.93 | 20.11 | 12.17 |
| | **1910-1914** (n=138) | 58.70 | 15.94 | 13.04 | 12.32 |
| | **Before 1910** (n=72) | 58.33 | 12.50 | 15.28 | 13.89 |
| **W4*** | **1925-1929** (n=357) | 39.50 | 25.49 | 19.33 | 15.69 |
| | **1920-1924** (n=312) | 43.27 | 23.72 | 22.76 | 10.26 |
| | **1915-1919** (n=164) | 49.39 | 17.07 | 21.34 | 12.20 |
| | **1910-1914** (n=118) | 53.39 | 17.80 | 14.41 | 14.41 |
| | **Before 1910** (n=52) | 51.92 | 15.38 | 19.23 | 13.46 |
| **W5**** | **1925-1929** (n=332) | 38.25 | 25.90 | 18.98 | 16.87 |
| | **1920-1924** (n=286) | 43.01 | 24.13 | 22.73 | 10.14 |
| | **1915-1919** (n=151) | 48.34 | 17.22 | 23.18 | 11.26 |
| | **1910-1914** (n=104) | 49.04 | 18.27 | 16.35 | 16.35 |
| | **Before 1910** (n=37) | 56.76 | 13.51 | 13.51 | 16.22 |
| **W6** | **1925-1929** (n=298) | 37.92 | 25.50 | 19.13 | 17.45 |
| | **1920-1924** (n=240) | 43.33 | 24.58 | 21.67 | 10.42 |
| | **1915-1919** (n=129) | 50.39 | 17.83 | 21.71 | 10.08 |
| | **1910-1914** (n=84) | 46.43 | 19.05 | 20.24 | 14.29 |
| | **Before 1910** (n=26) | 53.85 | 11.54 | 15.38 | 19.23 |
| **W7** | **1925-1929** (n=268) | 38.43 | 24.25 | 20.90 | 16.42 |
| | **1920-1924** (n=217) | 42.40 | 25.35 | 21.20 | 11.06 |
| | **1915-1919** (n=117) | 47.86 | 19.66 | 22.22 | 10.26 |
| | **1910-1914** (n=70) | 40.00 | 21.43 | 21.43 | 17.14 |
| | **Before 1910** (n=19) | 47.37 | 15.79 | 21.05 | 15.79 |
| **W8** | **1925-1929** (n=242) | 38.02 | 23.97 | 21.90 | 16.12 |
| | **1920-1924** (n=204) | 40.69 | 25.00 | 22.55 | 11.76 |
| | **1915-1919** (n=100) | 48.00 | 21.00 | 21.00 | 10.00 |
| | **1910-1914** (n=58) | 39.66 | 18.97 | 20.69 | 20.69 |
| | **Before 1910** (n=10) | 40.00 | 20.00 | 30.00 | 10.00 |
| **W9** | **1925-1929** (n=221) | 38.01 | 25.34 | 20.81 | 15.84 |
| | **1920-1924** (n=187) | 41.18 | 23.53 | 24.06 | 11.23 |
| | **1915-1919** (n=88) | 47.73 | 21.59 | 19.32 | 11.36 |
| | **1910-1914** (n=48) | 37.50 | 18.75 | 25.00 | 18.75 |
| | **Before 1910** (n=6) | 33.33 | 33.33 | 33.33 | 0.00 |
| **W10** invalid | **1925-1929** (n=196) | 35.20 | 27.04 | 21.94 | 15.82 |
| | **1920-1924** (n=160) | 41.25 | 23.13 | 23.75 | 11.88 |
| | **1915-1919** (n=77) | 49.35 | 22.08 | 16.88 | 11.69 |
| | **1910-1914** (n=36) | 30.56 | 19.44 | 33.33 | 16.67 |
| | **Before 1910** (n=4) | 25.00 | 50.00 | 25.00 | 0.00 |
| **W11** invalid | **1925-1929** (n=177) | 35.03 | 26.55 | 22.03 | 16.38 |
| | **1920-1924** (n=144) | 41.67 | 23.61 | 22.22 | 12.50 |
| | **1915-1919** (n=67) | 52.24 | 20.90 | 13.43 | 13.43 |
| | **1910-1914** (n=30) | 30.00 | 23.33 | 30.00 | 16.67 |
| | **Before 1910** (n=2) | 0.00 | 50.00 | 50.00 | 0.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-14A:** Study sample by last occupational status over the study waves (PSBH 1994-2002)

| | LAST OCCUPATIONAL STATUS | | | | |
|---|---|---|---|---|---|
| **SAMPLE SIZE** | **Never worked** | **Blue collar** | **White collar** | **Self-employed** | **Other** |
| **W3** (n=1,123) | 22.62 | 29.56 | 26.63 | 15.05 | 6.14 |
| **W4** (n=1,003) | 22.13 | 28.32 | 27.72 | 15.65 | 6.18 |
| **W5** (n=910) | 22.20 | 27.36 | 28.35 | 15.71 | 6.37 |
| **W6** (n=777) | 23.04 | 27.16 | 28.70 | 14.93 | 6.18 |
| **W7** (n=691) | 23.15 | 27.21 | 29.23 | 14.76 | 5.64 |
| **W8** (n=614) | 21.99 | 27.20 | 29.48 | 15.80 | 5.54 |
| **W9** (n=550) | 22.55 | 27.45 | 29.27 | 15.27 | 5.45 |
| **W10** (n=473) | 22.62 | 27.70 | 27.70 | 16.07 | 5.92 |
| **W11** (n=420) | 21.43 | 28.33 | 27.38 | 16.43 | 6.43 |

| **TEST** | **Chi²** | **p value** |
|---|---|---|
| **Pearson Chi²** | 6.55 | 1.000 |

**APPENDIX TABLE VII-14B:** Survival function by last occupational status (PSBH 1994-2002)

| | LAST OCCUPATIONAL STATUS | | | | |
|---|---|---|---|---|---|
| **WAVE** | **Never worked** (initial n=254) | **Blue collar** (initial n=332) | **White collar** (initial n=299) | **Self-employed** (initial n=169) | **Other** (initial n=69) |
| **W3** | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| **W4** | 87.40 | 85.54 | 92.98 | 92.90 | 89.86 |
| **W5** | 79.53 | 75.00 | 86.29 | 84.62 | 84.06 |
| **W6** | 70.47 | 63.55 | 74.58 | 68.64 | 69.57 |
| **W7** | 62.99 | 56.63 | 67.56 | 60.36 | 56.52 |
| **W8** | 53.15 | 50.30 | 60.54 | 57.40 | 49.28 |
| **W9** | 48.82 | 45.48 | 53.85 | 49.70 | 43.48 |
| **W10** | 42.13 | 39.46 | 43.81 | 44.97 | 40.58 |
| **W11** | 35.43 | 35.84 | 38.46 | 40.83 | 39.13 |

| **TEST** | **Chi²** | **p value** |
|---|---|---|
| **Log-Rank** | 6.97 | 0.1373 |
| **Wilcoxon** | 5.47 | 0.2424 |

**APPENDIX TABLE VII-15:**
Last occupational status of men and women over the study waves (PSBH 1994-2002)

| | | LAST OCCUPATIONAL STATUS | | | | |
|---|---|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **GENDER** | **Never worked** | **Blue collar** | **White collar** | **Self-employed** | **Other** |
| **W3*** ** | **Man** (n=491) | 1.43 | 38.29 | 36.25 | 17.52 | 6.52 |
| | **Woman** (n=632) | 39.08 | 22.78 | 19.15 | 13.13 | 5.85 |
| **W4*** ** | **Man** (n=440) | 1.59 | 37.05 | 37.05 | 18.18 | 6.14 |
| | **Woman** (n=563) | 38.19 | 21.49 | 20.43 | 13.68 | 6.22 |
| **W5*** ** | **Man** (n=400) | 1.75 | 36.00 | 38.25 | 17.75 | 6.25 |
| | **Woman** (n=510) | 38.24 | 20.59 | 20.59 | 14.12 | 6.47 |
| **W6*** ** | **Man** (n=338) | 1.78 | 36.98 | 38.76 | 15.98 | 6.51 |
| | **Woman** (n=439) | 39.41 | 19.59 | 20.96 | 14.12 | 5.92 |
| **W7*** ** | **Man** (n=296) | 1.69 | 37.84 | 39.53 | 15.20 | 5.74 |
| | **Woman** (n=395) | 39.24 | 19.24 | 21.52 | 14.43 | 5.57 |
| **W8*** ** | **Man** (n=263) | 1.52 | 37.64 | 38.78 | 16.35 | 5.70 |
| | **Woman** (n=351) | 37.32 | 19.37 | 22.51 | 15.38 | 5.41 |
| **W9*** ** | **Man** (n=235) | 1.70 | 38.72 | 37.87 | 15.74 | 5.96 |
| | **Woman** (n=315) | 38.10 | 19.05 | 22.86 | 14.92 | 5.08 |
| **W10*** ** | **Man** (n=198) | 1.52 | 39.90 | 35.35 | 16.67 | 6.57 |
| | **Woman** (n=275) | 37.82 | 18.91 | 22.18 | 15.64 | 5.45 |
| **W11*** ** | **Man** (n=181) | 1.66 | 39.23 | 35.91 | 16.57 | 6.63 |
| | **Woman** (n=239) | 36.40 | 20.08 | 20.92 | 16.32 | 6.28 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-16:**
Last occupational status by education level over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | EDUCATION LEVEL | LAST OCCUPATIONAL STATUS | | | | |
|---|---|---|---|---|---|---|
| | | Never worked | Blue collar | White collar | Self-employed | Other |
| **W3***** | **Primary or less** (n=521) | 26.68 | 45.68 | 9.40 | 14.78 | 3.45 |
| | **Lower secondary** (n=243) | 29.22 | 20.99 | 28.81 | 17.28 | 3.70 |
| | **Upper secondary** (n=215) | 18.14 | 15.35 | 47.91 | 15.35 | 3.26 |
| | **Higher education** (n=144) | 3.47 | 6.94 | 53.47 | 11.81 | 24.31 |
| **W4***** | **Primary or less** (n=447) | 26.62 | 43.62 | 9.84 | 16.11 | 3.80 |
| | **Lower secondary** (n=222) | 27.93 | 22.52 | 28.83 | 17.57 | 3.15 |
| | **Upper secondary** (n=202) | 17.82 | 15.35 | 48.02 | 15.35 | 3.47 |
| | **Higher education** (n=132) | 3.79 | 6.06 | 55.30 | 11.36 | 23.48 |
| **W5***** | **Primary or less** (n=395) | 27.59 | 41.52 | 10.63 | 16.46 | 3.80 |
| | **Lower secondary** (n=205) | 27.32 | 23.41 | 27.32 | 18.54 | 3.41 |
| | **Upper secondary** (n=185) | 17.84 | 15.68 | 48.65 | 14.59 | 3.24 |
| | **Higher education** (n=125) | 3.20 | 6.40 | 56.00 | 10.40 | 24.00 |
| **W6** *** | **Primary or less** (n=335) | 28.66 | 40.90 | 10.75 | 16.12 | 3.58 |
| | **Lower secondary** (n=177) | 29.38 | 23.73 | 26.55 | 17.51 | 2.82 |
| | **Upper secondary** (n=158) | 18.35 | 15.82 | 49.37 | 13.29 | 3.16 |
| | **Higher education** (n=107) | 1.87 | 6.54 | 57.94 | 9.35 | 24.30 |
| **W7** *** | **Primary or less** (n=288) | 29.17 | 40.97 | 10.76 | 15.63 | 3.47 |
| | **Lower secondary** (n=161) | 29.81 | 24.22 | 26.71 | 17.39 | 1.86 |
| | **Upper secondary** (n=147) | 17.69 | 16.33 | 49.66 | 13.61 | 2.72 |
| | **Higher education** (n=95) | 2.11 | 7.37 | 57.89 | 9.47 | 23.16 |
| **W8** *** | **Primary or less** (n=250) | 27.20 | 41.20 | 10.80 | 17.20 | 3.60 |
| | **Lower secondary** (n=143) | 30.07 | 24.48 | 25.87 | 18.18 | 1.40 |
| | **Upper sec**ondary (n=135) | 17.04 | 16.30 | 49.63 | 14.07 | 2.96 |
| | **Higher education** (n=86) | 1.16 | 8.14 | 58.14 | 10.47 | 22.09 |
| **W9** *** | **Primary or less** (n=223) | 28.70 | 40.36 | 10.76 | 16.59 | 3.59 |
| | **Lower secondary** (n=130) | 28.46 | 26.15 | 24.62 | 19.23 | 1.54 |
| | **Upper secondary** (n=122) | 18.03 | 16.39 | 50.00 | 12.30 | 3.28 |
| | **Higher education** (n=75) | 1.33 | 9.33 | 58.67 | 9.33 | 21.33 |
| **W10** *** | **Primary or less** (n=185) | 28.11 | 40.54 | 10.27 | 17.84 | 3.24 |
| | **Lower secondary** (n=116) | 30.17 | 26.72 | 21.55 | 19.83 | 1.72 |
| | **Upper secondary** (n=107) | 18.69 | 18.69 | 46.73 | 12.15 | 3.74 |
| | **Higher education** (n=65) | 0.00 | 7.69 | 56.92 | 10.77 | 24.62 |
| **W11** *** | **Primary or less** (n=166) | 27.11 | 41.57 | 9.64 | 18.07 | 3.61 |
| | **Lower secondary** (n=103) | 28.16 | 28.16 | 22.33 | 19.42 | 1.94 |
| | **Upper secondary** (n=90) | 17.78 | 18.89 | 45.56 | 14.44 | 3.33 |
| | **Higher education** (n=61) | 0.00 | 6.56 | 57.38 | 9.84 | 26.23 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-17A:**
Study sample by region over the study waves
(PSBH 1994-2002)

| | REGION | | |
|---|---|---|---|
| **SAMPLE SIZE** | **Flanders** | **Wallonia** | **Brussels** |
| **W3** (n=1,123) | 45.41 | 41.41 | 13.18 |
| **W4** (n=1,003) | 44.57 | 41.87 | 13.56 |
| **W5** (n=910) | 44.29 | 41.76 | 13.96 |
| **W6** (n=777) | 44.02 | 43.11 | 12.87 |
| **W7** (n=691) | 44.28 | 42.40 | 13.31 |
| **W8** (n=614) | 44.14 | 42.35 | 13.52 |
| **W9** (n=550) | 44.73 | 41.82 | 13.45 |
| **W10** (n=473) | 47.57 | 40.17 | 12.26 |
| **W11** (n=420) | 49.05 | 38.33 | 12.62 |
| **TEST** | **Chi²** | **p value** | |
| **Pearson Chi²** | 5.74 | 0.9906 | |

**APPENDIX TABLE VII-17B:**
Survival function by region
(PSBH 1994-2002)

| | REGION | | |
|---|---|---|---|
| **WAVE** | **Flanders** (initial n=510) | **Wallonia** (initial n=465) | **Brussels** (initial n=148) |
| **W3** | 100.00 | 100.00 | 100.00 |
| **W4** | 87.65 | 90.32 | 91.89 |
| **W5** | 79.02 | 81.72 | 85.81 |
| **W6** | 67.06 | 72.04 | 67.57 |
| **W7** | 60.00 | 63.01 | 62.16 |
| **W8** | 53.14 | 55.91 | 56.08 |
| **W9** | 48.24 | 49.46 | 50.00 |
| **W10** | 44.12 | 40.86 | 39.19 |
| **W11** | 40.39 | 34.62 | 35.81 |
| **TEST** | **Chi²** | **p value** | |
| **Log-Rank** | 16.83 | 0.0002 | |
| **Wilcoxon** | 15.56 | 0.0004 | |

**APPENDIX TABLE VII-18:** Urbanisation level by region over the study waves (PSBH 1994-2002)

| | | URBANISATION LEVEL | | |
|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **REGION** | **City** | **Town** | **Countryside** |
| **W3*****| **Flanders** (n=510) | 31.37 | 35.49 | 33.14 |
| | **Wallonia** (n=465) | 44.73 | 32.90 | 22.37 |
| | **Brussels** (n=148) | 100.00 | 0.00 | 0.00 |
| **W4*****| **Flanders** (n=447) | 31.32 | 36.47 | 32.21 |
| | **Wallonia** (n=420) | 44.76 | 32.86 | 22.38 |
| | **Brussels** (n=136) | 100.00 | 0.00 | 0.00 |
| **W5*****| **Flanders** (n=403) | 32.01 | 34.49 | 33.50 |
| | **Wallonia** (n=380) | 46.84 | 31.05 | 22.11 |
| | **Brussels** (n=127) | 100.00 | 0.00 | 0.00 |
| **W6*****| **Flanders** (n=342) | 30.70 | 33.63 | 35.67 |
| | **Wallonia** (n=335) | 46.57 | 31.04 | 22.39 |
| | **Brussels** (n=100) | 100.00 | 0.00 | 0.00 |
| **W7*****| **Flanders** (n=306) | 31.73 | 33.21 | 35.06 |
| | **Wallonia** (n=293) | 45.38 | 31.15 | 23.46 |
| | **Brussels** (n=92) | 100.00 | 0.00 | 0.00 |
| **W8*****| **Flanders** (n=271) | 32.52 | 30.49 | 36.99 |
| | **Wallonia** (n=260) | 44.35 | 31.30 | 24.35 |
| | **Brussels** (n=83) | 100.00 | 0.00 | 0.00 |
| **W9*****| **Flanders** (n=246) | 32.52 | 30.49 | 36.99 |
| | **Wallonia** (n=230) | 44.35 | 31.30 | 24.35 |
| | **Brussels** (n=74) | 100.00 | 0.00 | 0.00 |
| **W10*****| **Flanders** (n=225) | 32.44 | 30.22 | 37.33 |
| | **Wallonia** (n=190) | 44.74 | 31.05 | 24.21 |
| | **Brussels** (n=58) | 100.00 | 0.00 | 0.00 |
| **W11*****| **Flanders** (n=206) | 32.52 | 30.10 | 37.38 |
| | **Wallonia** (n=161) | 45.34 | 30.43 | 24.22 |
| | **Brussels** (n=53) | 100.00 | 0.00 | 0.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-19:** Number of children by region over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | REGION | NUMBER OF CHILDREN: No child | 1 child | 2 children | 3 children | 4 children+ |
|---|---|---|---|---|---|---|
| **W3**** | **Flanders** (n=510) | 17.84 | 19.61 | 20.78 | 15.49 | 26.27 |
| | **Wallonia** (n=465) | 16.13 | 24.73 | 24.95 | 17.42 | 16.77 |
| | **Brussels** (n=148) | 16.89 | 25.00 | 25.00 | 16.22 | 16.89 |
| **W4** | **Flanders** (n=447) | 17.23 | 20.36 | 21.25 | 14.99 | 26.17 |
| | **Wallonia** (n=420) | 15.24 | 25.00 | 22.86 | 18.57 | 18.33 |
| | **Brussels** (n=136) | 16.18 | 25.74 | 23.53 | 16.91 | 17.65 |
| **W5*** | **Flanders** (n=403) | 17.12 | 19.60 | 21.59 | 15.14 | 26.55 |
| | **Wallonia** (n=380) | 15.00 | 26.84 | 22.11 | 17.89 | 18.16 |
| | **Brussels** (n=127) | 14.96 | 27.56 | 24.41 | 16.54 | 16.54 |
| **W6** | **Flanders** (n=342) | 16.96 | 19.88 | 20.76 | 16.08 | 26.32 |
| | **Wallonia** (n=335) | 16.12 | 25.67 | 22.99 | 17.01 | 18.21 |
| | **Brussels** (n=100) | 14.00 | 27.00 | 23.00 | 19.00 | 17.00 |
| **W7** | **Flanders** (n=306) | 17.65 | 19.61 | 21.57 | 16.34 | 24.84 |
| | **Wallonia** (n=293) | 16.04 | 25.60 | 24.57 | 17.06 | 16.72 |
| | **Brussels** (n=92) | 13.04 | 29.35 | 22.83 | 19.57 | 15.22 |
| **W8** | **Flanders** (n=271) | 17.71 | 18.08 | 22.88 | 16.61 | 24.72 |
| | **Wallonia** (n=260) | 15.77 | 26.15 | 23.08 | 16.54 | 18.46 |
| | **Brussels** (n=83) | 14.46 | 30.12 | 22.89 | 19.28 | 13.25 |
| **W9** | **Flanders** (n=246) | 17.07 | 17.89 | 22.76 | 15.45 | 26.83 |
| | **Wallonia** (n=230) | 14.78 | 24.78 | 24.35 | 16.52 | 19.57 |
| | **Brussels** (n=74) | 10.81 | 31.08 | 22.97 | 20.27 | 14.86 |
| **W10** | **Flanders** (n=225) | 16.44 | 19.11 | 23.11 | 15.56 | 25.78 |
| | **Wallonia** (n=190) | 12.63 | 24.74 | 24.74 | 17.89 | 20.00 |
| | **Brussels** (n=58) | 8.62 | 32.76 | 20.69 | 24.14 | 13.79 |
| **W11*** | **Flanders** (n=206) | 17.48 | 18.45 | 22.33 | 15.05 | 26.70 |
| | **Wallonia** (n=161) | 11.18 | 25.47 | 24.22 | 18.63 | 20.50 |
| | **Brussels** (n=53) | 7.55 | 30.19 | 22.64 | 26.42 | 13.21 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-20A:**
Study sample by urbanization level over the study waves (PSBH 1994-2002)

| SAMPLE SIZE | URBANISATION LEVEL: City | Town | Countryside |
|---|---|---|---|
| **W3** (n=1,123) | 45.77 | 29.83 | 24.40 |
| **W4** (n=1,003) | 46.06 | 30.11 | 23.83 |
| **W5** (n=910) | 47.47 | 28.35 | 24.18 |
| **W6** (n=777) | 46.33 | 28.19 | 25.48 |
| **W7** (n=691) | 45.88 | 28.65 | 25.47 |
| **W8** (n=614) | 46.58 | 27.85 | 25.57 |
| **W9** (n=550) | 46.36 | 26.73 | 26.91 |
| **W10** (n=473) | 45.67 | 26.85 | 27.48 |
| **W11** (n=420) | 45.95 | 26.43 | 27.62 |

| TEST | Chi² | p value |
|---|---|---|
| **Pearson Chi²** | 7.93 | 0.9509 |

**APPENDIX TABLE VII-20B:**
Survival function by urbanisation level (PSBH 1994-2002)

| WAVE | URBANISATION LEVEL: City (initial n=514) | Town (initial n=335) | Countryside (initial n=274) |
|---|---|---|---|
| **W3** | 100.00 | 100.00 | 100.00 |
| **W4** | 89.88 | 90.15 | 87.23 |
| **W5** | 84.05 | 77.01 | 80.29 |
| **W6** | 70.04 | 65.37 | 72.26 |
| **W7** | 61.67 | 59.10 | 64.23 |
| **W8** | 55.64 | 51.04 | 57.30 |
| **W9** | 49.61 | 43.88 | 54.01 |
| **W10** | 42.02 | 37.91 | 47.45 |
| **W11** | 37.55 | 33.13 | 42.34 |

| TEST | Chi² | p value |
|---|---|---|
| **Log-Rank** | 4.17 | 0.1240 |
| **Wilcoxon** | 5.14 | 0.0764 |

**APPENDIX TABLE VII-21:** Religiosity by urbanisation level over the study waves (PSBH 1994-2002)

| | | RELIGIOSITY | |
|---|---|---|---|
| **WAVE AND CHI² SIG.** | **URBANISATION LEVEL** | **Non-religious** | **Religious** |
| **W3***** | **City** (n=514) | 30.74 | 69.26 |
| | **Town** (n=335) | 18.81 | 81.19 |
| | **Countryside** (n=274) | 10.95 | 89.05 |
| **W4***** | **City** (n=462) | 30.30 | 69.70 |
| | **Town** (n=302) | 18.87 | 81.13 |
| | **Countryside** (n=239) | 11.72 | 88.28 |
| **W5***** | **City** (n=432) | 29.86 | 70.14 |
| | **Town** (n=258) | 18.60 | 81.40 |
| | **Countryside** (n=220) | 11.82 | 88.18 |
| **W6***** | **City** (n=360) | 30.83 | 69.17 |
| | **Town** (n=219) | 19.63 | 80.37 |
| | **Countryside** (n=198) | 12.12 | 87.88 |
| **W7***** | **City** (n=317) | 30.60 | 69.40 |
| | **Town** (n=198) | 19.70 | 80.30 |
| | **Countryside** (n=176) | 11.36 | 88.64 |
| **W8***** | **City** (n=286) | 30.42 | 69.58 |
| | **Town** (n=171) | 21.05 | 78.95 |
| | **Countryside** (n=157) | 11.46 | 88.54 |
| **W9***** | **City** (n=255) | 30.98 | 69.02 |
| | **Town** (n=147) | 23.13 | 76.87 |
| | **Countryside** (n=148) | 12.16 | 87.84 |
| **W10***** | **City** (n=216) | 31.02 | 68.98 |
| | **Town** (n=127) | 23.62 | 76.38 |
| | **Countryside** (n=130) | 11.54 | 88.46 |
| **W11***** | **City** (n=193) | 32.12 | 67.88 |
| | **Town** (n=111) | 24.32 | 75.68 |
| | **Countryside** (n=116) | 11.21 | 88.79 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-22:** Study sample by subjective health over the study waves, before and after imputation (PSBH 1994-2002)

| WAVE | | SUBJECTIVE HEALTH Good | Fair | Bad |
|---|---|---|---|---|
| **Wave 3** | **Before** (n=1,099) | 44.40 | 41.77 | 13.83 |
| | **After** (n=1,123) | 45.59 | 40.87 | 13.54 |
| **Wave 4** | **Before** (n=965) | 43.77 | 43.27 | 12.96 |
| | **After** (n=1,003) | 43.77 | 43.27 | 12.96 |
| **Wave 5** | **Before** (n=883) | 44.73 | 41.45 | 13.82 |
| | **After** (n=910) | 44.95 | 41.32 | 13.74 |
| **Wave 6** | **Before** (n=752) | 44.28 | 41.09 | 14.63 |
| | **After** (n=777) | 44.66 | 40.80 | 14.54 |
| **Wave 7** | **Before** (n=667) | 43.63 | 42.73 | 13.64 |
| | **After** (n=691) | 43.56 | 42.55 | 13.89 |
| **Wave 8** | **Before** (n=589) | 42.95 | 41.77 | 15.28 |
| | **After** (n=614) | 44.14 | 40.88 | 14.98 |
| **Wave 9** | **Before** (n=533) | 40.34 | 45.03 | 14.63 |
| | **After** (n=550) | 40.73 | 44.91 | 14.36 |
| **Wave 10** | **Before** (n=450) | 42.89 | 42.89 | 14.22 |
| | **After** (n=473) | 44.61 | 42.07 | 13.32 |
| **Wave 11** | **Before** (n=391) | 37.08 | 45.78 | 17.14 |
| | **After** (n=420) | 41.67 | 42.62 | 15.71 |

**APPENDIX TABLE VII-23:** Disability by subjective health over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | DISABILITY | SUBJECTIVE HEALTH Good | Fair | Bad |
|---|---|---|---|---|
| **W3*** ** | **None** (n=894) | 53.91 | 39.04 | 7.05 |
| | **Moderate** (n=104) | 24.04 | 60.58 | 15.38 |
| | **Severe** (n=125) | 4.00 | 37.60 | 58.40 |
| **W4*** ** | **None** (n=692) | 56.94 | 38.58 | 4.48 |
| | **Moderate** (n=141) | 21.99 | 63.83 | 14.18 |
| | **Severe** (n=170) | 8.24 | 45.29 | 46.47 |
| **W5*** ** | **None** (n=611) | 58.10 | 37.32 | 4.58 |
| | **Moderate** (n=127) | 29.13 | 55.12 | 15.75 |
| | **Severe** (n=172) | 9.88 | 45.35 | 44.77 |
| **W6*** ** | **None** (n=506) | 60.08 | 33.60 | 6.32 |
| | **Moderate** (n=141) | 23.40 | 60.99 | 15.60 |
| | **Severe** (n=130) | 7.69 | 46.92 | 45.38 |
| **W7*** ** | **None** (n=396) | 64.14 | 33.59 | 2.27 |
| | **Moderate** (n=157) | 21.66 | 66.88 | 11.46 |
| | **Severe** (n=138) | 9.42 | 40.58 | 50.00 |
| **W8*** ** | **None** (n=385) | 58.96 | 35.58 | 5.45 |
| | **Moderate** (n=121) | 28.10 | 59.50 | 12.40 |
| | **Severe** (n=108) | 9.26 | 38.89 | 51.85 |
| **W9*** ** | **None** (n=352) | 57.10 | 38.07 | 4.83 |
| | **Moderate** (n=111) | 16.22 | 72.07 | 11.71 |
| | **Severe** (n=87) | 5.75 | 37.93 | 56.32 |
| **W10*** ** | **None** (n=295) | 59.66 | 34.58 | 5.76 |
| | **Moderate** (n=94) | 25.53 | 65.96 | 8.51 |
| | **Severe** (n=84) | 13.10 | 41.67 | 45.24 |
| **W11*** ** | **None** (n=253) | 59.29 | 35.57 | 5.14 |
| | **Moderate** (n=83) | 22.89 | 63.86 | 13.25 |
| | **Severe** (n=84) | 7.14 | 42.86 | 50.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-24:** Subjective health by recent hospitalisation over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | RECENT HOSPITALISATION | SUBJECTIVE HEALTH | | |
|---|---|---|---|---|
| | | Good | Fair | Bad |
| **W3***** | **No** (n=909) | 50.83 | 39.16 | 10.01 |
| | **Yes** (n=214) | 23.36 | 48.13 | 28.50 |
| **W4***** | **No** (n=799) | 48.81 | 40.68 | 10.51 |
| | **Yes** (n=204) | 24.02 | 53.43 | 22.55 |
| **W5***** | **No** (n=719) | 48.96 | 40.47 | 10.57 |
| | **Yes** (n=191) | 29.84 | 44.50 | 25.65 |
| **W6***** | **No** (n=618) | 49.35 | 40.78 | 9.87 |
| | **Yes** (n=159) | 26.42 | 40.88 | 32.70 |
| **W7***** | **No** (n=541) | 47.50 | 42.14 | 10.35 |
| | **Yes** (n=150) | 29.33 | 44.00 | 26.67 |
| **W8***** | **No** (n=480) | 49.38 | 39.17 | 11.46 |
| | **Yes** (n=134) | 25.37 | 47.01 | 27.61 |
| **W9***** | **No** (n=419) | 47.49 | 41.53 | 10.98 |
| | **Yes** (n=131) | 19.08 | 55.73 | 25.19 |
| **W10***** | **No** (n=358) | 51.68 | 37.43 | 10.89 |
| | **Yes** (n=115) | 22.61 | 56.52 | 20.87 |
| **W11***** | **No** (n=328) | 46.65 | 40.24 | 13.11 |
| | **Yes** (n=92) | 23.91 | 51.09 | 25.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-25:** Study sample by disability over the study waves, before and after imputation (PSBH 1994-2002)

| WAVE | | DISABILITY | | |
|---|---|---|---|---|
| | | None | Moderate | Severe |
| **Wave 3** | **Before** (n=1,123) | 79.61 | 9.26 | 11.13 |
| | **After** (n=1,123) | 79.61 | 9.26 | 11.13 |
| **Wave 4** | **Before** (n=987) | 68.99 | 14.06 | 16.95 |
| | **After** (n=1,003) | 68.99 | 14.06 | 16.95 |
| **Wave 5** | **Before** (n=898) | 67.37 | 13.81 | 18.82 |
| | **After** (n=910) | 67.14 | 13.96 | 18.90 |
| **Wave 6** | **Before** (n=753) | 65.74 | 18.19 | 16.07 |
| | **After** (n=777) | 65.12 | 18.15 | 16.73 |
| **Wave 7** | **Before** (n=671) | 57.08 | 23.25 | 19.67 |
| | **After** (n=691) | 57.31 | 22.72 | 19.97 |
| **Wave 8** | **Before** (n=595) | 62.18 | 20.34 | 17.48 |
| | **After** (n=614) | 62.70 | 19.71 | 17.59 |
| **Wave 9** | **Before** (n=526) | 63.69 | 20.15 | 16.16 |
| | **After** (n=550) | 64.00 | 20.18 | 15.82 |
| **Wave 10** | **Before** (n=455) | 61.54 | 20.22 | 18.24 |
| | **After** (n=473) | 62.37 | 19.87 | 17.76 |
| **Wave 11** | **Before** (n=412) | 59.47 | 20.39 | 20.15 |
| | **After** (n=420) | 60.24 | 19.76 | 20.00 |

**APPENDIX TABLE VII-26:** Disability by recent hospitalisation over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | RECENT HOSPITALISATION | DISABILITY None | Moderate | Severe |
|---|---|---|---|---|
| **W3*** ** | **No** (n=909) | 82.95 | 9.02 | 8.03 |
| | **Yes** (n=214) | 65.42 | 10.28 | 24.30 |
| **W4*** ** | **No** (n=799) | 73.59 | 13.77 | 12.64 |
| | **Yes** (n=204) | 50.98 | 15.20 | 33.82 |
| **W5*** ** | **No** (n=719) | 71.07 | 13.21 | 15.72 |
| | **Yes** (n=191) | 52.36 | 16.75 | 30.89 |
| **W6*** ** | **No** (n=618) | 69.58 | 16.99 | 13.43 |
| | **Yes** (n=159) | 47.80 | 22.64 | 29.56 |
| **W7*** ** | **No** (n=541) | 61.55 | 22.18 | 16.27 |
| | **Yes** (n=150) | 42.00 | 24.67 | 33.33 |
| **W8*** ** | **No** (n=480) | 66.88 | 20.00 | 13.13 |
| | **Yes** (n=134) | 47.76 | 18.66 | 33.58 |
| **W9*** ** | **No** (n=419) | 67.78 | 20.29 | 11.93 |
| | **Yes** (n=131) | 51.91 | 19.85 | 28.24 |
| **W10*** ** | **No** (n=358) | 67.88 | 18.16 | 13.97 |
| | **Yes** (n=115) | 45.22 | 25.22 | 29.57 |
| **W11*** ** | **No** (n=328) | 64.63 | 18.29 | 17.07 |
| | **Yes** (n=92) | 44.57 | 25.00 | 30.43 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-27:** Study sample by recent hospitalisation over the study waves, before and after imputation (PSBH 1994-2002)

| WAVE | | RECENT HOSPITALISATION No | Yes |
|---|---|---|---|
| **Wave 3** | **Before** (n=1,121) | 80.91 | 19.09 |
| | **After** (n=1,123) | 80.94 | 19.06 |
| **Wave 4** | **Before** (n=979) | 79.98 | 20.02 |
| | **After** (n=1,003) | 79.66 | 20.34 |
| **Wave 5** | **Before** (n=885) | 79.10 | 20.90 |
| | **After** (n=910) | 79.01 | 20.99 |
| **Wave 6** | **Before** (n=752) | 79.12 | 20.88 |
| | **After** (n=777) | 79.54 | 20.46 |
| **Wave 7** | **Before** (n=669) | 78.33 | 21.67 |
| | **After** (n=691) | 78.29 | 21.71 |
| **Wave 8** | **Before** (n=595) | 77.65 | 22.35 |
| | **After** (n=614) | 78.18 | 21.82 |
| **Wave 9** | **Before** (n=532) | 75.38 | 24.62 |
| | **After** (n=550) | 76.18 | 23.82 |
| **Wave 10** | **Before** (n=455) | 74.95 | 25.05 |
| | **After** (n=473) | 75.69 | 24.31 |
| **Wave 11** | **Before** (n=415) | 77.83 | 22.17 |
| | **After** (n=420) | 78.10 | 21.90 |

**APPENDIX TABLE VII-28:** Study sample by spousal health over the study waves after imputation (PSBH 1994-2002)

| | SPOUSAL HEALTH | | | |
|---|---|---|---|---|
| **SAMPLE SIZE** | **Not in couple** | **Good** | **Fair** | **Bad** |
| **W3** (n=1,123) | 40.61 | 28.05 | 24.31 | 7.03 |
| **W4** (n=1,003) | 42.47 | 25.82 | 25.72 | 5.98 |
| **W5** (n=910) | 42.86 | 26.81 | 22.86 | 7.47 |
| **W6** (n=777) | 44.79 | 25.87 | 22.14 | 7.21 |
| **W7** (n=691) | 45.59 | 24.31 | 23.88 | 6.22 |
| **W8** (n=614) | 46.09 | 24.59 | 21.01 | 8.31 |
| **W9** (n=550) | 46.36 | 22.73 | 22.36 | 8.55 |
| **W10** (n=473) | 47.57 | 23.68 | 21.99 | 6.77 |
| **W11** (n=420) | 46.90 | 23.33 | 23.57 | 6.19 |
| **TEST** | **Chi²** | **p value** | | |
| **Pearson Chi²** | 15.31 | 0.9114 | | |

**APPENDIX TABLE VII-29:** Marital status by partnership status over the study waves (PSBH 1994-2002)

| | | MARITAL STATUS | | | | |
|---|---|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **PARTNERSHIP STATUS** | **Married** | **Separated** | **Divorced** | **Widowed** | **Single** |
| **W3*** ** | **Not in couple** (n=456) | 0.22 | 1.32 | 6.58 | 79.61 | 12.28 |
| | **In couple** (n=667) | 97.15 | 0.15 | 0.15 | 2.55 | 0.00 |
| **W4*** ** | **Not in couple** (n=426) | 0.23 | 1.41 | 6.81 | 78.87 | 12.68 |
| | **In couple** (n=577) | 97.92 | 0.35 | 0.00 | 1.73 | 0.00 |
| **W5*** ** | **Not in couple** (n=390) | 0.51 | 1.54 | 6.92 | 79.23 | 11.79 |
| | **In couple** (n=520) | 97.69 | 0.38 | 0.00 | 1.92 | 0.00 |
| **W6*** ** | **Not in couple** (n=348) | 0.86 | 1.44 | 6.32 | 79.31 | 12.07 |
| | **In couple** (n=429) | 98.14 | 0.23 | 0.00 | 1.63 | 0.00 |
| **W7** * | **Not in couple** (n=315) | 1.27 | 1.59 | 6.67 | 78.10 | 12.38 |
| | **In couple** (n=376) | 98.14 | 0.27 | 0.00 | 1.60 | 0.00 |
| **W8** | **Not in couple** (n=283) | 1.06 | 1.41 | 6.36 | 79.15 | 12.01 |
| | **In couple** (n=331) | 98.19 | 0.00 | 0.30 | 1.51 | 0.00 |
| **W9*** ** | **Not in couple** (n=255) | 1.57 | 1.18 | 6.27 | 78.43 | 12.55 |
| | **In couple** (n=295) | 98.31 | 0.00 | 0.34 | 1.36 | 0.00 |
| **W10*** ** | **Not in couple** (n=225) | 1.78 | 0.89 | 6.22 | 80.00 | 11.11 |
| | **In couple** (n=248) | 98.39 | 0.00 | 0.40 | 1.21 | 0.00 |
| **W11*** ** | **Not in couple** (n=197) | 1.02 | 1.02 | 6.60 | 80.20 | 11.17 |
| | **In couple** (n=223) | 98.21 | 0.00 | 0.45 | 1.35 | 0.00 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-30:** Partnership status of men and woman over the study waves (PSBH 1994-2002)

| WAVE AND CHI² SIG. | GENDER | PARTNERSHIP STATUS: Not in couple | PARTNERSHIP STATUS: In couple |
|---|---|---|---|
| **W3***** | **Man** (n=491) | 23.83 | 76.17 |
| | **Woman** (n=632) | 53.64 | 46.36 |
| **W4***** | **Man** (n=440) | 25.00 | 75.00 |
| | **Woman** (n=563) | 56.13 | 43.87 |
| **W5***** | **Man** (n=400) | 25.50 | 74.50 |
| | **Woman** (n=510) | 56.47 | 43.53 |
| **W6***** | **Man** (n=338) | 27.51 | 72.49 |
| | **Woman** (n=439) | 58.09 | 41.91 |
| **W7***** | **Man** (n=296) | 27.36 | 72.64 |
| | **Woman** (n=395) | 59.24 | 40.76 |
| **W8***** | **Man** (n=263) | 27.76 | 72.24 |
| | **Woman** (n=351) | 59.83 | 40.17 |
| **W9***** | **Man** (n=235) | 27.66 | 72.34 |
| | **Woman** (n=315) | 60.32 | 39.68 |
| **W10***** | **Man** (n=198) | 27.78 | 72.22 |
| | **Woman** (n=275) | 61.82 | 38.18 |
| **W11***** | **Man** (n=181) | 29.28 | 70.72 |
| | **Woman** (n=239) | 60.25 | 39.75 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-31A:** Study sample by number of children level over the study waves (PSBH 1994-2002)

| SAMPLE SIZE | NUMBER OF CHILDREN: No child | 1 child | 2+ children |
|---|---|---|---|
| **W3** (n=1,123) | 17.01 | 22.44 | 60.55 |
| **W4** (n=1,003) | 16.25 | 23.03 | 60.72 |
| **W5** (n=910) | 15.93 | 23.74 | 60.33 |
| **W6** (n=777) | 16.22 | 23.29 | 60.49 |
| **W7** (n=691) | 16.35 | 23.44 | 60.20 |
| **W8** (n=614) | 16.45 | 23.13 | 60.42 |
| **W9** (n=550) | 15.27 | 22.55 | 62.18 |
| **W10** (n=473) | 13.95 | 23.04 | 63.00 |
| **W11** (n=420) | 13.81 | 22.62 | 63.57 |

| TEST | Chi² | p value |
|---|---|---|
| **Pearson Chi²** | 5.27 | 0.9942 |

**APPENDIX TABLE VII-31B:** Survival function by number of children level (PSBH 1994-2002)

| WAVE | NUMBER OF CHILDREN: No child (initial n=191) | 1 child (initial n=252) | 2+ children (initial n=680) |
|---|---|---|---|
| **W3** | 100.00 | 100.00 | 100.00 |
| **W4** | 85.34 | 91.67 | 89.56 |
| **W5** | 75.92 | 85.71 | 80.74 |
| **W6** | 65.97 | 71.83 | 69.12 |
| **W7** | 59.16 | 64.29 | 61.18 |
| **W8** | 52.88 | 56.35 | 54.56 |
| **W9** | 43.98 | 49.21 | 50.29 |
| **W10** | 34.55 | 43.25 | 43.82 |
| **W11** | 30.37 | 37.70 | 39.26 |

| TEST | Chi² | p value |
|---|---|---|
| **Log-Rank** | 7.45 | 0.0241 |
| **Wilcoxon** | 7.73 | 0.0209 |

**APPENDIX TABLE VII-32A:** Study sample by number of daughters level over the study waves (PSBH 1994-2002)

| | NUMBER OF DAUGHTERS | | |
|---|---|---|---|
| **SAMPLE SIZE** | **No daughter** | **1 daughter** | **2+ daughters** |
| **W3** (n=1,123) | 35.17 | 33.21 | 31.61 |
| **W4** (n=1,003) | 34.60 | 34.30 | 31.11 |
| **W5** (n=910) | 34.62 | 33.85 | 31.54 |
| **W6** (n=777) | 35.14 | 33.20 | 31.66 |
| **W7** (n=691) | 35.46 | 34.59 | 29.96 |
| **W8** (n=614) | 35.02 | 34.20 | 30.78 |
| **W9** (n=550) | 33.82 | 34.55 | 31.64 |
| **W10** (n=473) | 32.98 | 35.52 | 31.50 |
| **W11** (n=420) | 30.95 | 37.14 | 31.90 |
| **TEST** | **Chi²** | **p** | |
| **Pearson Chi²** | 4.95 | 0.9960 | |

**APPENDIX TABLE VII-32B:** Survival function by number of daughters level (PSBH 1994-2002)

| | NUMBER OF DAUGHTERS | | |
|---|---|---|---|
| **WAVE** | **No daughter** (initial n=395) | **1 daughter** (initial n=373) | **2+ daughters** (initial n=355) |
| **W3** | 100.00 | 100.00 | 100.00 |
| **W4** | 87.85 | 92.23 | 87.89 |
| **W5** | 79.75 | 82.57 | 80.85 |
| **W6** | 69.11 | 69.17 | 69.30 |
| **W7** | 62.03 | 64.08 | 58.31 |
| **W8** | 54.43 | 56.30 | 53.24 |
| **W9** | 47.09 | 50.94 | 49.01 |
| **W10** | 39.49 | 45.04 | 41.97 |
| **W11** | 32.91 | 41.82 | 37.75 |
| **TEST** | **Chi²** | **p value** | |
| **Log-Rank** | 14.84 | 0.0006 | |
| **Wilcoxon** | 13.51 | 0.0012 | |

**APPENDIX TABLE VII-33A:** Study sample by number of sons level over the study waves (PSBH 1994-2002)

| | NUMBER OF SONS | | |
|---|---|---|---|
| **SAMPLE SIZE** | **No son** | **1 son** | **2+ sons** |
| **W3** (n=1,123) | 42.39 | 27.25 | 30.37 |
| **W4** (n=1,003) | 41.97 | 26.72 | 31.31 |
| **W5** (n=910) | 42.31 | 27.03 | 30.66 |
| **W6** (n=777) | 41.83 | 27.03 | 31.15 |
| **W7** (n=691) | 41.68 | 27.21 | 31.11 |
| **W8** (n=614) | 42.67 | 25.57 | 31.76 |
| **W9** (n=550) | 40.55 | 25.82 | 33.64 |
| **W10** (n=473) | 39.32 | 26.64 | 34.04 |
| **W11** (n=420) | 38.57 | 26.19 | 35.24 |
| **TEST** | **Chi²** | **p value** | |
| **Pearson Chi²** | 7.18 | 0.9697 | |

**APPENDIX TABLE VII-33B:** Survival function by number of sons level (PSBH 1994-2002)

| | NUMBER OF SONS | | |
|---|---|---|---|
| **WAVE** | **No son** (initial n=476) | **1 son** (initial n=306) | **2+ sons** (initial n=341) |
| **W3** | 100.00 | 100.00 | 100.00 |
| **W4** | 88.45 | 87.58 | 92.08 |
| **W5** | 80.88 | 80.39 | 81.82 |
| **W6** | 68.28 | 68.63 | 70.97 |
| **W7** | 60.50 | 61.44 | 63.05 |
| **W8** | 55.04 | 51.31 | 57.18 |
| **W9** | 46.85 | 46.41 | 54.25 |
| **W10** | 39.08 | 41.18 | 47.21 |
| **W11** | 34.03 | 35.95 | 43.40 |
| **TEST** | **Chi²** | **p value** | |
| **Log-Rank** | 11.02 | 0.0041 | |
| **Wilcoxon** | 11.49 | 0.0032 | |

**APPENDIX TABLE VII-34:** Study sample by closest child proximity over the study waves (PSBH 1994-2002)

| | CLOSEST CHILD PROXIMITY | | | | |
|---|---|---|---|---|---|
| **SAMPLE SIZE** | **Cohabiting** | **<1 Km** | **1-9 Km** | **10-49 Km** | **>49 Km or no child** |
| **W3** (n=1,123) | 10.95 | 26.89 | 25.11 | 12.20 | 24.84 |
| **W4** (n=1,003) | 11.47 | 25.72 | 26.52 | 12.06 | 24.23 |
| **W5** (n=910) | 10.77 | 25.27 | 28.24 | 11.98 | 23.74 |
| **W6** (n=777) | 10.94 | 26.00 | 29.09 | 10.68 | 23.29 |
| **W7** (n=691) | 9.99 | 26.48 | 29.23 | 11.43 | 22.87 |
| **W8** (n=614) | 9.45 | 26.87 | 29.97 | 11.07 | 22.64 |
| **W9** (n=550) | 9.09 | 25.09 | 32.55 | 10.91 | 22.36 |
| **W10** (n=473) | 8.46 | 26.85 | 31.50 | 12.05 | 21.14 |
| **W11** (n=420) | 8.10 | 30.48 | 30.71 | 11.19 | 19.52 |
| **TEST** | **Chi²** | **p value** | | | |
| **Pearson Chi²** | 4.95 | 0.9960 | | | |

**APPENDIX TABLE VII-35:**
Closest child proximity distribution for number of children over the study waves (PSBH 1994-2002)

| | | CLOSEST CHILD PROXIMITY | | | | |
|---|---|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **NUMBER OF CHILDREN** | **Cohabiting** | **< 1 Km** | **1-9 Km** | **10-49 Km** | **> 49 Km** |
| **W3*** ** | **1 child** (n=252) | 6.75 | 24.21 | 28.17 | 22.22 | 18.65 |
| | **2 children** (n=259) | 11.20 | 29.73 | 32.82 | 17.37 | 8.88 |
| | **3 children** (n=184) | 20.65 | 28.26 | 32.61 | 11.41 | 7.07 |
| | **4 children** (n=237) | 16.46 | 47.26 | 27.85 | 6.33 | 2.11 |
| **W4*** ** | **1 child** (n=231) | 7.79 | 22.08 | 28.14 | 25.11 | 16.88 |
| | **2 children** (n=223) | 10.76 | 33.18 | 33.18 | 14.35 | 8.52 |
| | **3 children** (n=168) | 22.02 | 26.79 | 32.74 | 10.12 | 8.33 |
| | **4 children** (n=218) | 16.51 | 40.37 | 33.03 | 6.42 | 3.67 |
| **W5*** ** | **1 child** (n=216) | 6.94 | 27.31 | 28.24 | 20.37 | 17.13 |
| | **2 children** (n=202) | 8.42 | 33.17 | 33.66 | 14.85 | 9.90 |
| | **3 children** (n=150) | 22.00 | 23.33 | 35.33 | 13.33 | 6.00 |
| | **4 children** (n=197) | 16.75 | 35.03 | 38.07 | 7.61 | 2.54 |
| **W6** *** | **1 child** (n=181) | 6.63 | 29.28 | 32.04 | 16.57 | 15.47 |
| | **2 children** (n=171) | 9.94 | 33.92 | 31.58 | 16.37 | 8.19 |
| | **3 children** (n=131) | 21.37 | 23.66 | 37.40 | 11.45 | 6.11 |
| | **4 children** (n=168) | 16.67 | 35.71 | 38.69 | 5.95 | 2.98 |
| **W7** *** | **1 child** (n=162) | 5.56 | 30.86 | 31.48 | 17.90 | 14.20 |
| | **2 children** (n=159) | 10.06 | 32.70 | 32.70 | 15.72 | 8.81 |
| | **3 children** (n=118) | 19.49 | 27.12 | 38.98 | 11.02 | 3.39 |
| | **4 children** (n=139) | 15.11 | 35.25 | 38.13 | 8.63 | 2.88 |
| **W8** *** | **1 child** (n=142) | 4.93 | 31.69 | 33.10 | 17.61 | 12.68 |
| | **2 children** (n=141) | 9.93 | 32.62 | 33.33 | 14.89 | 9.22 |
| | **3 children** (n=104) | 17.31 | 29.81 | 40.38 | 9.62 | 2.88 |
| | **4 children** (n=126) | 15.08 | 34.13 | 38.10 | 9.52 | 3.17 |
| **W9** ** | **1 child** (n=124) | 5.65 | 29.03 | 33.87 | 17.74 | 13.71 |
| | **2 children** (n=129) | 8.53 | 31.78 | 37.21 | 12.40 | 10.08 |
| | **3 children** (n=91) | 18.68 | 26.37 | 41.76 | 8.79 | 4.40 |
| | **4 children** (n=122) | 12.30 | 30.33 | 41.80 | 11.48 | 4.10 |
| **W10** *** | **1 child** (n=109) | 4.59 | **28.44** | 33.03 | 17.43 | 16.51 |
| | **2 children** (n=111) | 5.41 | 36.04 | 34.23 | 15.32 | 9.01 |
| | **3 children** (n=83) | **18.07** | 21.69 | 42.17 | 14.46 | 3.61 |
| | **4 children** (n=104) | 13.46 | 36.54 | 38.46 | 8.65 | 2.88 |
| **W11** *** | **1 child** (n=95) | **4.21** | 31.58 | 34.74 | 18.95 | 10.53 |
| | **2 children** (n=97) | 5.15 | **38.14** | ***32.99*** | ***13.40*** | ***10.31*** |
| | **3 children** (n=75) | 14.67 | 22.67 | 48.00 | 13.33 | 1.33 |
| | **4 children** (n=95) | **14.74** | 46.32 | 29.47 | 6.32 | 3.16 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-36:**
Study sample by ability to make ends meet over the study waves, before and after imputation (PSBH 1994-2002)

| | | ABILITY TO MAKE ENDS MEET | | |
|---|---|---|---|---|
| **WAVE** | | **Easily** | **Fairly** | **Hardly** |
| **Wave 3** | **Before** (n=1,123) | 35.72 | 34.65 | 29.63 |
| | **After** (n=1,117) | 35.53 | 34.82 | 29.65 |
| **Wave 4** | **Before** (n=985) | 36.19 | 30.71 | 33.10 |
| | **After** (n=1,003) | 36.19 | 30.71 | 33.10 |
| **Wave 5** | **Before** (n=895) | 35.31 | 32.40 | 32.29 |
| | **After** (n=910) | 35.49 | 32.31 | 32.20 |
| **Wave 6** | **Before**(n=770) | 34.42 | 31.95 | 33.64 |
| | **After** (n=777) | 34.11 | 32.18 | 33.72 |
| **Wave 7** | **Before** (n=678) | 39.53 | 31.12 | 29.35 |
| | **After** (n=691) | 39.22 | 30.97 | 29.81 |
| **Wave 8** | **Before** (n=610) | 39.18 | 27.54 | 33.28 |
| | **After** (n=614) | 39.09 | 28.01 | 32.90 |
| **Wave 9** | **Before** (n=544) | 37.50 | 29.04 | 33.46 |
| | **After** (n=550) | 37.82 | 28.91 | 33.27 |
| **Wave 10** | **Before** (n=467) | 39.19 | 30.62 | 30.19 |
| | **After** (n=473) | 39.32 | 30.23 | 30.44 |
| **Wave 11** | **Before** (n=420) | 36.43 | 34.29 | 29.29 |
| | **After** (n=420) | 37.14 | 33.81 | 29.05 |

**APPENDIX TABLE VII-37:**
Ability to make ends meet distribution by education level over the study waves (PSBH 1994-2002)

| | | ABILITY TO MAKE ENDS MEET | | |
|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **EDUCATION LEVEL** | **Easily** | **Fairly** | **Hardly** |
| **W3***** | **Primary or less** (n=521) | 29.17 | 32.05 | 38.77 |
| | **Lower secondary** (n=243) | 34.16 | 37.86 | 27.98 |
| | **Upper secondary** (n=215) | 42.33 | 35.81 | 21.86 |
| | **Higher education** (n=144) | 50.69 | 38.19 | 11.11 |
| **W4***** | **Primary or less** (n=447) | 26.62 | 31.54 | 41.83 |
| | **Lower secondary** (n=222) | 31.98 | 33.78 | 34.23 |
| | **Upper secondary** (n=202) | 46.53 | 28.22 | 25.25 |
| | **Higher education** (n=132) | 59.85 | 26.52 | 13.64 |
| **W5***** | **Primary or less** (n=395) | 25.82 | 32.15 | 42.03 |
| | **Lower secondary** (n=205) | 32.20 | 36.10 | 31.71 |
| | **Upper secondary** (n=185) | 42.70 | 33.51 | 23.78 |
| | **Higher education** (n=125) | 60.80 | 24.80 | 14.40 |
| **W6***** | **Primary or less** (n=335) | 28.36 | 27.16 | 44.48 |
| | **Lower secondary** (n=177) | 26.55 | 37.85 | 35.59 |
| | **Upper secondary** (n=158) | 39.87 | 36.71 | 23.42 |
| | **Higher education** (n=107) | 56.07 | 31.78 | 12.15 |
| **W7***** | **Primary or less** (n=288) | 28.47 | 32.64 | 38.89 |
| | **Lower secondary** (n=161) | 31.68 | 37.27 | 31.06 |
| | **Upper secondary** (n=147) | 56.46 | 22.45 | 21.09 |
| | **Higher education** (n=95) | 57.89 | 28.42 | 13.68 |
| **W8***** | **Primary or less** (n=250) | 31.60 | 26.00 | 42.40 |
| | **Lower secondary** (n=143) | 35.66 | 30.07 | 34.27 |
| | **Upper secondary** (n=135) | 46.67 | 29.63 | 23.70 |
| | **Higher education** (n=86) | 54.65 | 27.91 | 17.44 |
| **W9***** | **Primary or less** (n=223) | 24.66 | 31.39 | 43.95 |
| | **Lower secondary** (n=130) | 37.69 | 26.92 | 35.38 |
| | **Upper secondary** (n=122) | 48.36 | 30.33 | 21.31 |
| | **Higher education** (n=75) | 60.00 | 22.67 | 17.33 |
| **W10***** | **Primary or less** (n=185) | 31.89 | 27.03 | 41.08 |
| | **Lower secondary** (n=116) | 32.76 | 38.79 | 28.45 |
| | **Upper secondary** (n=107) | 50.47 | 25.23 | 24.30 |
| | **Higher education** (n=65) | 53.85 | 32.31 | 13.85 |
| **W11***** | **Primary or less** (n=166) | 27.11 | 35.54 | 37.35 |
| | **Lower secondary** (n=103) | 34.95 | 34.95 | 30.10 |
| | **Upper secondary** (n=90) | 46.67 | 30.00 | 23.33 |
| | **Higher education** (n=61) | 54.10 | 32.79 | 13.11 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VII-38:**
Ability to make ends meet distribution by partnership status over the study waves
(PSBH 1994-2002)

| | | ABILITY TO MAKE ENDS MEET | | |
|---|---|---|---|---|
| **WAVE AND CHI² SIG.** | **PARTNERSHIP STATUS** | **Easily** | **Fairly** | **Hardly** |
| **W3***** | **Not in couple** (n=456) | 31.80 | 32.46 | 35.75 |
| | **In couple** (n=667) | 38.08 | 36.43 | 25.49 |
| **W4***** | **Not in couple** (n=426) | 32.16 | 27.00 | 40.85 |
| | **In couple** (n=577) | 39.17 | 33.45 | 27.38 |
| **W5***** | **Not in couple** (n=390) | 28.72 | 32.31 | 38.97 |
| | **In couple** (n=520) | 40.58 | 32.31 | 27.12 |
| **W6***** | **Not in couple** (n=348) | 31.03 | 26.44 | 42.53 |
| | **In couple** (n=429) | 36.60 | 36.83 | 26.57 |
| **W7**** | **Not in couple** (n=315) | 34.92 | 30.16 | 34.92 |
| | **In couple** (n=376) | 42.82 | 31.65 | 25.53 |
| **W8** | **Not in couple** (n=283) | 36.04 | 28.98 | 34.98 |
| | **In couple** (n=331) | 41.69 | 27.19 | 31.12 |
| **W9***** | **Not in couple** (n=255) | 31.76 | 28.24 | 40.00 |
| | **In couple** (n=295) | 43.05 | 29.49 | 27.46 |
| **W10***** | **Not in couple** (n=225) | 32.44 | 29.78 | 37.78 |
| | **In couple** (n=248) | 45.56 | 30.65 | 23.79 |
| **W11***** | **Not in couple** (n=197) | 29.95 | 31.98 | 38.07 |
| | **In couple** (n=223) | 43.50 | 35.43 | 21.08 |

*Note*: *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

# *CHAPTER VIII*

**APPENDIX TABLE VIII-1:** Characteristics of the study sample at wave 3 by birth cohort (PSBH 1994)

| | BIRTH COHORT | | | | | |
|---|---|---|---|---|---|---|
| **CHARACTERISTICS** | **1925-1929** | **1920-1924** | **1915-1919** | **1910-1914** | **Before 1910** | **All cohorts** |
| **Gender** (***) | (n= 378) | (n=346) | (n=189) | (n=138) | (n=72) | (n=1,123) |
| Man | 48.41 | 44.51 | 39.15 | 44.20 | 26.39 | 43.72 |
| Woman | 51.59 | 55.49 | 60.85 | 55.80 | 73.61 | 56.28 |
| **Religiosity** (ns) | | | | | | |
| Non-religious | 23.81 | 22.25 | 22.75 | 20.29 | 18.06 | 22.35 |
| Religious | 76.19 | 77.75 | 77.25 | 79.71 | 81.94 | 77.65 |
| **Education** (***) | | | | | | |
| Higher education | 15.61 | 10.12 | 12.17 | 12.32 | 13.89 | 12.82 |
| Upper secondary | 18.52 | 22.54 | 20.11 | 13.04 | 15.28 | 19.15 |
| Lower secondary | 25.93 | 23.70 | 16.93 | 15.94 | 12.50 | 21.64 |
| Primary or less | 39.95 | 43.64 | 50.79 | 58.70 | 58.33 | 46.39 |
| **Last occupational status** (ns) | | | | | | |
| Never worked | 21.43 | 21.39 | 22.75 | 22.46 | 34.72 | 22.62 |
| Blue collar | 32.01 | 26.01 | 29.10 | 35.51 | 23.61 | 29.56 |
| White collar | 25.40 | 31.50 | 26.46 | 22.46 | 18.06 | 26.63 |
| Self-employed | 14.81 | 15.32 | 15.87 | 15.22 | 12.50 | 15.05 |
| Other | 6.35 | 5.78 | 5.82 | 4.35 | 11.11 | 6.14 |
| **Region (*)** | | | | | | |
| Flanders | 43.92 | 43.64 | 43.39 | 52.90 | 52.78 | 45.41 |
| Wallonia | 43.65 | 43.93 | 44.97 | 28.99 | 31.94 | 41.41 |
| Brussels | 12.43 | 12.43 | 11.64 | 18.12 | 15.28 | 13.18 |
| **Urbanisation level** (ns) | | | | | | |
| City | 44.71 | 46.82 | 45.50 | 49.28 | 40.28 | 45.77 |
| Town | 28.84 | 29.48 | 29.63 | 29.71 | 37.50 | 29.83 |
| Countryside | 26.46 | 23.70 | 24.87 | 21.01 | 22.22 | 24.40 |
| **Subjective health** (W3:***) | | | | | | |
| Good | 51.06 | 46.82 | 38.62 | 36.23 | 47.22 | 45.59 |
| Fair | 38.36 | 41.33 | 46.56 | 41.30 | 36.11 | 40.87 |
| Bad | 10.58 | 11.85 | 14.81 | 22.46 | 16.67 | 13.54 |
| **Disability** (W3: **) | | | | | | |
| None | 81.48 | 82.66 | 72.49 | 76.09 | 80.56 | 79.61 |
| Moderated | 9.26 | 6.65 | 15.87 | 9.42 | 4.17 | 9.26 |
| Severe | 9.26 | 10.69 | 11.64 | 14.49 | 15.28 | 11.13 |
| **Recent hospitalisation** (W3: ns) | | | | | | |
| No | 84.92 | 80.35 | 78.31 | 78.26 | 75.00 | 80.94 |
| Yes | 15.08 | 19.65 | 21.69 | 21.74 | 25.00 | 19.06 |
| **Ability to make ends meet** (W3: *) | | | | | | |
| Easily | 35.53 | 34.66 | 39.02 | 40.74 | 25.36 | 29.17 |
| Fairly | 33.60 | 35.26 | 31.22 | 39.13 | 40.28 | 34.82 |
| Hardly | 31.75 | 25.72 | 28.04 | 35.51 | 30.56 | 29.65 |
| **Family constellation** (W3: ***) | | | | | | |
| Family-less | 7.67 | 8.09 | 12.7 | 13.77 | 20.83 | 10.24 |
| Only spouse | 6.35 | 7.23 | 7.94 | 5.80 | 5.56 | 6.77 |
| Spouse & daughter(s) | 25.40 | 15.90 | 10.05 | 11.59 | 6.94 | 17.01 |
| Spouse & son(s) | 12.43 | 13.29 | 11.64 | 5.07 | 4.17 | 11.13 |
| Spouse, daughter(s)&son(s) | 31.22 | 26.59 | 17.46 | 19.57 | 6.94 | 24.49 |
| Only children | 16.93 | 28.9 | 40.21 | 44.20 | 55.56 | 30.37 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Spousal health** (W3: ***) | | | | | | |
| Not in couple | 76.39 | 57.97 | 52.91 | 36.99 | 24.60 | 40.61 |
| Good | 9.72 | 15.94 | 19.05 | 29.19 | 39.42 | 28.05 |
| Fair | 5.56 | 18.84 | 20.11 | 26.88 | 29.63 | 24.31 |
| Bad | 8.33 | 7.25 | 7.94 | 6.94 | 6.35 | 7.03 |
| **Closest child proximity** (W3: ***) | | | | | | |
| Cohabiting | 11.38 | 12.14 | 6.88 | 8.70 | 18.06 | 10.95 |
| <1 Km | 27.25 | 28.03 | 29.10 | 22.46 | 22.22 | 26.89 |
| 1-9 Km | 28.04 | 25.72 | 22.22 | 23.91 | 16.67 | 25.11 |
| 10-49 Km | 12.43 | 8.96 | 16.40 | 15.94 | 8.33 | 12.20 |
| >49 Km/no child | 20.90 | 25.14 | 25.40 | 28.99 | 34.72 | 24.84 |
| **Attrition status (***)** | | | | | | |
| Attritors | 53.17 | 58.38 | 64.55 | 78.26 | 97.22 | 62.60 |
| Non-attritor | 46.83 | 41.62 | 35.45 | 21.01 | 2.78 | 37.40 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VIII-2:** Care characteristics of the oldest old and of the '1910-1914' (PSBH 1994-2002)

| | BIRTH COHORT | |
|---|---|---|
| | **1910-1014** | **Before 1910** |
| **CARE CHARACTERISTICS** | (n=73) | (n=37) |
| **Always mixed care** | 45.21 | 67.57 |
| **Daughter(s) care only** | 31.51 | 32.43 |
| **Only 1 CG** | 21.92 | 35.14 |
| **Ever IADL&ADL care** | 68.49 | 62.16 |

**APPENDIX TABLE VIII-3:** Proportion of the oldest old (born before 1910) among the very old (born before 1914) by wave (PSBH 1994-2002)

| **SAMPLE SIZE** | **%** |
|---|---|
| **W3** (n=210) | 34.29 |
| **W4** (n=170) | 30.59 |
| **W5** (n=141) | 26.24 |
| **W6** (n=101) | 23.64 |
| **W7** (n=89) | 21.35 |
| **W8** (n=68) | 14.71 |
| **W9** (n=54) | 11.11 |
| **W10** (n=40) | 10.00 |
| **W11** (n=32) | 6.25 |

**APPENDIX TABLE VIII-4:** Proportion of respondents using care services by birth cohort (PSBH 1994-2002)

| | WAVE | |
|---|---|---|
| **BIRTH COHORT** | **Wave 3 (1994)** | **Last study wave** |
| **1925-1929** (n=378) | 34.92 | 51.32 |
| **1920-1924** (n=346) | 47.40 | 60.12 |
| **1915-1919** (n=189) | 65.61 | 78.31 |
| **Before 1915** (n=210) | 75.71 | 84.29 |

**APPENDIX TABLE VIII- 5:** Mean predicted probability of having ever received care services by gender, region and cohort group (PSBH 1994-2002, n=1,123)

| MEN | | WOMEN | |
|---|---|---|---|
| **Profile** | **Prob.** | **Profile** | **Prob.** |
| **1920-29, Flanders** (n=152) | 0.66 | **1920-29, Flanders** (n=165) | 0.70 |
| **1920-29, Wallonia** (n=138) | 0.67 | **1920-29, Wallonia** (n=179) | 0.74 |
| **1920-29, Brussels** (n=47) | 0.55 | **1920-29, Brussels** (n=43) | 0.78 |
| **1915-19, Flanders** (n=26) | 0.83 | **1915-19, Flanders** (n=56) | 0.89 |
| **1915-19, Wallonia** (n=37) | 0.81 | **1915-19, Wallonia** (n=48) | 0.91 |
| **1915-19, Brussels** (n=11) | 0.77 | **1915-19, Brussels** (n=11) | 0.85 |
| **Very old, Flanders** (n=43) | 0.87 | **Very old, Flanders** (n=68) | 0.92 |
| **Very old, Wallonia** (n=24) | 0.89 | **Very old, Wallonia** (n=39) | 0.94 |
| **Very old, Brussels** (n=13) | 0.81 | **Very old, Brussels** (n=23) | 0.88 |

**APPENDIX TABLE VIII-6:** Health by IADL care combination and family membership over the study waves (PSBH 1994-2002)

| | | FAMILY MEMBERSHIP AND IADL CARE COMBINATION | | | | | |
|---|---|---|---|---|---|---|---|
| **WAVE AND CHI$^2$ SIG.** | **HEALTH** | **FL: No Care** | **FL: Care services** | **FM: No care** | **FM: Care services** | **FM: Family care** | **FM: Mixed care** |
| **W3** | No problem | 58.33 | 29.11 | 54.09 | 42.59 | 43.24 | 39.13 |
| FL (n=115) invalid | Subjective problem | 36.11 | 46.84 | 32.19 | 35.56 | 35.14 | 35.65 |
| FM (n=838)** | Moderate disability | 2.78 | 11.39 | 6.60 | 11.85 | 9.46 | 12.17 |
| | Severe disability | 2.78 | 12.66 | 7.12 | 10.00 | 12.16 | 13.04 |
| **W4** | No problem | 62.07 | 33.82 | 50.93 | 38.68 | 30.56 | 31.86 |
| FL (n=97)* | Subjective problem | 17.24 | 29.41 | 29.94 | 29.63 | 41.67 | 29.20 |
| FM (n=752)*** | Moderate disability | 17.24 | 20.59 | 10.80 | 12.35 | 13.89 | 19.47 |
| | Severe disability | 3.45 | 16.18 | 8.33 | 19.34 | 13.89 | 19.47 |
| **W5** | No problem | 51.61 | 26.42 | 54.95 | 35.93 | 45.10 | 29.57 |
| FL (n=84)** | Subjective problem | 29.03 | 26.42 | 24.91 | 28.14 | 29.41 | 39.13 |
| FM (n=690)*** | Moderate disability | 12.90 | 18.87 | 10.24 | 15.58 | 11.76 | 13.04 |
| | Severe disability | 6.45 | 28.30 | 9.90 | 20.35 | 13.73 | 18.26 |
| **W6** | No problem | 50.00 | 36.54 | 51.36 | 41.11 | 33.33 | 38.61 |
| FL (n=76) invalid | Subjective problem | 33.33 | 25.00 | 29.55 | 26.67 | 33.33 | 25.74 |
| FM (n=546)** | Moderate disability | 8.33 | 15.38 | 10.45 | 20.56 | 20.00 | 15.84 |
| | Severe disability | 8.33 | 23.08 | 8.64 | 11.67 | 13.33 | 19.80 |
| **W7** | No problem | 56.25 | 23.08 | 51.50 | 40.10 | 40.74 | 21.98 |
| FL (n=68) invalid | Subjective problem | 25.00 | 23.08 | 24.50 | 15.10 | 18.52 | 29.67 |
| FM (n=510)*** | Moderate disability | 6.25 | 21.15 | 17.00 | 26.56 | 14.81 | 25.27 |
| | Severe disability | 12.50 | 32.69 | 7.00 | 18.23 | 25.93 | 23.08 |
| **W8** | No problem | 41.67 | 26.09 | 55.36 | 34.97 | 50.00 | 24.14 |
| FL (n=58) invalid | Subjective problem | 33.33 | 30.43 | 23.81 | 29.37 | 23.68 | 28.74 |
| FM (n=436)*** | Moderate disability | 16.67 | 21.74 | 13.10 | 23.78 | 21.05 | 19.54 |
| | Severe disability | 8.33 | 21.74 | 7.74 | 11.89 | 5.26 | 27.59 |
| **W9** | No problem | 66.67 | 20.00 | 49.64 | 42.11 | 42.86 | 27.16 |
| FL (n=50) invalid | Subjective problem | 20.00 | 34.29 | 30.22 | 27.07 | 31.43 | 28.40 |
| FM (n=388)*** | Moderate disability | 13.33 | 20.00 | 15.83 | 20.30 | 14.29 | 19.75 |
| | Severe disability | 0.00 | 25.71 | 4.32 | 10.53 | 11.43 | 24.69 |
| **W10** | No problem | 62.50 | 30.00 | 50.91 | 47.32 | 48.28 | 30.95 |
| FL (n=38) invalid | Subjective problem | 25.00 | 26.67 | 30.00 | 16.96 | 20.69 | 32.14 |
| FM (n=335)** | Moderate disability | 12.50 | 20.00 | 10.00 | 19.64 | 20.69 | 15.48 |
| | Severe disability | 0.00 | 23.33 | 9.09 | 16.07 | 10.34 | 21.43 |
| **W11** | No problem | 66.67 | 19.23 | 52.94 | 46.59 | 37.50 | 31.76 |
| FL (n=32) invalid | Subjective problem | 33.33 | 38.46 | 28.24 | 20.45 | 20.83 | 22.35 |
| FM (n=282)** | Moderate disability | 0.00 | 11.54 | 12.94 | 17.05 | 16.67 | 22.35 |
| | Severe disability | 0.00 | 30.77 | 5.88 | 15.91 | 25.00 | 23.53 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VIII-7:** Characteristics of the study sample at wave 3 by family constellation (PSBH 1994)

| | FAMILY CONSTELLATIONS | | | | | | |
|---|---|---|---|---|---|---|---|
| **CHARACTERISTICS** | **Family-less** | **Only spouse** | **Spouse & daughter(s)** | **Spouse & son(s)** | **Spouse, daughter(s) & son(s)** | **Only children** | **All constellations** |
| **Gender** (***) | (n=115) | (n=76) | (n=194) | (n=125) | (n=276) | (n=337) | (n=1123) |
| Man | 34.78 | 53.95 | 59.79 | 52.80 | 55.80 | 21.96 | 43.72 |
| Woman | 65.22 | 46.05 | 40.21 | 47.20 | 44.20 | *78.04* | 56.28 |
| **Birth cohort** (***) | | | | | | | |
| 1925-1929 | 25.22 | 31.58 | 50.00 | 37.60 | 43.12 | 18.40 | 33.66 |
| 1920-1924 | 24.35 | 32.89 | 29.38 | 36.80 | 33.33 | 29.08 | 30.81 |
| 1915-1919 | 20.87 | 19.74 | 9.79 | 17.60 | 11.96 | 22.55 | 16.83 |
| 1910-1914 | 16.52 | 10.53 | 8.25 | 5.60 | 9.78 | 18.10 | 12.29 |
| Before 1910 | 13.04 | 5.26 | 2.58 | 2.40 | 1.81 | 11.87 | 6.41 |
| **Religiosity** (ns) | | | | | | | |
| Non-religious | 21.74 | 30.26 | 24.74 | 23.20 | 18.84 | 21.96 | 22.35 |
| Religious | 78.26 | 69.74 | 75.26 | 76.80 | 81.16 | 78.04 | 77.65 |
| **Education** (***) | | | | | | | |
| Higher education | 11.30 | 9.21 | 15.98 | 11.20 | 15.94 | 10.39 | 12.82 |
| Upper secondary | 17.39 | 22.37 | 22.68 | 17.60 | 20.65 | 16.32 | 19.15 |
| Lower secondary | 17.39 | 25.00 | 25.77 | 20.80 | 17.75 | 23.44 | 21.64 |
| Primary or less | **53.91** | 43.42 | 35.57 | 50.40 | 45.65 | 49.85 | 46.39 |
| **Last occupational status** (ns) | | | | | | | |
| Never worked | 21.74 | 11.84 | 13.40 | 21.60 | 24.64 | 29.38 | 22.62 |
| Blue collar | 40.00 | 34.21 | 34.02 | 24.80 | 23.91 | ***28.78*** | 29.56 |
| White collar | 24.35 | 39.47 | 31.44 | 27.20 | 27.54 | 20.77 | 26.63 |
| Self-employed | 7.83 | 10.53 | 15.46 | 20.00 | 17.03 | 14.84 | 15.05 |
| Other | 6.09 | 3.95 | 5.67 | 6.40 | 6.88 | 6.23 | 6.14 |
| **Region** (*) | | | | | | | |
| Flanders | 48.70 | 46.05 | 36.08 | 48.80 | 53.26 | 41.84 | 45.41 |
| Wallonia | 38.26 | 40.79 | 46.39 | 40.00 | 37.32 | 43.62 | 41.41 |
| Brussels | 13.04 | 13.16 | 17.53 | 11.20 | 9.42 | 14.54 | 13.18 |
| **Urbanisation level** (ns) | | | | | | | |
| City | 39.13 | 56.58 | 46.39 | 47.20 | 42.75 | 47.18 | 45.77 |
| Town | 36.52 | 26.32 | 31.96 | 28.00 | 26.81 | 30.27 | 29.83 |
| Countryside | 24.35 | 17.11 | 21.65 | 24.80 | 30.43 | 22.55 | 24.40 |
| **Subjective health** (W3: ***) | | | | | | | |
| Good | 40.00 | 47.37 | 53.09 | 46.40 | 40.95 | 47.46 | 45.59 |
| Fair | 46.09 | 40.79 | 36.60 | 36.00 | 42.73 | 41.67 | 40.87 |
| Bad | 13.91 | 11.84 | 10.31 | 17.60 | 16.32 | 10.87 | 13.54 |
| **Disability** (W3: **) | | | | | | | |
| None | 81.74 | 80.26 | 79.90 | 81.60 | 80.07 | 77.45 | 79.61 |
| Moderated | 8.70 | 9.21 | 6.19 | 8.80 | 10.51 | 10.39 | 9.26 |
| Severe | 9.57 | 10.53 | 13.92 | 9.60 | 9.42 | 12.17 | 11.13 |
| **Recent hospitalisation** (W3: ns) | | | | | | | |
| No | 82.61 | 84.21 | 82.99 | 81.60 | 80.43 | 78.64 | 80.94 |
| Yes | 17.39 | 15.79 | 17.01 | 18.40 | 19.57 | 21.36 | 19.06 |
| **Ability to make ends meet** (W3: *) | | | | | | | |
| Easily | 28.70 | 35.53 | 34.54 | 44.00 | 38.04 | 33.23 | 29.17 |
| Fairly | 33.04 | 34.21 | 42.27 | 32.80 | 34.78 | 32.05 | 34.82 |
| Hardly | 38.26 | 30.26 | 23.20 | 23.20 | 27.17 | 34.72 | 29.65 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Spousal health** (W3: ***) | | | | | | | |
| Not in couple | - | 0.00 | 1.55 | 0.00 | 0.36 | - | 40.61 |
| Good | - | 42.11 | 50.00 | 44.80 | 47.10 | - | 28.05 |
| Fair | - | 46.05 | 37.63 | 37.60 | 42.75 | - | 24.31 |
| Bad | - | 11.84 | 10.82 | 17.60 | 9.78 | - | 7.03 |
| **Closest child proximity** (W3: ***) | | | | | | | |
| Cohabiting | - | - | 6.19 | 11.20 | 17.03 | 14.84 | 10.95 |
| <1 Km | - | - | 30.41 | 24.80 | 37.68 | 32.05 | 26.89 |
| 1-9 Km | - | - | 32.99 | 28.80 | 32.25 | 27.60 | 25.11 |
| 10-49 Km | - | - | 20.62 | 17.60 | 7.25 | 16.32 | 12.20 |
| >49 Km/no child | - | - | 9.79 | 17.60 | 5.80 | 9.20 | 24.84 |
| **Attrition status** (***) | | | | | | | |
| Attritors | 72.17 | 65.79 | 62.37 | 63.2 | 56.52 | 63.5 | 62.60 |
| Non-attritor | 27.83 | 34.21 | 37.63 | 36.8 | 43.48 | 36.5 | 37.40 |

*Note:* ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE VIII-8:** Mean predicted probability of ever received care by gender, region and cohort group (PSBH 1994-2002, n=1,008)

| MEN | | | | | WOMEN | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **PROFILE** | **Predicted probability** | | | | **PROFILE** | **Predicted probability** | | | |
| | No care | Care services | Family care | Both cares | | No care | Care services | Family care | Both cares |
| **1920-29, Flanders** (n=137) | 0.20 | 0.19 | 0.43 | 0.18 | **1920-29, Flanders** (n=151) | 0.19 | 0.14 | 0.54 | 0.13 |
| **1920-29, Wallonia** (n=130) | 0.26 | 0.16 | 0.39 | 0.19 | **1920-29, Wallonia** (n=164) | 0.26 | 0.11 | 0.51 | 0.12 |
| **1920-29, Brussels** (n=46) | 0.24 | 0.12 | 0.32 | 0.31 | **1920-29, Brussels** (n=39) | 0.27 | 0.08 | 0.44 | 0.21 |
| **1915-19, Flanders** (n=24) | 0.24 | 0.09 | 0.57 | 0.10 | **1915-19, Flanders** (n=48) | 0.22 | 0.07 | 0.66 | 0.05 |
| **1915-19, Wallonia** (n=36) | 0.33 | 0.09 | 0.48 | 0.10 | **1915-19, Wallonia** (n=37) | 0.28 | 0.05 | 0.62 | 0.05 |
| **1915-19, Brussels** (n=11) | 0.37 | 0.04 | 0.39 | 0.20 | **1915-19, Brussels** (n=9) | 0.36 | 0.03 | 0.49 | 0.12 |
| **Very old, Flanders** (n=36) | 0.29 | 0.04 | 0.59 | 0.07 | **Very old, Flanders** (n=58) | 0.26 | 0.03 | 0.67 | 0.04 |
| **Very old, Wallonia** (n=21) | 0.35 | 0.03 | 0.55 | 0.08 | **Very old, Wallonia** (n=33) | 0.35 | 0.02 | 0.59 | 0.04 |
| **Very old, Brussels** (n=10) | 0.38 | 0.03 | 0.43 | 0.16 | **Very old, Brussels** (n=18) | 0.39 | 0.02 | 0.50 | 0.09 |

# *CHAPTER IX*

**APPENDIX TABLE IX-1:** Care combination observed over the study waves among the 'family-members' elderly (PSBH 1994-2002)

| CARE COMBINATION | W3 (n=999) | W4 (n=897) | W5 (n=817) | W6 (n=692) | W7 (n=614) | W8 (n=548) | W9 (n=495) | W10 (n=431) | W11 (n=384) | Last wave (n=999) |
|---|---|---|---|---|---|---|---|---|---|---|
| **No care** | 37.64 | 35.79 | 35.62 | 31.65 | 32.25 | 30.47 | 27.88 | 25.29 | 21.88 | 23.12 |
| **Care services** | 26.53 | 26.53 | 27.54 | 25.29 | 30.29 | 24.82 | 26.06 | 25.29 | 22.14 | 25.93 |
| **Family care** | 12.91 | 13.60 | 12.24 | 13.01 | 10.75 | 12.59 | 13.13 | 14.15 | 13.80 | 13.71 |
| **Mixed care** | 22.92 | 24.08 | 24.60 | 30.06 | 26.71 | 32.12 | 32.93 | 35.27 | 42.19 | 37.24 |

*Note:* the nine elderly who became family-less are excluded.

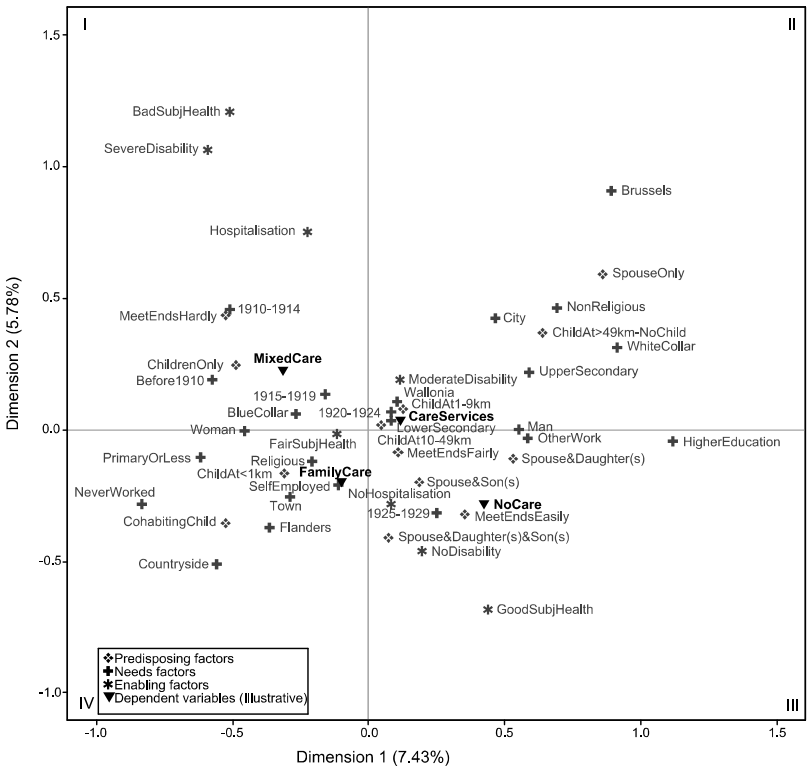
**APPENDIX TABLE IX-2:** Having always, once or never received mixed care over the study waves (PSBH 1994-2002, n=999)

| | |
|---|---|
| **Always mixed care** | 14.71 |
| **Sometimes mixed care** | 35.44 |
| **Any family care but never mixed care** | 11.11 |
| **Only care services** | 25.23 |
| **Never cared** | 13.51 |

**APPENDIX TABLE IX-3:** Mixed care use (%) at the first and the last study wave according to the other care aspects (PSBH 1994-2002, n=999)

| | FIRST STUDY WAVE | | LAST STUDY WAVE | |
|---|---|---|---|---|
| **CARE ASPECTS** | **n** | **% mixed care** | **n** | **% mixed care** |
| **No care** | 641 | 41.34 | 490 | 52.86 |
| **Son care** | 90 | 67.78 | 122 | 73.77 |
| **Daughter care** | 115 | 65.22 | 171 | 70.76 |
| **Daughter(s) & son(s)** | 85 | 58.82 | 94 | 74.47 |
| **Spouse** | 12 | 83.33 | 52 | 71.15 |
| **Spouse & son(s) care** | 12 | 50.00 | 20 | 90.00 |
| **Spouse & daughter(s)** | 25 | 72.00 | 33 | 72.73 |
| **Spouse & daughter(s) & son(s) care** | 19 | 47.37 | 17 | 70.59 |
| | | | | |
| **IADL care only** | 188 | 60.64 | 238 | 74.79 |
| **ADL care only** | 41 | 43.90 | 47 | 53.19 |
| **IADL&ADL care** | 129 | 75.19 | 201 | 77.11 |
| **Undefined care** | | | 23 | 60.87 |
| **1 care-giver** | 160 | 69.38 | 260 | 73.08 |
| **2+ care-givers** | 198 | 59.60 | 249 | 73.09 |

**APPENDIX GRAPH IX-1:** Multiple correspondence analysis on the 999 elderly 'at risk' of all the care combinations, the last study wave (PSBH 1994-2002)



**APPENDIX TABLE IX-4:** Care combination at the first and the last study wave according to the characteristics of the 999 elderly 'at risk' of receiving family care (PSBH 1994-2002)

| | FIRST STUDY WAVE % | | | | LAST STUDY WAVE % | | | |
|---|---|---|---|---|---|---|---|---|
| | No care | Care services | Family care | Mixed care | No care | Care services | Family care | Mixed care |
| **CHARACTERISTICS** | | | | | | | | |
| **Gender** | | | | | | | | |
| *rc: Man (n=449)* | 45.21 | 25.61 | 12.25 | 16.93 | 28.95 | 25.39 | 14.25 | 31.40 |
| Woman (n=550) | 31.45 | 27.27 | 13.45 | 27.82 | 18.36 | 26.36 | 13.27 | 42.00 |
| **Birth cohort** | | | | | | | | |
| *rc: 1925-1929 (n=347)* | 48.41 | 22.48 | 17.87 | 11.24 | 30.26 | 22.48 | 19.02 | 28.24 |
| 1920-1924 (n=317) | 41.64 | 22.08 | 13.25 | 23.03 | 26.50 | 22.08 | 14.51 | 36.91 |
| 1915-1919 (n=162) | 25.93 | 34.57 | 9.88 | 29.63 | 16.67 | 31.48 | 8.02 | 43.83 |
| Before 1915 (n=173) | 19.65 | 35.26 | 5.20 | 39.88 | 8.67 | 34.68 | 6.94 | 49.71 |
| **Religiosity** | | | | | | | | |
| *rc: Non-religious (n=224)* | 43.75 | 27.23 | 12.05 | 16.96 | 29.91 | 26.34 | 12.95 | 30.80 |
| Religious (n=775) | 35.87 | 26.32 | 13.16 | 24.65 | 21.16 | 25.81 | 13.94 | 39.10 |
| **Education** | | | | | | | | |
| *rc: Secondary or more (n=544)* | 38.24 | 30.33 | 12.13 | 19.30 | 22.61 | 29.78 | 12.50 | 35.11 |
| Primary or less (n=455) | 36.92 | 21.98 | 13.85 | 27.25 | 23.74 | 21.32 | 15.16 | 39.78 |
| **Region** | | | | | | | | |
| Flanders (n=449) | 33.63 | 22.94 | 16.48 | 26.95 | 19.38 | 24.05 | 15.59 | 40.98 |
| *rc: Wallonia (n=419)* | 38.66 | 29.59 | 10.50 | 21.24 | 23.87 | 27.21 | 13.37 | 35.56 |
| Brussels (n=131) | 48.09 | 29.01 | 8.40 | 14.50 | 33.59 | 28.24 | 8.40 | 29.77 |
| **Health** | | | | | | | | |
| *rc: No problem (n=434/310)* | 46.77 | 26.04 | 12.21 | 14.98 | 36.77 | 28.06 | 13.87 | 21.29 |
| Subjective problem (n=360/293) | 33.89 | 26.11 | 13.33 | 26.67 | 25.26 | 28.33 | 11.95 | 34.47 |
| Moderate disability (n=95/166) | 26.88 | 34.41 | 12.90 | 25.81 | 11.45 | 22.89 | 15.66 | 50.00 |
| Severe disability (n=112/230) | 23.21 | 23.21 | 14.29 | 39.29 | 10.43 | 22.17 | 14.35 | 53.04 |
| **Recent hospitalisation** | | | | | | | | |
| *rc: No (n= 807/729)* | 40.15 | 26.64 | 12.52 | 20.69 | 26.06 | 26.20 | 14.27 | 33.47 |
| Yes (n=192/270) | 27.08 | 26.04 | 14.58 | 32.29 | 15.19 | 25.19 | 12.22 | 47.41 |
| **Ability to make ends meet** | | | | | | | | |
| *rc: Easily (n=363/342)* | 36.91 | 30.58 | 14.33 | 18.18 | 24.27 | 30.41 | 11.40 | 33.92 |
| Fairly (n=351/349) | 43.30 | 25.93 | 9.40 | 21.37 | 26.07 | 24.07 | 13.75 | 36.10 |
| Hardly (n=285/308) | 31.58 | 22.11 | 15.44 | 30.88 | 18.51 | 23.05 | 16.23 | 42.21 |
| **Spousal health** | | | | | | | | |
| *rc: Not in couple (n=341/400)* | 21.41 | 34.31 | 8.80 | 35.48 | 11.75 | 31.50 | 10.25 | 46.50 |
| Good (n=313/246) | 52.08 | 23.32 | 16.29 | 8.31 | 39.02 | 21.54 | 18.70 | 20.73 |
| Fair or bad (n=345/353) | 40.58 | 21.74 | 13.91 | 23.77 | 24.93 | 22.66 | 14.16 | 38.24 |
| **Number of children** | | | | | | | | |
| *rc: 0-1 child (n=319)* | 45.45 | 28.21 | 7.21 | 19.12 | 28.21 | 28.84 | 12.23 | 30.72 |
| 2+ children (n=680) | 33.97 | 25.74 | 15.59 | 24.71 | 20.74 | 24.56 | 14.41 | 40.29 |
| **Number of daughters** | | | | | | | | |
| *rc: 0 daughter (n=271)* | 46.13 | 28.78 | 8.12 | 16.97 | 28.78 | 31.37 | 9.23 | 30.63 |
| 1+ daughter(s) (n=728) | 34.48 | 25.69 | 14.70 | 25.14 | 21.02 | 23.90 | 15.38 | 39.70 |
| **Closest child proximity** | | | | | | | | |
| Cohabiting (n=123/108) | 37.40 | 24.39 | 23.58 | 14.63 | 34.26 | 19.44 | 21.30 | 25.00 |
| <10 Km (n=584/605) | 32.19 | 22.43 | 15.41 | 29.97 | 17.69 | 20.66 | 15.04 | 46.61 |
| *rc: 10 Km+/no child (n=292/286)* | 48.63 | 35.62 | 3.42 | 12.33 | 30.42 | 39.51 | 8.04 | 22.03 |
| **Attrition status** | | | | | | | | |
| *rc: Attritor (n=615)* | 31.45 | 27.27 | 13.45 | 27.82 | 23.90 | 28.29 | 13.66 | 34.15 |
| Non-attritor (n=384) | 45.21 | 25.61 | 12.25 | 16.93 | 21.88 | 22.14 | 13.80 | 42.19 |

**APPENDIX TABLE IX-5A:** Bivariate multinomial logistic regressions on 'care combination' [*W-COMBICARE*] at the first study wave (PSBH 1994, n=999)

| | BIVARIATE REGRESSIONS (first study wave) | | | | | |
|---|---|---|---|---|---|---|
| **PREDICTORS** | **Services/*No*** OR | **Family/*No*** OR | **Mixed/*No*** OR | **Family/*Services*** OR | **Mixed/*Services*** OR | **Mixed/*Family*** OR |
| **Gender** | AIC: 2,626.90 | | | | | |
| *rc: Man (n=449)* | | | | | | |
| Woman (n=550) | **1.53** *** | **1.58** ** | **2.36** *** | 1.03 | **1.54** ** | **1.50** * |
| **Birth cohort** | AIC: 2,552.62 | | | | | |
| *rc: 1925-1929 (n=347)* | | | | | | |
| 1920-1924 (n=317) | 1.14 | 0.86 | **2.38** *** | 0.76 | **2.09** *** | **2.76** *** |
| 1915-1919 (n=162) | **2.87** *** | 1.03 | **4.92** *** | **0.36** *** | **1.71** * | **4.77** *** |
| Before 1915 (n=173) | **3.86** *** | 0.72 | **8.74** *** | **0.19** *** | **2.26** *** | **12.19** *** |
| **Religiosity** | AIC: 2,645.13 | | | | | |
| *rc: Non-religious (n=224)* | | | | | | |
| Religious (n=775) | 1.18 | 1.33 | **1.77** *** | 1.13 ns | **1.50** * | 1.33 |
| **Education** | AIC: 2,638.83 | | | | | |
| *rc: Secondary or more (n=544)* | | | | | | |
| Primary or less (n=455) | **0.75** * | 1.18 | **1.46** ** | **1.58** ** | **1.95** *** | 1.24 |
| **Region** | AIC: 2632.66 | | | | | |
| Flanders (n=449) | 0.89 | **1.80** *** | **1.46** ** | **2.03** *** | **1.64** ** | 0.81 |
| *rc: Wallonia (n=419)* | | | | | | |
| Brussels (n=131) | 0.79 | 0.64 | 0.55 | 0.82 | 0.70 | 0.85 |
| **Health** | AIC: 2,614.51 | | | | | |
| *rc: No problem (n=434)* | | | | | | |
| Subjective problem (n=360) | **1.38** * | **1.51** * | **2.46** *** | 1.09 | **1.78** *** | **1.63** * |
| Moderate disability (n=95) | **2.30** *** | 1.84 | **3.00** *** | 0.80 | 1.30 | 1.63 |
| Severe disability (n=112) | **1.80** * | **2.36** ** | **5.29** *** | 1.31 | **2.94** *** | **2.24** ** |
| **Recent hospitalisation** | AIC: 2,636.44 | | | | | |
| *rc: No (n=807)* | | | | | | |
| Yes (n=192) | **1.45** * | **1.73** ** | **2.31** *** | 1.19 | **1.60** ** | 1.34 Ns |
| **Ability to make ends meet** | AIC: 2,631.78 | | | | | |
| *rc: Easily (n=363)* | | | | | | |
| Fairly (n=351) | **0.72** * | **0.56** ** | 1.00 | 0.77 | 1.39 | **1.79** ** |
| Hardly (n=285) | 0.85 | 1.26 | **1.99** *** | 1.49 | **2.35** *** | **1.58** * |
| **Spousal health** | AIC: 2,536.05 | | | | | |
| *rc: Not in couple (n=341)* | | | | | | |
| Good (n=313) | **0.28** *** | 0.76 | **0.10** *** | **2.73** *** | **0.35** *** | **0.13** *** |
| Fair or bad (n=345) | **0.33** *** | 0.83 | **0.35** *** | **2.50** *** | 1.06 | **0.42** *** |
| **Number of children** | AIC: 2,628.89 | | | | | |
| *rc: 0-1 child (n=319)* | | | | | | |
| 2+ children (n=680) | 1.22 | **2.89** *** | **1.73** *** | **2.37** *** | **1.42** * | **0.60** * |
| **Number of daughters** | AIC: 2,631.99 | | | | | |
| *rc: 0 daughter (n=271)* | | | | | | |
| 1+ daughter(s) (n=728) | 1.19 | **2.42** *** | **1.98** *** | **2.03** *** | **1.66** ** | 0.82 |
| **Closest child proximity** | AIC: 2,560.00 | | | | | |
| Cohabiting (n=123) | 0.89 | **8.95** *** | 1.54 | **10.05** *** | 1.73 | **0.17** *** |
| <10 Km (n=584) | 0.95 | **6.80** *** | **3.67** *** | **7.15** *** | **3.86** *** | 0.54 |
| *rc: 10 Km+/no child (n=292)* | | | | | | |
| **Attrition status** | AIC: 2,637.28 | | | | | |
| *rc: Attritor (n=615)* | | | | | | |
| Non-attritor (n=384) | **0.57** *** | 0.87 | **0.59** *** | **1.53** * | 1.03 | **0.68** * |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE IX-5B:** Bivariate multinomial logistic regressions on 'care combination' [*W-COMBICARE*] at the last study wave (PSBH 1994-2002, n=999)

| | BIVARIATE REGRESSIONS (last study wave) | | | | | |
|---|---|---|---|---|---|---|
| **PREDICTORS** | **Services/*No*** OR | **Family/*No*** OR | **Mixed/*No*** OR | **Family/*Services*** OR | **Mixed/*Services*** OR | **Mixed/*Family*** OR |
| **Gender** | AIC: 2,647.41 | | | | | |
| *rc: Man (n=449)* | | | | | | |
| Woman (n=550) | **1.64** *** | **1.47** * | **2.11** *** | 0.90 | 1.29 | **1.44** * |
| **Birth cohort** | AIC: 2,602.22 | | | | | |
| *rc: 1925-1929 (n=347)* | | | | | | |
| 1920-1924 (n=317) | 1.12 | 0.87 | **1.49** ** | 0.78 | 1.33 | **1.71** ** |
| 1915-1919 (n=162) | **2.54** *** | 0.77 | **2.82** *** | **0.30** *** | 1.11 | **3.68** *** |
| Before 1915 (n=173) | **5.38** *** | 1.27 | **6.14** *** | **0.24** *** | 1.14 | **4.83** *** |
| **Religiosity** | AIC: 2,658.22 | | | | | |
| *rc: Non-religious (n=224)* | | | | | | |
| Religious (n=775) | 1.39 | **1.52** * | **1.79** *** | 1.10 | 1.30 | 1.18 |
| **Education** | AIC: 2,657.33 | | | | | |
| *rc: Secondary or more (n=544)* | | | | | | |
| Primary or less (n=455) | 0.68 ** | 1.16 | 1.08 | **1.70** ** | **1.58** *** | 0.93 |
| **Region** | AIC: 2,655.22 | | | | | |
| Flanders (n=449) | 1.09 | 1.44 | **1.42** ** | 1.32 | 1.30 | 0.99 |
| *rc: Wallonia (n=419)* | | | | | | |
| Brussels (n=131) | 0.74 | **0.45** ** | **0.60** * | 0.61 | 0.81 | 1.33 |
| **Health** | AIC: 2,575.04 | | | | | |
| *rc: No problem (n=310)* | | | | | | |
| Subjective problem (n=293) | **1.47** * | 1.25 | **2.36** *** | 0.85 | **1.60** ** | **1.88** ** |
| Moderate disability (n=166) | **2.62** *** | **3.63** *** | **7.55** *** | 1.38 | **2.88** *** | **2.08** ** |
| Severe disability (n=230) | **2.78** *** | **3.65** *** | **8.78** *** | 1.31 | **3.15** *** | **2.41** *** |
| **Recent hospitalisation** | AIC: 2,645.66 | | | | | |
| *rc: No (n=729)* | | | | | | |
| Yes (n=270) | **1.65** ** | 1.47 | **2.43** *** | 0.89 | **1.47** ** | **1.65** ** |
| **Ability to make ends meet** | AIC: 2,658.74 | | | | | |
| *rc: Easily (n=342)* | | | | | | |
| Fairly (n=349) | 0.74 | 1.12 | 0.99 | 1.52 | 1.35 | 0.88 |
| Hardly (n=308) | 0.99 | **1.87** ** | **1.63** ** | **1.88** ** | **1.64** ** | 0.87 |
| **Spousal health** | AIC: 2,577.12 | | | | | |
| *rc: Not in couple (n=400)* | **0.21** *** | **0.55** ** | **0.13** *** | **2.67** *** | **0.65** * | **0.24** *** |
| Good (n=246) | **0.34** *** | 0.65 | **0.39** *** | **1.92** ** | 1.14 | **0.60** *** |
| Fair or bad (n=353) | | | | | | |
| **Number of children** | AIC: 2,654.24 | | | | | |
| *rc: 0-1 child (n=319)* | | | | | | |
| 2+ children (n=680) | 1.16 | **1.60** ** | **1.79** *** | 1.38 | **1.54** ** | **1.11** |
| **Number of daughters** | AIC: 2,647.65 | | | | | |
| *rc: 0 daughter (n=271)* | | | | | | |
| 1+ daughter(s) (n=728) | 1.04 | **2.28** *** | **1.78** *** | **2.19** *** | **1.70** *** | 0.78 |
| **Closest child proximity** | AIC: 2,575.81 | | | | | |
| Cohabiting (n=108) | | | | | | |
| <10 Km (n=605) | **0.44** *** | **2.35** ** | 1.01 | **5.38** *** | **2.31** ** | **0.43** ** |
| *10 Km+/no child (n=286)* | 0.90 | **3.22** *** | **3.64** *** | **3.58** *** | **4.05** *** | 1.13 |
| **Attrition status** | AIC: 2,659.12 | | | | | |
| *rc: Attritor (n=615)* | | | | | | |
| Non-attritor (n=384) | 0.86 | 1.10 | **1.35** * | 1.29 | **1.58** *** | 1.22 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE IX-6A:** Mean predicted probability of care combination at the first study wave by gender, region and cohort group (PSBH 1994-2002, n=1,008)

| MEN | | | | | WOMEN | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **PROFILE** | **Predicted probability** | | | | **PROFILE** | **Predicted probability** | | | |
| | No care | Care services | Family care | Mixed care | | No care | Care services | Family care | Mixed care |
| **1920-29, Flanders** (n=137) | 0.47 | 0.18 | 0.19 | 0.16 | **1920-29, Flanders** (n=150) | 0.37 | 0.19 | 0.22 | 0.22 |
| **1920-29, Wallonia** (n=130) | 0.52 | 0.24 | 0.11 | 0.13 | **1920-29, Wallonia** (n=163) | 0.39 | 0.27 | 0.13 | 0.20 |
| **1920-29, Brussels** (n=46) | 0.63 | 0.20 | 0.10 | 0.06 | **1920-29, Brussels** (n=39) | 0.51 | 0.25 | 0.11 | 0.12 |
| **1915-19, Flanders** (n=24) | 0.32 | 0.28 | 0.12 | 0.28 | **1915-19, Flanders** (n=46) | 0.17 | 0.29 | 0.14 | 0.39 |
| **1915-19, Wallonia** (n=36) | 0.30 | 0.40 | 0.08 | 0.22 | **1915-19, Wallonia** (n=36) | 0.23 | 0.37 | 0.07 | 0.33 |
| **1915-19, Brussels** (n=11) | 0.42 | 0.43 | 0.03 | 0.11 | **1915-19, Brussels** (n=9) | 0.28 | 0.41 | 0.06 | 0.25 |
| **Very old, Flanders** (n=35) | 0.25 | 0.35 | 0.06 | 0.35 | **Very old, Flanders** (n=58) | 0.13 | 0.30 | 0.06 | 0.50 |
| **Very old, Wallonia** (n=21) | 0.30 | 0.41 | 0.04 | 0.25 | **Very old, Wallonia** (n=33) | 0.13 | 0.38 | 0.04 | 0.45 |
| **Very old, Brussels** (n=10) | 0.38 | 0.36 | 0.04 | 0.22 | **Very old, Brussels** (n=16) | 0.19 | 0.42 | 0.04 | 0.35 |

**APPENDIX TABLE IX-6B:** Mean predicted probability of care combination at the last study wave by gender, region and cohort group (PSBH 1994-2002, n=1,008)

| MAN | | | | | WOMAN | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **PROFILE** | **Predicted probability** | | | | **PROFILE** | **Predicted probability** | | | |
| | No care | Care services | Family care | Mixed care | | No care | Care services | Family care | Mixed care |
| **1920-29, Flanders** (n=137) | 0.30 | 0.21 | 0.20 | 0.30 | **1920-29, Flanders** (n=150) | 0.20 | 0.20 | 0.19 | 0.41 |
| **1920-29, Wallonia** (n=130) | 0.34 | 0.22 | 0.17 | 0.28 | **1920-29, Wallonia** (n=163) | 0.24 | 0.26 | 0.15 | 0.35 |
| **1920-29, Brussels** (n=46) | 0.49 | 0.20 | 0.12 | 0.20 | **1920-29, Brussels** (n=39) | 0.37 | 0.26 | 0.10 | 0.27 |
| **1915-19, Flanders** (n=24) | 0.23 | 0.29 | 0.10 | 0.38 | **1915-19, Flanders** (n=46) | 0.11 | 0.28 | 0.09 | 0.52 |
| **1915-19, Wallonia** (n=36) | 0.22 | 0.34 | 0.09 | 0.35 | **1915-19, Wallonia** (n=36) | 0.12 | 0.32 | 0.07 | 0.50 |
| **1915-19, Brussels** (n=11) | 0.25 | 0.41 | 0.04 | 0.30 | **1915-19, Brussels** (n=9) | 0.14 | 0.35 | 0.04 | 0.47 |
| **Very old, Flanders** (n=35) | 0.08 | 0.35 | 0.07 | 0.49 | **Very old, Flanders** (n=58) | 0.07 | 0.31 | 0.08 | 0.54 |
| **Very old, Wallonia** (n=21) | 0.13 | 0.42 | 0.06 | 0.39 | **Very old, Wallonia** (n=33) | 0.08 | 0.33 | 0.07 | 0.52 |
| **Very old, Brussels** (n=10) | 0.20 | 0.32 | 0.04 | 0.44 | **Very old, Brussels** (n=16) | 0.07 | 0.42 | 0.04 | 0.46 |

**APPENDIX TABLE IX-7:** Proportion of spousal care observed over the study waves among the elderly living in couple (PSBH 1994-2002)

| % | **W3** (n=595) | **W4** (n=524) | **W5** (n=474) | **W6** (n=397) | **W7** (n=350) | **W8** (n=315) | **W9** (n=282) | **W10** (n=244) | **W11** (n=220) | **Last wave** (n=595) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Spousal care** | 9.75 | 12.6 | 14.35 | 22.17 | 22.00 | 22.54 | 20.92 | 22.13 | 25.00 | 20.34 |

**APPENDIX TABLE IX-8:** Proportion of daughter care observed over the study waves among the elderly having daughter(s) (PSBH 1994-2002)

| % | **W3** (n=728) | **W4** (n=656) | **W5** (n=595) | **W6** (n=504) | **W7** (n=446) | **W8** (n=399) | **W9** (n=364) | **W10** (n=317) | **W11** (n=290) | **Last wave** (n=728) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Daughter care** | 33.52 | 35.06 | 33.78 | 36.71 | 31.39 | 40.6 | 42.31 | 45.74 | 48.28 | 43.27 |

**APPENDIX TABLE IX-9:** Proportion of son care observed over the study waves among the elderly having son(s) (PSBH 1994-2002)

| % | W3 (n=647) | W4 (n=582) | W5 (n=525) | W6 (n=452) | W7 (n=403) | W8 (n=352) | W9 (n=327) | W10 (n=287) | W11 (n=258) | Last wave (n=647) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Son care** | 31.84 | 32.99 | 31.24 | 31.86 | 27.30 | 33.52 | 36.7 | 39.72 | 44.96 | 39.10 |

**APPENDIX TABLE IX-10:** Care-giver types combinations at the first and the last study waves among the elderly receiving family care at the given wave (PSBH 1994-2002)

| CARE-GIVER TYPES COMBINATION | FIRST STUDY WAVE (n=358) | LAST STUDY WAVE (n=509) |
|---|---|---|
| **Spouse** | 3.35 | 10.22 |
| **Daughter(s)** | 32.12 | 33.60 |
| **Son(s)** | 25.14 | 23.97 |
| **Spouse & daughter(s)** | 6.98 | 6.48 |
| **Spouse & son(s)** | 3.35 | 3.93 |
| **Daughter(s) & son(s)** | 23.74 | 18.47 |
| **Spouse, daughter(s) & son(s)** | 5.31 | 3.34 |

**APPENDIX TABLE IX-11:** Care-givers types combinations including the spouse at the first and the last study waves (PSBH 1994-2002)

| CARE-GIVER TYPES COMBINATION | FIRST STUDY WAVE (n=58) | LAST STUDY WAVE (n=121) |
|---|---|---|
| **Alone** | 15.52 | 42.15 |
| **With daughter(s)** | 39.66 | 27.27 |
| **With son(s)** | 18.97 | 16.53 |
| **With daughter(s) & son(s)** | 25.86 | 14.05 |

**APPENDIX TABLE IX-12:** Care-giver types combinations including daughter(s) at the first and the last study waves (PSBH 1994-2002)

| CARE-GIVER TYPES COMBINATION | FIRST STUDY WAVE (n=244) | LAST STUDY WAVE (n=315) |
|---|---|---|
| **Alone** | 47.13 | 54.29 |
| **With spouse** | 10.25 | 10.48 |
| **With son(s)** | 34.84 | 29.84 |
| **With spouse & son(s)** | 7.79 | 5.40 |

**APPENDIX TABLE IX-13:** Care-giver types combinations including son(s) at the first and the last study waves (PSBH 1994-2002)

| CARE-GIVER TYPES COMBINATION | FIRST STUDY WAVE (n=206) | LAST STUDY WAVE (n=253) |
|---|---|---|
| **Alone** | 43.69 | 48.22 |
| **With spouse** | 5.83 | 7.91 |
| **With daughter(s)** | 41.26 | 37.15 |
| **With spouse & daughter(s)** | 9.22 | 6.72 |

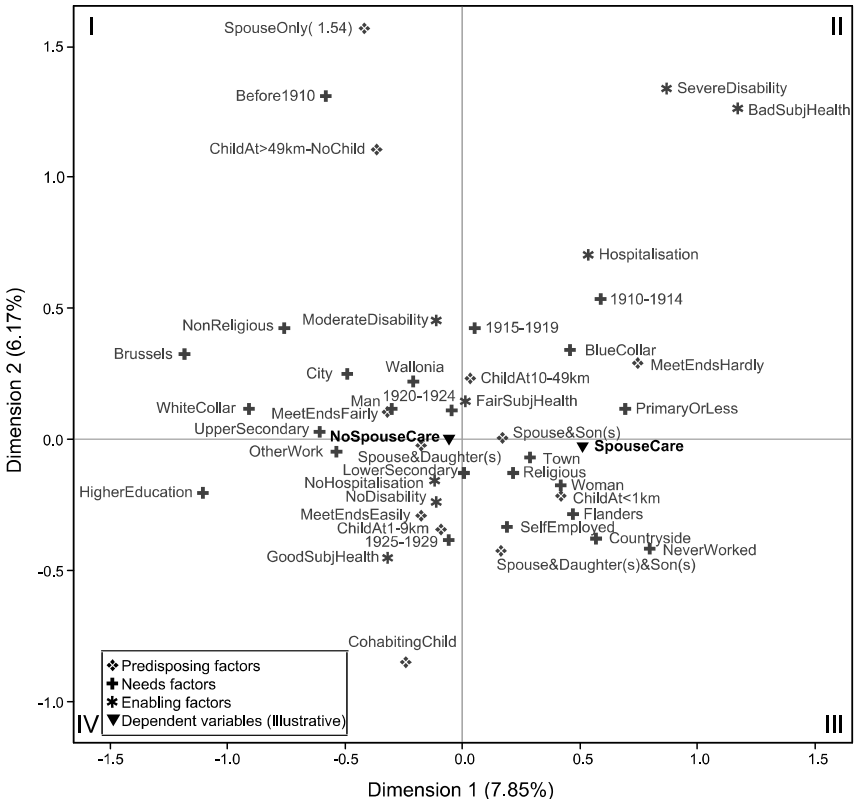
**APPENDIX TABLE IX-14:** Having always, once or never received care from a given type of care-giver over the study waves (PSBH 1994-2002)

| | CARE-GIVER TYPES (X=) | | |
|---|---|---|---|
| **EVER CARE FROM X…** | **Spouse** (n=595) | **Daughter(s)** (n=728) | **Son(s)** (n=647) |
| **Always** | 7.73 | 21.84 | 18.86 |
| **Sometimes** | 14.29 | 33.52 | 34.62 |
| **Only other family care-givers** | 35.29 | 10.99 | 12.21 |
| **Only services** | 23.70 | 22.66 | 22.41 |
| **Never cared** | 18.99 | 10.99 | 11.90 |

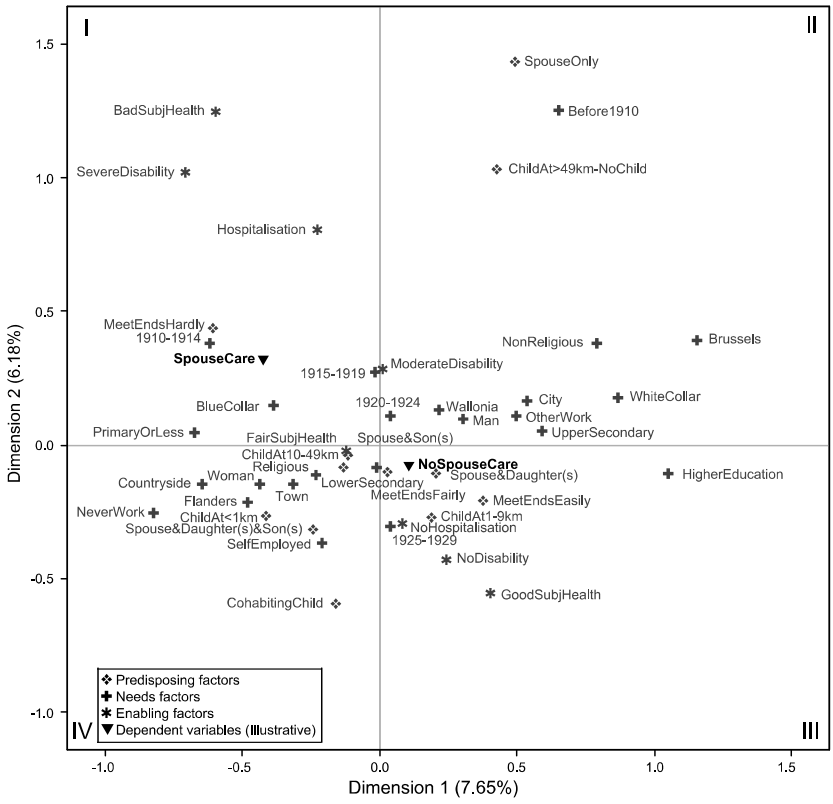
**APPENDIX TABLE IX-15:** Proportion of care services use and IADL&ADL care at the first and the last study waves among the elderly receiving spousal, daughter or son care (PSBH 1994-2002, n=999)

| | | FIRST STUDY WAVE | | LAST STUDY WAVE | |
|---|---|---|---|---|---|
| | | **IADL&ADL** | **Care services** | **IADL&ADL** | **Care services** |
| **Spouse care** | (FSW: n=58; LSW: n=121) | 41.38 | 62.07 | 45.45 | 74.38 |
| **Daughter care** | (FSW: n=244; LSW: n=315) | 34.84 | 62.30 | 40.00 | 72.06 |
| **Son care** | (FSW: n=206/ LSW: n=253) | 32.04 | 61.17 | 39.53 | 75.10 |

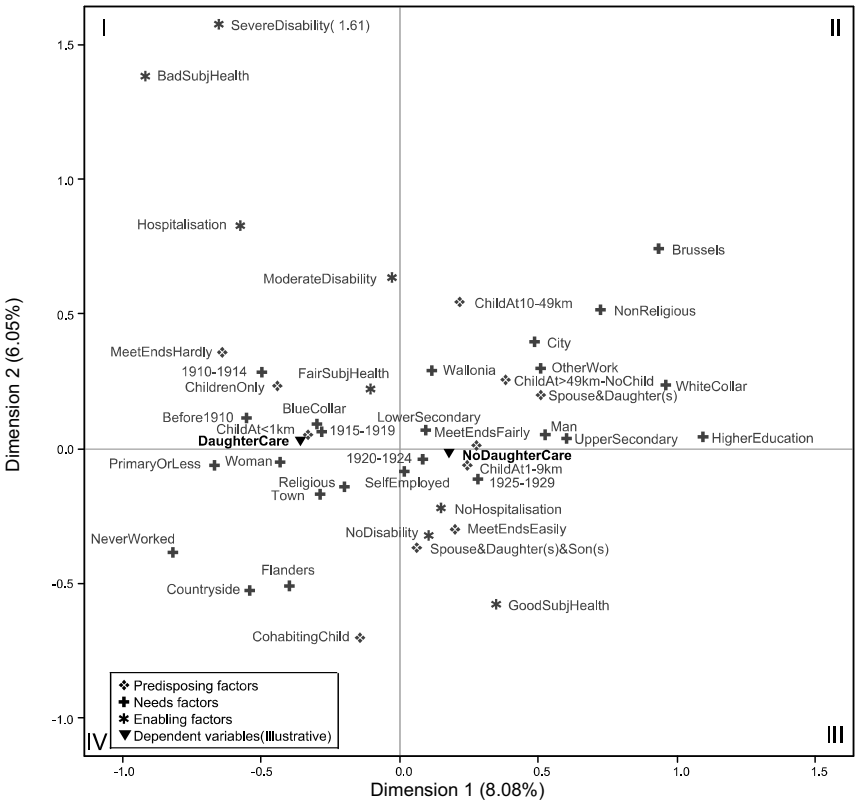
**APPENDIX GRAPH IX-2A:** Multiple correspondence analysis on the 595 elderly 'at risk' of spousal care, first study wave (PSBH 1994)



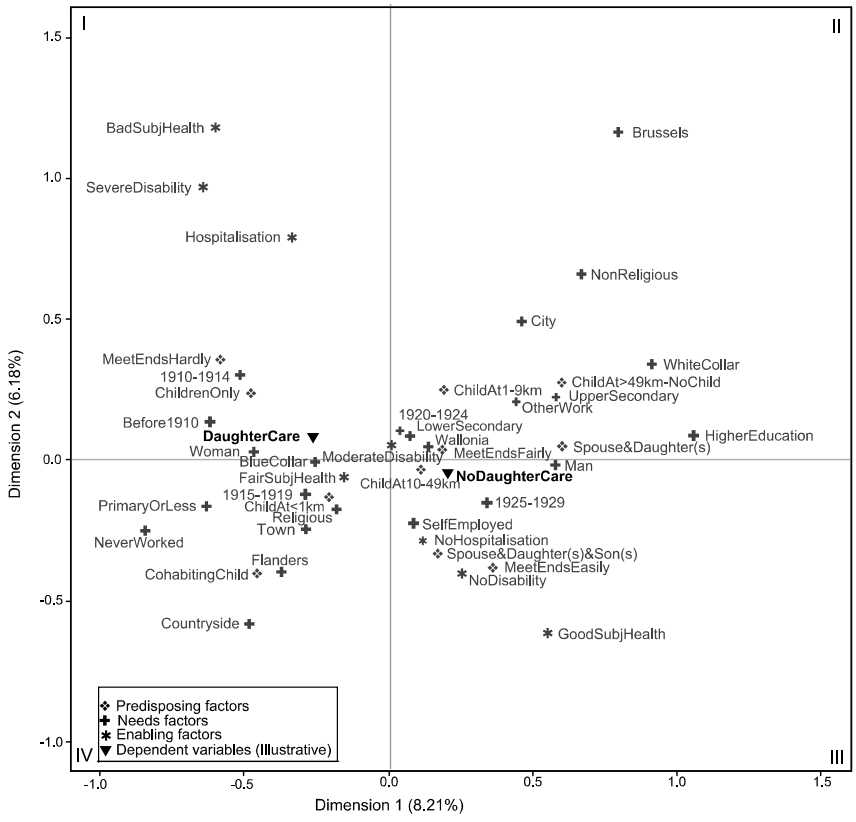

**APPENDIX GRAPH IX-2B:** Multiple correspondence analysis on the 595 elderly 'at risk' of spousal care, last study wave (PSBH 1994-2002)



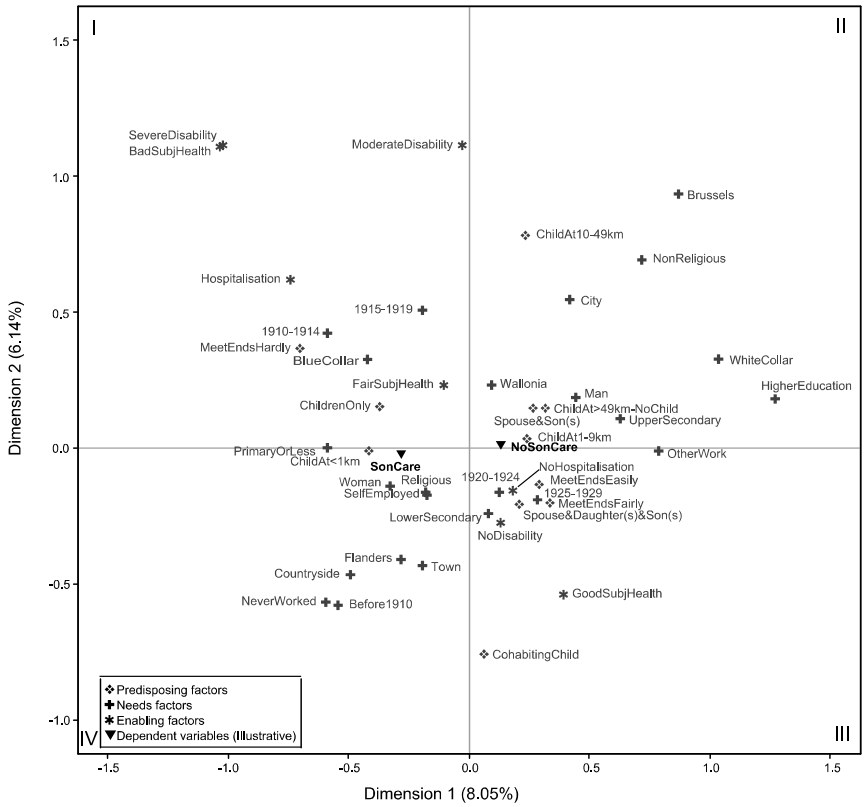
**APPENDIX GRAPH IX-3A:** Multiple correspondence analysis on the 728 elderly 'at risk' of daughter care, first study wave (PSBH 1994)



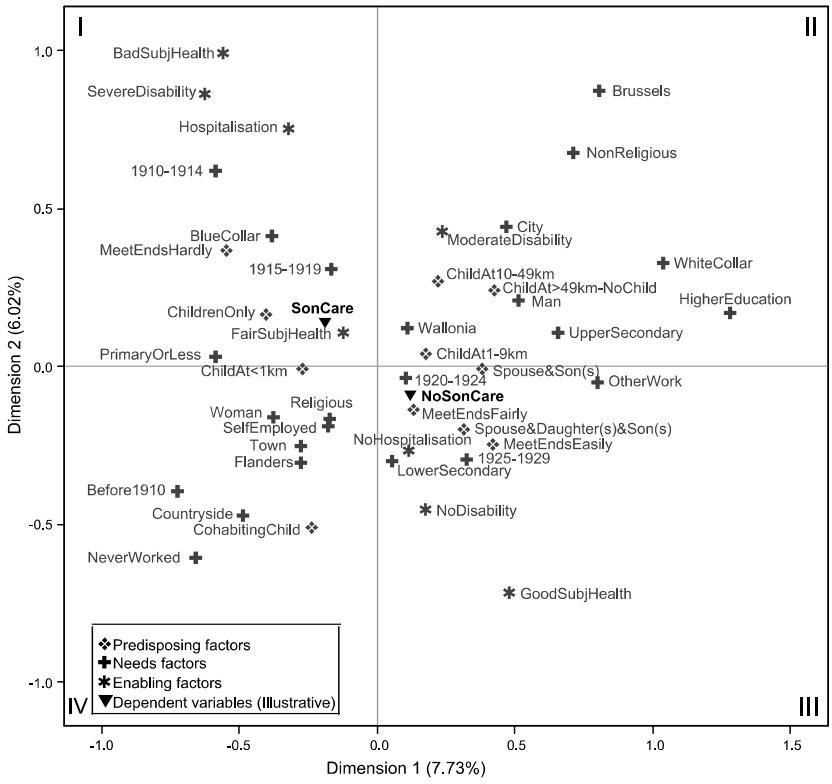

**APPENDIX GRAPH IX-3B:** Multiple correspondence analysis on the 728 elderly 'at risk' of daughter care, last study wave (PSBH 1994-2002)



**APPENDIX GRAPH IX-4A:** Multiple correspondence analysis on the 647 elderly 'at risk' of son care, first study wave (PSBH 1994)




**APPENDIX GRAPH IX-4B:** Multiple correspondence analysis on the 647 elderly 'at risk' of son care, last study wave (PSBH 1994-2002)



**APPENDIX TABLE IX-16:** Characteristics of the study sample at the first and the last study waves, for the elderly having a spouse only, children only and their complementary sub-sample (PSBH 1994-2002, n=999)

| CHARACTERISTICS | Spouse only (n=67) | Children (& spouse) (n=932) | Children only (n=404) | Spouse (& child(ren)) (n=595) |
|---|---|---|---|---|
| **Gender** (**[1]/***[2]) | | | | |
| Man | **58.21** | **43.99** | **25.00** | **58.49** |
| Woman | 41.79 | 56.01 | 75.00 | 41.51 |
| **Birth cohort** (ns/***) | | | | |
| 1925-1929 | 32.84 | 34.87 | **21.04** | **44.03** |
| 1920-1924 | 35.82 | 31.44 | 30.20 | 32.77 |
| 1915-1919 | 17.91 | 16.09 | 21.29 | 12.77 |
| 1910-1914 | 7.46 | 11.91 | 17.08 | 7.90 |
| Before 1910 | 5.97 | 5.69 | **10.40** | **2.52** |
| **Religiosity** (*/ns) | | | | |
| Non-religious | **31.34** | **21.78** | 22.28 | 22.52 |
| Religious | 68.66 | 78.22 | 77.72 | 77.48 |
| **Education** (ns/***) | | | | |
| Higher education | 7.46 | 13.30 | 10.40 | 14.62 |
| Upper secondary | 20.90 | 19.10 | 16.34 | 21.18 |
| Lower secondary | 28.36 | 21.89 | 21.78 | 22.69 |
| Primary or less | 43.28 | 45.71 | **51.49** | **41.51** |
| **Last occupational status** (**/***) | | | | |
| Never worked | 11.94 | 23.61 | 28.22 | 19.16 |
| Blue collar | 34.33 | 27.90 | 28.22 | 28.40 |
| White collar | **38.81** | **25.86** | **20.54** | **30.92** |
| Self-employed | 10.45 | 16.31 | 16.34 | 15.63 |
| Other | 4.48 | 6.33 | 6.68 | 5.88 |
| **Region** (ns/ns) | | | | |
| Flanders | 44.78 | 44.96 | 41.58 | 47.23 |
| Wallonia | 43.28 | 41.85 | 43.07 | 41.18 |
| Brussels | 11.94 | 13.20 | 15.35 | 11.60 |
| **Urbanisation level** (ns/ns) | | | | |
| City | **56.72** | **45.71** | 47.03 | 46.05 |
| Town | 26.87 | 29.29 | 28.96 | 29.24 |
| Countryside | 16.42 | 25.00 | 24.01 | 24.71 |
| **Subjective health** (FSW: ns/ns) | | | | |
| Good | 46.27 | 46.14 | 42.82 | 48.40 |
| Fair | 41.79 | 40.24 | 41.58 | 39.50 |
| Bad | 11.94 | 13.63 | 15.59 | 12.10 |
| **Subjective health** (LSW: ns/***) | | | | |
| Good | 40.30 | 35.41 | **29.21** | **40.17** |
| Fair | 41.79 | 43.88 | 47.03 | 41.51 |
| Bad | 17.91 | 20.71 | 23.76 | 18.32 |
| **Disability** (FSW: ns/ns) | | | | |
| None | 82.09 | 79.29 | 77.72 | 80.67 |
| Moderated | 8.96 | 9.33 | 11.14 | 8.07 |
| Severe | 8.96 | 11.37 | 11.14 | 11.26 |
| **Disability** (LSW: ns/ns) | | | | |
| None | 61.19 | 60.30 | 57.67 | 62.18 |
| Moderated | 23.88 | 16.09 | 16.58 | 16.64 |
| Severe | 14.93 | 23.61 | 25.74 | 21.18 |

[1] Significant difference between 'spouse only' and 'children (& spouse).
[2] Significant difference between 'children only' and 'spouse (& child(ren))'.

| | | | | |
|---|---|---|---|---|
| **Recent hospitalisation** (FWS: ns/ns) | | | | |
| No | 85.07 | 80.47 | 78.47 | 82.35 |
| Yes | 14.93 | 19.53 | 21.53 | 17.65 |
| **Recent hospitalisation** (LSW: ns/ns) | | | | |
| No | 68.66 | 73.28 | 72.03 | 73.61 |
| Yes | 31.34 | 26.72 | 27.97 | 26.39 |
| **Ability to make ends meet** (FSW: ns/***) | | | | |
| Easily | 35.82 | 36.37 | 32.18 | 39.16 |
| Fairly | 35.82 | 35.09 | 33.66 | 36.13 |
| Hardly | 28.36 | 28.54 | **34.16** | **24.71** |
| **Ability to make ends meet** (LSW: ns/***) | | | | |
| Easily | 31.34 | 34.44 | 30.45 | 36.81 |
| Fairly | 38.81 | 34.66 | 30.45 | 37.98 |
| Hardly | 29.85 | 30.90 | **39.11** | **25.21** |
| **Attrition status** (ns/ns) | | | | |
| Attritors | 67.16 | 61.16 | 59.41 | 63.03 |
| Non-attritor | 32.84 | 38.84 | 40.59 | 36.97 |

*Note:* The proximity of the closest child and the spousal health are not distributed because their value is partly determined by the sub-sample definition. *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE IX-17:** Proportion of spousal, daughter and son care at the first and the last study waves according to the characteristics of the elderly at the respective 'at risk' sub-samples (PSBH 1994-2002)

| | DOES SPOUSE CARE? (n=595) | | | | DO DAUGHTERS CARE? (n=728) | | | | DO SONS CARE? (n=647) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | First study wave | | Last study wave | | First study wave | | Last study wave | | First study wave | | Last study wave | |
| **CHARACTERISTICS** | (58 'yes') | | (121 'yes') | | (244 'yes') | | (315 'yes') | | (206 'yes') | | (253 'yes') | |
| | n | %'yes' | n | %'yes' | n | %'yes' | n | %'yes' | n | %'yes' | n | %'yes' |
| **Gender** | | | | | | | | | | | | |
| Man | 348 | **8.62** | 348 | **18.39** | 325 | **28.92** | 325 | **39.08** | 274 | **27.37** | 274 | **33.58** |
| Woman | 247 | **11.34** | 247 | **23.08** | 403 | **37.22** | 403 | **46.65** | 373 | **35.12** | 373 | **43.16** |
| **Birth cohort** | | | | | | | | | | | | |
| 1925-1929 | 262 | **9.92** | 262 | **19.08** | 269 | **27.88** | 269 | **40.52** | 209 | **27.27** | 209 | **35.41** |
| 1920-1924 | 195 | **8.72** | 195 | **20.51** | 225 | **36.44** | 225 | **45.33** | 209 | **32.06** | 209 | **39.23** |
| 1915-1919 | 76 | **9.21** | 76 | **19.74** | 104 | **34.62** | 104 | **39.42** | 119 | **36.13** | 119 | **39.50** |
| Before 1915 | 62 | **12.90** | 62 | **25.81** | 130 | **39.23** | 130 | **48.46** | 110 | **35.45** | 110 | **45.45** |
| **Religiosity** | | | | | | | | | | | | |
| Non-religious | 134 | **5.97** | 134 | **14.18** | 154 | **25.32** | 154 | **38.31** | 126 | **26.19** | 126 | **37.30** |
| Religious | 461 | **10.85** | 461 | **22.13** | 574 | **35.71** | 574 | **44.60** | 521 | **33.21** | 521 | **39.54** |
| **Education** | | | | | | | | | | | | |
| Secondary or more | 348 | **9.20** | 348 | **20.40** | 403 | **28.04** | 403 | **37.97** | 325 | **30.15** | 325 | **37.54** |
| Primary or less | 247 | **10.53** | 247 | **20.24** | 325 | **40.31** | 325 | **49.85** | 322 | **33.54** | 322 | **40.68** |
| **Region** | | | | | | | | | | | | |
| Flanders | 281 | **14.23** | 281 | **26.69** | 325 | **42.46** | 325 | **52.31** | 318 | **36.16** | 318 | **38.99** |
| Wallonia | 245 | **6.94** | 245 | **16.73** | 304 | **28.29** | 304 | **37.83** | 254 | **28.74** | 254 | **41.34** |
| Brussels | 69 | **1.45** | 69 | **7.25** | 99 | **20.20** | 99 | **30.30** | 75 | **24.00** | 75 | **32.00** |
| **Health** | | | | | | | | | | | | |
| No problem | 274 | **6.20** | 209 | **6.70** | 322 | **27.33** | 218 | **30.73** | 281 | **25.98** | 198 | **31.31** |
| Subjective problem | 260 | **12.14** | 161 | **9.94** | 251 | **36.65** | 216 | **42.59** | 238 | **36.55** | 191 | **33.51** |
| Moderate disability | 48 | **6.25** | 99 | **35.35** | 70 | **37.14** | 119 | **51.26** | 63 | **28.57** | 109 | **51.38** |
| Severe disability | 67 | **19.40** | 126 | **44.44** | 85 | **44.71** | 175 | **54.29** | 65 | **43.08** | 149 | **47.65** |
| **Recent hospitalisation** | | | | | | | | | | | | |
| No | 490 | **8.57** | 438 | **17.35** | 579 | **32.47** | 534 | **41.20** | 518 | **30.50** | 479 | **35.91** |
| Yes | 105 | **15.24** | 157 | **28.66** | 149 | **37.58** | 194 | **48.97** | 129 | **37.21** | 168 | **48.21** |
| **Ability to make ends meet** | | | | | | | | | | | | |
| Easily | 223 | **7.73** | 219 | **15.07** | 262 | **29.39** | 246 | **38.21** | 240 | **28.75** | 210 | **35.24** |
| Fairly | 215 | **8.37** | 226 | **23.01** | 265 | **28.30** | 251 | **43.43** | 207 | **27.05** | 222 | **37.39** |
| Hardly | 147 | **14.97** | 150 | **24.00** | 201 | **45.77** | 231 | **48.48** | 200 | **40.50** | 215 | **44.65** |
| **Spousal health** | | | | | | | | | | | | |
| Not in couple | - | - | - | - | 262 | **38.55** | 309 | **49.51** | 247 | **34.82** | 294 | **43.88** |
| Good | 294 | **7.14** | 245 | **13.47** | 227 | **26.43** | 173 | **35.26** | 186 | **22.58** | 148 | **28.38** |
| Fair or bad | 301 | **12.29** | 350 | **25.14** | 239 | **34.73** | 246 | **41.06** | 214 | **36.45** | 205 | **40.00** |
| **Number of daughters** | | | | | | | | | | | | |
| 0 daughter | 180 | **7.22** | 180 | **18.89** | - | - | - | - | 204 | **31.37** | 204 | **43.63** |
| 1+ daughter(s) | 415 | **10.84** | 415 | **20.96** | 1=373 | **31.90** | 1=373 | **42.36** | 443 | **32.05** | 443 | **37.02** |
| | | | | | >1=499 | **35.21** | >1=499 | **44.23** | | | | |
| **Number of sons** | | | | | | | | | | | | |
| 0 son | 243 | **8.64** | 243 | **16.87** | 285 | **31.58** | 285 | **47.37** | - | - | - | - |
| 1+ son(s) | 352 | **10.51** | 352 | **22.73** | 443 | **34.76** | 443 | **40.63** | 1=306 | **24.51** | 1=306 | **33.01** |
| | | | | | | | | | >1=341 | **38.42** | >1=341 | **44.57** |
| **Closest child proximity** | | | | | | | | | | | | |
| Cohabiting | 66 | **12.12** | 51 | **25.49** | 99 | **31.31** | 88 | **35.23** | 101 | **28.71** | 87 | **33.33** |
| <10 Km | 340 | **12.65** | 352 | **22.73** | 478 | **38.49** | 488 | **49.59** | 405 | **40.00** | 421 | **47.03** |
| 10 Km+/no child | 189 | **3.70** | 192 | **14.58** | 151 | **19.21** | 152 | **27.63** | 141 | **10.64** | 139 | **18.71** |
| **Attrition status** | | | | | | | | | | | | |
| Attritor | 375 | **7.47** | 375 | **17.60** | 438 | **34.47** | 438 | **39.95** | 389 | **31.36** | 389 | **35.22** |
| Non-attritor | 220 | **13.64** | 220 | **25.00** | 290 | **32.07** | 290 | **48.28** | 258 | **32.56** | 258 | **44.96** |

**APPENDIX TABLE IX-18:** Bivariate binary logistic regressions on 'spousal care' [*W-SPOUSALCARE*], 'daughter care' [*W-DAUGHTERCARE*], and on 'son care' [*W-SONCARE*], at the first and the last study waves (PSBH 1994-2002)

| | SPOUSAL CARE (n=595) | | DAUGHTER CARE (n=728) | | SON CARE (n=647) | |
|---|---|---|---|---|---|---|
| CHARACTERISTICS | First study wave OR | Last study wave OR | First study wave OR | Last study wave OR | First study wave OR | Last study wave OR |
| **Gender** | AIC: 383.02 | AIC: 603.04 | AIC:927.00 | AIC: 995.78 | AIC: 809.19 | AIC: 863.82 |
| *rc: Man* | | | | | | |
| Woman | 1.20 | 1.33 | **1.46** ** | 1.36 ** | **1.44** ** | 1.50 ** |
| **Birth cohort** | AIC: 387.29 | AIC: 607.63 | AIC: 929.88 | AIC: 1,000.72 | AIC: 813.88 | AIC: 870.90 |
| *rc: 1925-1929* | | | | | | |
| 1920-1924 | 0.87 | 1.09 | 1.48 ** | 1.22 | 1.26 | 1.18 |
| 1915-1919 | 0.92 | **1.04** ** | 1.37 | 0.96 | 1.51 * | 1.19 |
| Before 1915 | *1.35* | 1.48 | 1.67 ** | 1.38 | 1.47 | 1.52 * |
| **Religiosity** | AIC: 381.11 | AIC: 600.67 | AIC: 926.50 | AIC: 998.02 | AIC: 811.23 | AIC: 869.74 |
| *rc: Non-religious* | | | | | | |
| Religious | *1.92* * | **1.72** ** | 1.64 ** | 1.30 | 1.40 | 1.10 |
| **Education** | AIC: 383.93 | AIC: 604.98 | AIC: 920.47 | AIC: 989.64 | AIC: 812.74 | AIC: 869.28 |
| *rc: Secondary or more* | | | | | | |
| Primary or less | 1.16 | 0.99 | 1.73 *** | 1.62 *** | 1.17 | 1.14 |
| **Region** | AIC: 369.93 | AIC: 589.23 | AIC: 910.93 | AIC: 980.55 | AIC: 809.53 | AIC: 869.79 |
| Flanders | **2.23** *** | **1.81** *** | 1.87 *** | 1.80 *** | 1.41 * | 0.91 |
| *rc: Wallonia* | | | | | | |
| Brussels | *0.20* | *0.39* * | 0.64 | 0.72 | 0.78 | 0.67 |
| **Health** | AIC: 376.10 | AIC: 516.70 | AIC: 924.81 | AIC: 977.88 | AIC: 806.69 | AIC: 855.00 |
| *rc: No problem* | | | | | | |
| Subjective problem | **2.09** ** | 1.54 | **1.54** ** | **1.67** ** | **1.64** *** | 1.11 |
| Moderate disability | *1.01* | **7.62** *** | *1.57* | **2.37** *** | 1.14 | **2.32** *** |
| Severe disability | **3.64** *** | **11.14** *** | **2.15** *** | **2.68** *** | **2.16** *** | **2.00** *** |
| **Recent hospitalisation** | AIC: 380.29 | AIC: 596.32 | AIC: 931.23 | AIC: 996.51 | AIC: 811.50 | AIC: 862.15 |
| *rc: No* | | | | | | |
| Yes | **1.92** ** | **1.91** *** | 1.25 | **1.37** * | 1.35 | **1.66** *** |
| **Ability to make ends meet** | AIC: 380.60 | AIC: 600.79 | AIC: 916.31 | AIC: 996.86 | AIC: 805.63 | AIC: 867.61 |
| *rc: Easily* | | | | | | |
| Fairly | 1.09 | **1.68** ** | 0.95 | 1.24 | 0.92 | 1.10 |
| Hardly | **2.10** ** | **1.78** ** | **2.03** *** | **1.52** ** | **1.69** *** | **1.48** ** |
| **Spousal health** | AIC: 379.68 | AIC: 592.38 | AIC: 926.21 | AIC: 992.02 | AIC: 804.73 | AIC: 861.65 |
| Not in couple | - | - | rc | rc | rc | rc |
| Good | rc | rc | 0.57 *** | **0.56** *** | **0.55** *** | **0.51** *** |
| Fair or bad | **1.82** ** | **2.16** *** | 0.85 | **0.71** ** | 1.07 | 0.85 |
| **Number of daughters** | AIC: 382.24 | AIC: 604.65 | AIC: 931.71 | AIC: 999.73 | AIC: 813.56 | AIC: 867.41 |
| 0 daughter | rc | rc | - | - | rc | rc |
| 1+ daughter(s) | 1.56 | 1.14 | rc | rc | 1.03 | 0.76 |
| 2+ daughters | | | 1.16 | 1.08 | | |
| **Number of sons** | AIC:383.64 | AIC: 601.89 | AIC: 931.81 | AIC: 996.79 | AIC: 799.07 | AIC: 860.85 |
| 0 son | rc | rc | rc | rc | - | - |
| 1+ son(s) | 1.24 | **1.44** * | 1.16 | **0.76** * | rc | rc |
| 2+ sons | | | | | **1.92** *** | **1.63** *** |
| **Closest child proximity** | AIC: 372.77 | AIC: 600.74 | AIC: 913.91 | AIC: 975.87 | AIC:767.82 | AIC: 832.87 |
| Cohabiting | ***3.59*** *** | **2.00** * | **1.92** ** | 1.42 | | |
| <10 Km | ***3.76*** *** | **1.72** ** | 2.63 *** | **2.58** *** | **3.38** *** | **2.17** ** |
| *rc: 10 Km+/no child* | | | | | **5.60** *** | **3.86** *** |
| **Attrition status** | AIC: 378.42 | AIC: 600.38 | AIC: 932.15 | AIC: 995.08 | AIC: 813.49 | AIC: 863.80 |
| *rc: Attritor* | | | | | | |
| Non-attritor | **1.96** ** | **1.56** ** | **0.90** ns | **1.40** ** | 1.06 | **1.50** ** |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01. Italics indicate that the result should not be interpreted due to small numbers (only for regression on spousal care at the first study wave).

**APPENDIX TABLE IX-19:** Characteristics of the study sample at the first and the last study waves for the elderly having only one potential care-giver and those having at least two potential care-givers (PSBH 1994-2002, n=999)

| CHARACTERISTICS | NUMBER OF POTENTIAL CARE-GIVERS 1 (n=174) | 2+ (n=825) |
|---|---|---|
| **Gender** (**) | | |
| Man | 37.93 | 46.42 |
| Woman | 62.07 | 53.58 |
| **Birth cohort** (***) | | |
| 1925-1929 | 22.99 | 37.21 |
| 1920-1924 | 32.76 | 31.52 |
| 1915-1919 | 20.11 | 15.39 |
| 1910-1914 | 13.79 | 11.15 |
| Before 1910 | 10.34 | 4.73 |
| **Religiosity** (***) | | |
| Non-religious | 31.03 | 20.61 |
| Religious | 68.97 | 79.39 |
| **Education** (ns) | | |
| Higher education | 8.62 | 13.82 |
| Upper secondary | 21.26 | 18.79 |
| Lower secondary | 24.71 | 21.82 |
| Primary or less | 45.40 | 45.58 |
| **Last occupational status** (ns) | | |
| Never worked | 17.24 | 24.00 |
| Blue collar | 32.76 | 27.39 |
| White collar | 29.89 | 26.06 |
| Self-employed | 13.22 | 16.48 |
| Other | 6.90 | 6.06 |
| **Region** (ns) | | |
| Flanders | 37.93 | 46.42 |
| Wallonia | 46.55 | 40.97 |
| Brussels | 15.52 | 12.61 |
| **Urbanisation level** (***) | | |
| City | 56.32 | 44.36 |
| Town | 27.59 | 29.45 |
| Countryside | 16.09 | 26.18 |
| **Subjective health** (FSW: ns) | | |
| Good | 41.95 | 47.03 |
| Fair | 43.68 | 39.64 |
| Bad | 14.37 | 13.33 |
| **Subjective health** (LSW: ns) | | |
| Good | 31.03 | 36.73 |
| Fair | 47.13 | 43.03 |
| Bad | 21.84 | 20.24 |
| **Disability** (FSW: ns) | | |
| None | 78.74 | 79.64 |
| Moderated | 8.62 | 9.45 |
| Severe | 12.64 | 10.91 |
| **Disability** (LSW: ns) | | |
| None | 56.90 | 61.09 |
| Moderated | 18.97 | 16.12 |
| Severe | 24.14 | 22.79 |

| | | |
|---|---|---|
| **Recent hospitalisation** (FSW: ns) | | |
| No | 83.33 | 80.24 |
| Yes | 16.67 | 19.76 |
| **Recent hospitalisation** (LSW: ns) | | |
| No | 70.69 | 73.45 |
| Yes | 29.31 | 26.55 |
| **Ability to make ends meet** (FSW: *) | | |
| Easily | 29.89 | 37.70 |
| Fairly | 36.21 | 34.91 |
| Hardly | 33.91 | 27.39 |
| **Ability to make ends meet** (LSW: ns) | | |
| Easily | 29.89 | 35.15 |
| Fairly | 37.93 | 34.30 |
| Hardly | 32.18 | 30.55 |
| **Care combination** (FWS: ***) | | |
| No care | 39.08 | 37.33 |
| Care services | 35.06 | 24.73 |
| Family care | 2.87 | 15.03 |
| Mixed care | 22.99 | 22.91 |
| **Care combination** (LSW: ***) | | |
| No care | 21.26 | 23.52 |
| Care services | 41.38 | 22.67 |
| Family care | 6.90 | 15.15 |
| Mixed care | 30.46 | 38.60 |
| **Attrition status** (ns) | | |
| Attritors | 63.79 | 61.09 |
| Non-attritor | 36.21 | 38.91 |

*Note:* FSW= first study wave; LSW= last study wave; ns= not significant; *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01. Spousal health, number of daughters, of sons and proximity of the closest child are not displayed, because they are (partly) determined by the sub-sample definition.

**APPENDIX TABLE IX-20:** Number of care-givers observed over the study waves among the elderly having two or more potential care-givers (PSBH 1994-2002)

| CARE-GIVERS NUMBER | W3 (n=825) | W4 (n=737) | W5 (n=668) | W6 (n=567) | W7 (n=504) | W8 (n=447) | W9 (n=406) | W10 (n=358) | W11 (n=321) | LAST WAVE (n=825) |
|---|---|---|---|---|---|---|---|---|---|---|
| **No family care** | 62.06 | 60.24 | 60.78 | 55.03 | 60.71 | 53.47 | 52.71 | 48.32 | 41.12 | 46.18 |
| **1 care-giver** | 14.06 | 13.57 | 14.97 | 18.34 | 16.27 | 17.90 | 17.24 | 20.67 | 23.05 | 23.64 |
| **2 care-givers** | 13.09 | 14.25 | 12.72 | 13.76 | 12.90 | 16.33 | 15.27 | 15.92 | 19.94 | 17.33 |
| **3 care-givers** | 6.91 | 7.87 | 7.34 | 7.76 | 5.75 | 6.71 | 8.37 | 9.78 | 10.28 | 8.12 |
| **4 care-givers** | 2.67 | 2.58 | 2.10 | 3.00 | 2.58 | 3.58 | 3.69 | 3.07 | 2.80 | 2.67 |
| **5 care-givers** | 0.97 | 0.54 | 1.20 | 1.06 | 0.60 | 0.67 | 1.72 | 1.40 | 1.87 | 1.45 |
| **6 care-givers** | 0.00 | 0.68 | 0.45 | 0.71 | 0.79 | 0.89 | 0.25 | 0.28 | 0.31 | 0.12 |
| **7 care-givers** | 0.24 | 0.27 | 0.45 | 0.35 | 0.40 | 0.45 | 0.74 | 0.56 | 0.62 | 0.48 |

**APPENDIX TABLE IX-21:** Having always, once or never received care from two care-givers at once over the study waves (PSBH 1994-2002, n=972)

| CARE SITUATION | % |
|---|---|
| **Always 2+ care-givers** | 13.21 |
| **Sometimes 2+ care-givers** | 28.36 |
| **Only 1 care-giver at once** | 23.16 |
| **Only care services** | 22.18 |
| **Never cared** | 13.09 |

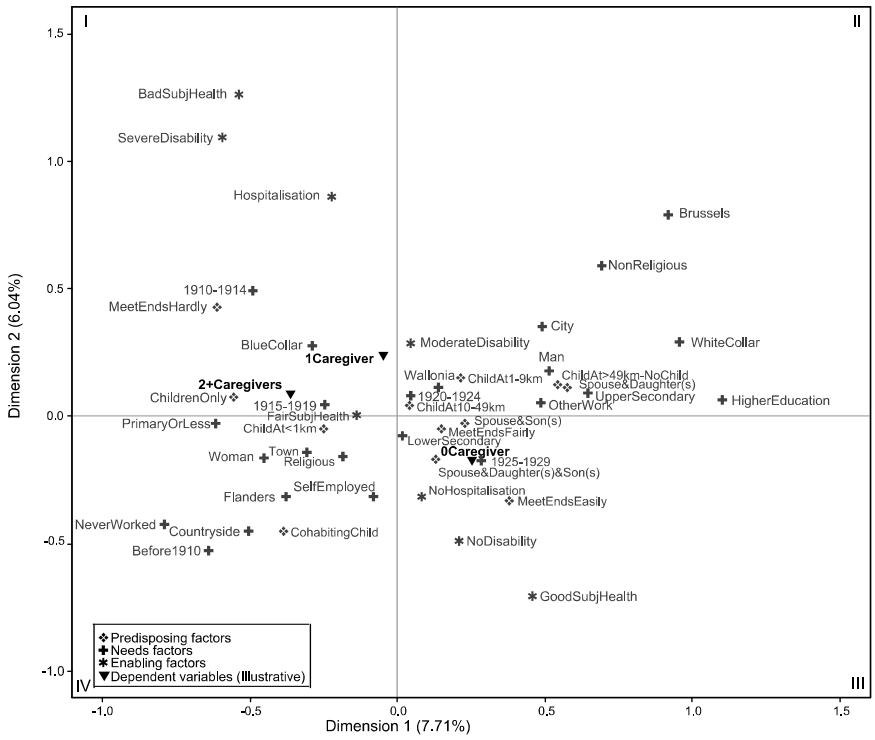
**APPENDIX TABLE IX-22:** Care activities observed over the study waves (PSBH 1994-2002)

| CARE ACTIVITIES | W3 (n=972) | W4 (n=870) | W5 (n=790) | W6 (n=665) | W7 (n=594) | W8 (n=532) | W9 (n=484) | W10 (n=424) | W11 (n=381) | LAST WAVE (n=972) |
|---|---|---|---|---|---|---|---|---|---|---|
| **No family care** | 63.17 | 61.15 | 61.90 | 58.35 | 63.97 | 56.02 | 54.13 | 50.47 | 43.57 | 50.00 |
| **IADL only** | 19.34 | 21.26 | 21.01 | 21.95 | 19.87 | 23.50 | 23.97 | 26.65 | 28.61 | 24.49 |
| **ADL only** | 4.22 | 3.33 | 3.42 | 2.71 | 2.36 | 3.20 | 3.72 | 4.48 | 6.56 | 4.84 |
| **IADL&ADL** | 13.27 | 14.25 | 13.67 | 16.99 | 13.80 | 17.29 | 18.18 | 18.40 | 21.26 | 20.68 |

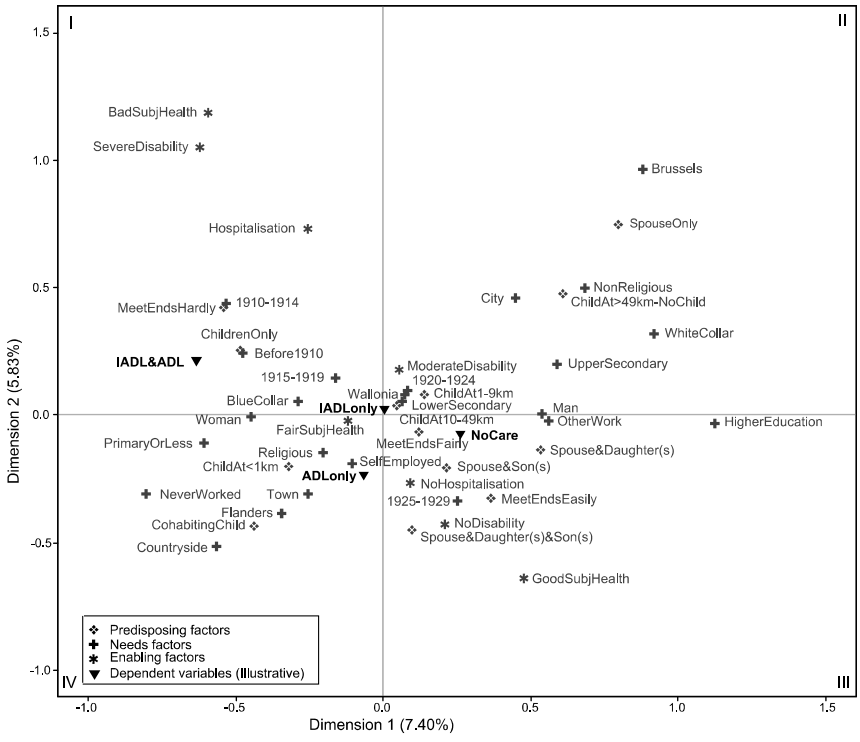
**APPENDIX TABLE IX-23:** Having always, once or never received care from two care-givers at once over the study waves (PSBH 1994-2002, n=972)

| CARE SITUATION | % |
|---|---|
| **Always ADL care** | 8.02 |
| **Sometimes ADL care** | 29.94 |
| **Only IADL care** | 22.22 |
| **Only care services** | 25.93 |
| **Never cared** | 13.89 |

**APPENDIX GRAPH IX-5:** Multiple correspondence analysis on the 825 elderly 'at risk' of receiving care from two care-givers or more, last study wave (PSBH 1994-2002)




**APPENDIX GRAPH IX-6:** Multiple correspondence analysis on the 972 elderly 'at risk' of receiving IADL or ADL care, last study wave (PSBH 1994-2002)



**APPENDIX TABLE IX-24:** Care-givers number at the first and the last study waves according to the characteristics of the 825 elderly 'at risk' of receiving care from two care-givers simultaneously (PSBH 1994-2002)

| | FIRST STUDY WAVE | | | LAST STUDY WAVE | | |
|---|---|---|---|---|---|---|
| | 0 care-giver | 1 care-giver | 2+ care-givers | 0 care-giver | 1 care-giver | 2+ care-givers |
| **CHARACTERISTICS** | | | | | | |
| **Gender** | | | | | | |
| Man (n=383) | 68.93 | 10.97 | 20.10 | 50.91 | 22.72 | 26.37 |
| Woman (n=442) | 56.11 | 16.74 | 27.15 | 42.08 | 24.43 | 33.48 |
| **Birth cohort** | | | | | | |
| 1925-1929 (n=307) | 68.73 | 9.77 | 21.50 | 49.84 | 21.17 | 28.99 |
| 1920-1924 (n=260) | 60.00 | 13.85 | 26.15 | 43.85 | 23.46 | 32.69 |
| 1915-1919 (n=127) | 59.06 | 18.90 | 22.05 | 47.24 | 27.56 | 25.20 |
| Before 1915 (n=131) | 53.44 | 19.85 | 26.72 | 41.22 | 25.95 | 32.82 |
| **Religiosity** | | | | | | |
| Non-religious (n=170) | 69.41 | 15.88 | 14.71 | 54.12 | 24.71 | 21.18 |
| Religious (n=655) | 60.15 | 13.59 | 26.26 | 44.12 | 23.36 | 32.52 |
| **Education** | | | | | | |
| Secondary or more (n=449) | 67.48 | 12.92 | 19.60 | 49.89 | 24.50 | 25.61 |
| Primary or less (n=376) | 55.59 | 15.43 | 28.99 | 41.76 | 22.61 | 35.64 |
| **Region** | | | | | | |
| Flanders (n=383) | 53.26 | 15.93 | 30.81 | 39.69 | 22.98 | 37.34 |
| Wallonia (n=338) | 67.75 | 12.43 | 19.82 | 49.41 | 24.26 | 26.33 |
| Brussels (n=104) | 75.96 | 12.50 | 11.54 | 59.62 | 24.04 | 16.35 |
| **Health** | | | | | | |
| No problem (n=369/265) | 71.00 | 8.40 | 20.60 | 61.13 | 16.23 | 22.64 |
| Subjective problem (n=288/239) | 56.25 | 17.36 | 26.39 | 51.05 | 25.10 | 23.85 |
| Moderate disability (n=78/133) | 60.26 | 21.79 | 17.95 | 29.32 | 30.08 | 40.60 |
| Severe disability (n=90/188) | 45.56 | 20.00 | 34.44 | 30.85 | 27.66 | 41.49 |
| **Recent hospitalisation** | | | | | | |
| No (n=662/606) | 65.11 | 12.54 | 22.36 | 50.17 | 21.62 | 28.22 |
| Yes (n=163/219) | 49.69 | 20.25 | 30.06 | 35.16 | 29.22 | 35.62 |
| **Ability to make ends meet** | | | | | | |
| Easily (n=311/290) | 65.59 | 12.22 | 22.19 | 52.76 | 21.38 | 25.86 |
| Fairly (n=288/283) | 67.36 | 13.89 | 18.75 | 47.70 | 22.61 | 29.68 |
| Hardly (n=226/252) | 50.44 | 16.81 | 32.74 | 36.90 | 27.38 | 35.71 |
| **Spousal health** | | | | | | |
| Not in couple (n=246/294) | 54.88 | 17.89 | 27.24 | 42.18 | 26.19 | 31.63 |
| Good (n=277/221) | 72.56 | 8.66 | 18.77 | 57.47 | 19.00 | 23.53 |
| Fair or bad (n=302/310) | 58.28 | 15.89 | 25.83 | 41.94 | 24.52 | 33.55 |
| **Number of daughters** | | | | | | |
| 0-1 daughter (n=470) | 64.04 | 16.17 | 19.79 | 45.53 | 28.94 | 25.53 |
| 2+ daughters (n=355) | 59.44 | 11.27 | 29.30 | 47.04 | 16.62 | 36.34 |
| **Number of sons** | | | | | | |
| 0-1 son (n=484) | 66.32 | 15.29 | 18.39 | 49.17 | 25.83 | 25.00 |
| 2+ sons (n=341) | 56.01 | 12.32 | 31.67 | 41.94 | 20.53 | 37.54 |
| **Closest child proximity** | | | | | | |
| Cohabiting (n=115/97) | 59.13 | 18.26 | 22.61 | 53.61 | 21.65 | 24.74 |
| <10 Km (n=528/546) | 56.25 | 13.26 | 30.49 | 39.01 | 22.34 | 38.64 |
| 10 Km+/no child (n=182/182) | 80.77 | 13.74 | 5.49 | 63.74 | 28.57 | 7.69 |
| **Attrition status** | | | | | | |
| Attritor (n=504) | 60.52 | 17.06 | 22.42 | 49.40 | 24.01 | 26.59 |
| Non-attritor (n=321) | 64.49 | 9.35 | 26.17 | 41.12 | 23.05 | 35.83 |

**APPENDIX TABLE IX-25:** Bivariate multinomial logistic regressions on 'care-givers number' [*W-CGNUMBER*], at the first and the last study waves (PSBH 1994-2002, n=825)

| | FIRST STUDY WAVE | | | LAST STUDY WAVE | | |
|---|---|---|---|---|---|---|
| | **1 CG/ *0 CG*** | **2+ CG/ *0 CG*** | **2+ CG/ *1 CG*** | **1 CG/ *0 CG*** | **2+ CG/ *0 CG*** | **2+ CG/ *1 CG*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | AIC: 1,501.24 | | | AIC: 1,748.63 | | |
| *rc: Man (n=383)* | | | | | | |
| Woman (n=442) | **1.88** *** | **1.66** *** | 0.89 | 1.30 | **1.54** *** | 1.18 |
| **Birth cohort** | AIC: 1,508.69 | | | AIC: 1,757.90 | | |
| *rc: 1925-1929 (n=307)* | | | | | | |
| 1920-1924 (n=260) | **1.62** * | 1.39 | 0.86 | 1.26 | 1.28 | 1.02 |
| 1915-1919 (n=127) | **2.25** *** | 1.19 | **0.53** * | 1.37 | 0.92 | 0.67 |
| Before 1915 (n=131) | **2.61** *** | **1.60** * | 0.61 | 1.48 | 1.37 | 0.92 |
| **Religiosity** | AIC: 1,505.16 | | | AIC: 1,746.64 | | |
| *rc: Non-religious (n=170)* | | | | | | |
| Religious (n=655) | 0.99 | **2.06** *** | **2.09** ** | 1.16 | **1.88** *** | 1.62 * |
| **Education** | AIC: 1,502.79 | | | AIC: 1,745.77 | | |
| *rc: Secondary or more (n=449)* | | | | | | |
| Primary or less (n=376) | **1.45** * | **1.80** *** | 1.24 | 1.10 | **1.66** *** | **1.51** ** |
| **Region** | AIC: 1490.67 | | | AIC: 1,735.84 | | |
| Flanders (n=383) | **1.63** ** | **1.98** *** | 1.21 | 1.18 | **1.77** *** | 1.50 ** |
| *rc: Wallonia (n=338)* | | | | | | |
| Brussels (n=104) | 0.90 | **0.52** * | 0.58 | 0.82 | **0.52** ** | 0.63 |
| **Health** | AIC: 1,489.19 | | | AIC: 1,699.90 | | |
| *rc: No problem (n=369/265)* | | | | | | |
| Subjective problem (n=288/239) | **2.61** *** | **1.62** *** | **0.62** * | **1.85** *** | 1.26 | 0.68 |
| Moderate disability (n=78/133) | **3.06** *** | 1.03 | **0.34** *** | **3.86** *** | **3.74** *** | 0.97 |
| Severe disability (n=90/188) | **3.71** *** | **2.6** *** | 0.70 | **3.38** *** | **3.63** *** | 1.08 |
| **Recent hospitalisation** | AIC: 1,502.54 | | | AIC:1740.92 | | |
| *rc: No (n=662/606)* | | | | | | |
| Yes (n=163/219) | **2.12** *** | **1.76** *** | 0.83 | **1.93** *** | **1.80** *** | 0.93 |
| **Ability to make ends meet** | AIC: 1,500.38 | | | AIC: 1,745.51 | | |
| *rc: Easily (n=311/290)* | | | | | | |
| Fairly (n=288/283) | 1.11 | 0.82 | 0.74 | 1.17 | 1.27 | 1.09 |
| Hardly (n=226/252) | **1.79** ** | **1.92** *** | 1.07 | **1.83** *** | **1.97** *** | 1.08 |
| **Spousal health** | AIC: 1,497.87 | | | AIC: 1743.99 | | |
| *rc: Not in couple (n=246/294)* | | | | | | |
| Good (n=277/221) | **0.37** *** | **0.52** *** | 1.42 | **0.53** *** | **0.55** *** | 1.03 |
| Fair or bad (n=302/310) | 0.84 | 0.89 | 1.07 | 0.94 | **1.07** | 1.13 |
| **Number of daughters** | AIC: 1,504.13 | | | AIC: 1,734.50 | | |
| *rc: 0-1 daughter (n=470)* | | | | | | |
| 2+ daughters (n=355) | 0.75 | **1.60** *** | **2.13** *** | **0.56** *** | **1.38** * | **2.48** *** |
| **Number of sons** | AIC: 1,496.68 | | | AIC: 1,740.86 | | |
| *rc: 0-1 son (n=484)* | | | | | | |
| 2+ sons (n=341) | 0.95 | **2.04** *** | **2.14** *** | 0.93 | **1.76** *** | **1.89** *** |
| **Closest child proximity** | AIC: 1,459.35 | | | AIC:1,682.64 | | |
| Cohabiting (n=115/97) | **1.82** * | **5.62** *** | **3.10** ** | 0.9 | **3.82** *** | **4.25** *** |
| <10 Km (n=528/546) | 1.39 | **7.97** *** | **5.75** *** | **1.28** | **8.2** *** | **6.42** *** |
| *rc: 10 Km+/no child (n=182/182)* | | | | | | |
| **Attrition status** | AIC: 1,505.50 | | | AIC: 1,747.33 | | |
| *rc: Attritor (n=504)* | | | | | | |
| Non-attritor (n=321) | **0.51** *** | 1.10 | **2.13** *** | 1.15 ns | **1.62** *** | 1.40 * |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE IX-26:** Family care activities at the first and the last study waves according to the characteristics of the 972 elderly 'at risk' of receiving IADL or ADL family care (PSBH 1994-2002)

| | FIRST STUDY WAVE | | | LAST STUDY WAVE | | |
|---|---|---|---|---|---|---|
| | No care | IADL only | ADL | No care | IADL only | ADL |
| **CHARACTERISTICS** | | | | | | |
| **Gender** | | | | | | |
| Man (n=437) | 70.02 | 16.48 | 13.50 | 55.38 | 24.03 | 20.59 |
| Woman (n=535) | 57.57 | 21.68 | 20.75 | 45.61 | 24.86 | 29.53 |
| **Birth cohort** | | | | | | |
| 1925-1929 (n=338) | 70.12 | 18.93 | 10.95 | 44.91 | 21.56 | 33.53 |
| 1920-1924 (n=307) | 62.54 | 19.87 | 17.59 | 48.75 | 26.88 | 24.38 |
| 1915-1919 (n=160) | 60.00 | 20.00 | 20.00 | 49.19 | 21.82 | 28.99 |
| Before 1915 (n=167) | 53.29 | 18.56 | 28.14 | 53.85 | 27.22 | 18.93 |
| **Religiosity** | | | | | | |
| Non-religious (n=220) | 70.45 | 18.64 | 10.91 | 56.82 | 26.36 | 16.82 |
| Religious (n=752) | 61.04 | 19.55 | 19.41 | 48.01 | 23.94 | 28.06 |
| **Education** | | | | | | |
| Secondary or more (n=530) | 67.74 | 20.94 | 11.32 | 53.58 | 26.23 | 20.19 |
| Primary or less (n=442) | 57.69 | 17.42 | 24.89 | 45.70 | 22.40 | 31.90 |
| **Region** | | | | | | |
| Flanders (n=436) | 55.28 | 15.14 | 29.59 | 44.04 | 16.06 | 39.91 |
| Wallonia (n=406) | 67.24 | 24.38 | 8.37 | 52.46 | 33.00 | 14.53 |
| Brussels (n=130) | 76.92 | 17.69 | 5.38 | 62.31 | 26.15 | 11.54 |
| **Health** | | | | | | |
| No problem (n=429/308) | 72.49 | 17.95 | 9.56 | 64.61 | 22.73 | 12.66 |
| Subjective problem (n=347/291) | 58.50 | 19.31 | 22.19 | 53.61 | 23.37 | 23.02 |
| Moderate disability (n=91/158) | 60.44 | 21.98 | 17.58 | 35.44 | 28.48 | 36.08 |
| Severe disability (n=105/215) | 42.86 | 22.86 | 34.29 | 34.88 | 25.58 | 39.53 |
| **Recent hospitalisation** | | | | | | |
| No (n=786/715) | 65.90 | 19.47 | 14.63 | 52.87 | 26.15 | 20.98 |
| Yes (n=186/257) | 51.61 | 18.82 | 29.57 | 42.02 | 19.84 | 38.13 |
| **Ability to make ends meet** | | | | | | |
| Easily (n=349/331) | 66.19 | 18.34 | 15.47 | 55.89 | 24.47 | 19.64 |
| Fairly (n=344/338) | 68.60 | 18.60 | 12.79 | 51.18 | 22.49 | 26.33 |
| Hardly (n=279/303) | 52.69 | 21.51 | 25.81 | 42.24 | 26.73 | 31.02 |
| **Spousal health** | | | | | | |
| Not in couple (n=338/397) | 55.33 | 22.78 | 21.89 | 43.58 | 26.70 | 29.72 |
| Good (n=302/235) | 74.50 | 17.22 | 8.28 | 61.70 | 17.87 | 20.43 |
| Fair or bad (n=332/340) | 60.84 | 17.77 | 21.39 | 49.41 | 26.47 | 24.12 |
| **Number of daughters** | | | | | | |
| 0-1 daughter (n=624) | 65.71 | 18.59 | 15.71 | 51.12 | 24.04 | 24.84 |
| 2+ daughters (n=348) | 58.62 | 20.69 | 20.69 | 47.99 | 25.29 | 26.72 |
| **Number of sons** | | | | | | |
| 0-1 son (n=637) | 67.35 | 17.58 | 15.07 | 53.85 | 22.92 | 23.23 |
| 2+ sons (n=335) | 55.22 | 22.69 | 22.09 | 42.69 | 27.46 | 29.85 |
| **Closest child proximity** | | | | | | |
| Cohabiting (n=117/103) | 59.83 | 26.50 | 13.68 | 56.31 | 17.48 | 26.21 |
| <10 Km (n=575/594) | 53.91 | 24.52 | 21.57 | 39.06 | 30.64 | 30.30 |
| 10 Km+/no child (n=280/275) | 83.57 | 5.71 | 10.71 | 71.27 | 13.82 | 14.91 |
| **Attrition status** | | | | | | |
| Attritor (n=591) | 61.25 | 19.63 | 19.12 | 54.15 | 21.83 | 24.03 |
| Non-attritor (n=381) | 66.14 | 18.90 | 14.96 | 43.57 | 28.61 | 27.82 |

**APPENDIX TABLE IX-27:** Bivariate multinomial logistic regressions on 'family care activities' [*W-CGACTIVITY*], at the first and the last study waves (PSBH 1994-2002, n=972)

| | FIRST STUDY WAVE | | | LAST STUDY WAVE | | |
|---|---|---|---|---|---|---|
| | **IADL only** | **ADL** | **ADL** | **IADL only** | **ADL** | **ADL** |
| | ***/No*** | ***/ No*** | ***/ IADL only*** | ***/No*** | ***/ No*** | ***/ IADL only*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | AIC: 1,765.97 | | | AIC: 2,016.71 | | |
| *rc: Man (n=437)* | | | | | | |
| Woman (n=535) | **1.6** *** | **1.87** *** | 1.17 | 1.26 | **1.74** *** | **0.33** * |
| **Birth cohort** | AIC: 1,765.74 | | | AIC: 2,020.56 | | |
| *rc: 1925-1929 (n=338)* | | | | | | |
| 1920-1924 (n=307) | 1.18 | **1.80** * | 1.53 | 0.88 | **1.68** *** | **1.91** *** |
| 1915-1919 (n=160) | 1.23 | **2.14** *** | **1.73** * | 1.09 | 1.42 | 1.30 |
| Before 1915 (n=167) | 1.29 | **3.38** *** | **2.62** *** | 0.95 | **2.12** *** | **2.24** *** |
| **Religiosity** | AIC: 1,772.40 | | | AIC: 2,016.78 | | |
| *rc: Non-religious (n=220)* | | | | | | |
| Religious (n=752) | 1.21 | **2.05** *** | **1.70** * | 1.08 | **1.98** *** | **1.84** *** |
| **Education** | AIC: 1,751.81 | | | AIC: 2,011.66 | | |
| *rc: Secondary or more (n=530)* | | | | | | |
| Primary or less (n=442) | 0.98 | **2.58** *** | **2.64** *** | 1.001 | **1.85** *** | **1.85** *** |
| **Region** | AIC: 1,698.98 | | | AIC: 1,934.79 | | |
| Flanders (n=436) | 0.76 | **4.30** *** | **5.69** *** | **0.58** *** | **3.27** *** | **5.65** *** |
| *rc: Wallonia (n=406)* | | | | | | |
| Brussels (n=130) | **0.63** * | 0.56 | 0.89 | **0.67** * | 0.67 | 1.00 |
| **Health** | AIC: 1,738.81 | | | AIC: 1,958.62 | | |
| *rc: No problem (n=429/308)* | | | | | | |
| Subjective problem (n=347/291) | 1.33 | **2.88** *** | **2.16** *** | 1.24 | **2.19** *** | **1.77** ** |
| Moderate disability (n=91/158) | 1.47 | **2.21** ** | 1.50 | **2.28** *** | **5.19** *** | **2.27** *** |
| Severe disability (n=105/215) | **2.15** *** | **6.07** *** | **2.82** *** | **2.09** *** | **5.78** *** | **2.77** *** |
| **Recent hospitalisation** | AIC: 1,760.78 | | | AIC: 2,001.14 | | |
| *rc: No (n=786/715)* | | | | | | |
| Yes (n=186/257) | 1.23 | **2.58** *** | **2.09** *** | 0.96 | **2.29** *** | **2.40** *** |
| **Ability to make ends meet** | AIC: 1,763.25 | | | AIC: 2,017.35 | | |
| *rc: Easily (n=349/331)* | | | | | | |
| Fairly (n=344/338) | 0.98 | 0.80 | 0.82 | 1.00 | **1.46** * | **1.46** * |
| Hardly (n=279/303) | 1.47 * | **2.10** *** | 1.42 | **1.45** * | **2.09** *** | 1.45 |
| **Spousal health** | AIC: 1,749.60 | | | AIC: 2,012.19 | | |
| *rc: Not in couple (n=338/397)* | | | | | | |
| Good (n=302/235) | **0.56** *** | **0.28** *** | **0.50** ** | **0.47** *** | **0.49** *** | 1.03 |
| Fair or bad (n=332/340) | **0.71** * | 0.89 | 1.25 | 0.87 | **0.72** * | 0.82 |
| **Number of daughters** | AIC: 1,777.24 | | | AIC: 2,028.12 | | |
| *rc: 0-1 daughter (n=624)* | | | | | | |
| 2+ daughters (n=348) | 1.25 | **1.48** ** | 1.18 | 1.12 | 1.15 | 1.02 |
| **Number of sons** | AIC: 1,768.56 | | | AIC: 2,017.90 | | |
| *rc: 0-1 son (n=637)* | | | | | | |
| 2+ sons (n=335) | 1.57 *** | **1.79** *** | 1.14 | **1.51** ** | **1.62** *** | 1.07 |
| **Closest child proximity** | AIC: 1,699.40 | | | AIC: 1,949.55 | | |
| Cohabiting (n=117/103) | | | | | | |
| <10 Km (n=575/594) | 6.48 *** | **1.78** * | **0.28** *** | 1.60 | **2.23** *** | 1.39 |
| *rc : 10 Km+/no child (n=280/275)* | 6.65 *** | **3.12** *** | **0.47** ** | **4.05** *** | **3.71** *** | 0.92 |
| **Attrition status** | AIC: 1,779.37 | | | AIC: 2,018.17 | | |
| *rc: Attritor (n=591)* | | | | | | |
| Non-attritor (n=381) | 0.89 | **0.73** * | 0.81 | **1.63** *** | **1.44** ** | 0.88 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

# *CHAPTER X*

**APPENDIX-TABLE X-1 :** Comparison of the characteristics of the included and excluded groups in the transition analyses (PSBH 1994)

| | AMONG THE 1,008 FAMILY MEMBERS | | AMONG THE 904 'AT RISK' OF FAMILY CARE TRANSITIONS | | |
|---|---|---|---|---|---|
| | | | Any family care spell | | |
| **CHARACTERISTICS** | Still in W4 (n=906) | Early leavers (n=102) | Any long-term spell (n=471) | Only short-term spell(s) (n=108) | No spell (n=325) |
| **Gender(ns[3]/**[4])** | | | | | |
| Man | 44.70 | 45.10 | 40.76 | 47.22 | 49.54 |
| Woman | 55.30 | 54.90 | 59.24 | 52.78 | 50.46 |
| **Birth cohort** (***/ns) | | | | | |
| 1925-1929 | 36.42 | 18.63 | 33.33 | 39.81 | 40.00 |
| 1920-1924 | 31.57 | 31.37 | 32.27 | 32.41 | 30.46 |
| 1915-1919 | 16.00 | 19.61 | 16.99 | 16.67 | 14.46 |
| 1910-1914 | 11.15 | 17.65 | 12.31 | 6.48 | 10.46 |
| Before 1910 | 4.86 | 12.75 | 5.10 | 4.63 | 4.62 |
| **Religiosity** (ns/ns) | | | | | |
| Non-religious | 22.41 | 22.55 | 19.75 | 25.00 | 25.23 |
| Religious | 77.59 | 77.45 | 80.25 | 75.00 | 74.77 |
| **Education** (**/***) | | | | | |
| Higher education | 13.13 | 11.76 | 11.04 | 18.52 | 13.85 |
| Upper secondary | 20.31 | 10.78 | 15.92 | 25.93 | 24.92 |
| Lower secondary | 22.63 | 17.65 | 24.20 | 16.67 | 22.46 |
| Primary or less | 43.93 | 59.80 | 48.83 | 38.89 | 38.77 |
| **Last occupational status** (*/*) | | | | | |
| Never worked | 22.63 | 23.53 | 23.57 | 20.37 | 22.15 |
| Blue collar | 27.15 | 39.22 | 31.42 | 21.30 | 23.08 |
| White collar | 27.81 | 18.63 | 23.35 | 33.33 | 32.00 |
| Self-employed | 16.34 | 11.76 | 15.71 | 16.67 | 17.23 |
| Other | 6.07 | 6.86 | 5.94 | 8.33 | 5.54 |
| **Region** (ns/**) | | | | | |
| Flanders | 44.26 | 51.96 | 47.98 | 45.37 | 38.46 |
| Wallonia | 42.16 | 38.24 | 40.76 | 45.37 | 43.38 |
| Brussels | 13.58 | 9.80 | 11.25 | 9.26 | 18.15 |
| **Urbanisation level** (ns/ns) | | | | | |
| City | 46.80 | 44.12 | 45.65 | 50.00 | 47.08 |
| Town | 29.58 | 24.51 | 28.03 | 30.56 | 31.69 |
| Countryside | 23.62 | 31.37 | 26.33 | 19.44 | 21.23 |
| **Subjective health** (W3: ***/***) | | | | | |
| Good | 46.91 | 40.20 | 37.15 | 50.93 | 50.46 |
| Fair | 40.73 | 36.27 | 46.28 | 39.81 | 39.69 |
| Bad | 12.36 | 23.53 | 16.56 | 9.26 | 9.85 |
| **Disability** (W3: **/***) | | | | | |
| None | 79.14 | 81.37 | 61.15 | 73.15 | 79.69 |
| Moderated | 10.04 | 2.94 | 16.14 | 14.81 | 8.62 |
| Severe | 10.82 | 15.69 | 22.72 | 12.04 | 11.69 |

[3] Significant difference between 'early leavers' and 'still in W4.

[4] Significant difference between 'any long-term', 'only short-term' and 'no spell'.

| | | | | | |
|---|---|---|---|---|---|
| **Recent hospitalisation** (W3: ***/**) | | | | | |
| No | 82.56 | 64.71 | 76.86 | 78.70 | 84.00 |
| Yes | 17.44 | 35.29 | 23.14 | 21.30 | 16.00 |
| **Ability to make ends meet** (W3: ns/***) | | | | | |
| Easily | 36.75 | 32.35 | 33.12 | 42.59 | 40.00 |
| Fairly | 35.10 | 34.31 | 29.94 | 25.93 | 35.08 |
| Hardly | 28.15 | 33.33 | 36.94 | 31.48 | 24.92 |
| **Spousal health** (W3: ns/***) | | | | | |
| Not in couple | 34.00 | 32.35 | 41.19 | 28.70 | 31.38 |
| Good | 31.24 | 31.37 | 22.29 | 39.81 | 34.15 |
| Fair | 27.37 | 24.51 | 29.09 | 25.93 | 28.62 |
| Bad | 7.40 | 11.76 | 7.43 | 5.56 | 5.85 |
| **Number of children** (ns/***) | | | | | |
| 0-1 child | 32.78 | 30.39 | 28.45 | 23.15 | 41.85 |
| 2+ children | 67.22 | 69.61 | 71.55 | 76.85 | 58.15 |
| **Number of daughters** (ns/***) | | | | | |
| 0 daughter | 27.59 | 29.41 | 20.59 | 26.85 | 37.54 |
| 1+ daughter(s) | 72.41 | 70.59 | 79.41 | 73.15 | 62.46 |
| **Closest child proximity** (ns/***) | | | | | |
| Cohabiting | 12.47 | 9.80 | 11.25 | 15.74 | 13.85 |
| <10 Km | 57.84 | 58.82 | 69.64 | 60.19 | 40.31 |
| 10 Km+/no child | 29.69 | 31.37 | 19.11 | 24.07 | 45.85 |

**APPENDIX TABLE X-2:** 'Care combination between-transition' over the transitional waves (PSBH 1995-2002) (%)

| **CARE COMBINATION BETWEEN-TRANSITION** | **W4** (n=904) | **W5** (n=823) | **W6** (n=696) | **W7** (n=616) | **W8** (n=549) | **W9** (n=496) | **W10** (n=432) | **W11 (n=384)** | **W4-11** (n=4,900) |
|---|---|---|---|---|---|---|---|---|---|
| **No** | 57.52 | 58.08 | 52.44 | 57.14 | 54.83 | 51.21 | 48.61 | 42.97 | 53.98 |
| **Start** | 6.97 | 4.98 | 11.78 | 1.30 | 9.29 | 6.65 | 6.48 | 7.81 | 6.86 |
| **Stop** | 4.98 | 5.22 | 4.31 | 5.36 | 0.55 | 2.82 | 2.08 | 1.04 | 3.69 |
| **Continue** | 30.53 | 31.71 | 31.47 | 36.2 | 35.34 | 39.31 | 42.82 | 48.18 | 35.47 |

**APPENDIX TABLE X-3:** 'Care combination between-transition' of the 904 elderly (e) over the 4,900 person-transitional-waves (w) by characteristics (PSBH 1995-2002)

| | % OF THE 4,900 TRANSITIONAL WAVES | | | |
|---|---|---|---|---|
| | No | Start | Stop | Continue |
| **CHARACTERISTICS** | | | | |
| **Gender** | | | | |
| Man (w=2,158; e=404) | 58.71 | 7.18 | 3.71 | 30.40 |
| Woman (w=2,742; e=500) | 50.26 | 6.60 | 3.68 | 39.46 |
| **Birth cohort** | | | | |
| 1925-1929 (w=1,929; e=330) | 59.77 | 7.00 | 3.68 | 29.55 |
| 1920-1924 (w=1607; e=286) | 53.76 | 6.91 | 3.86 | 35.47 |
| 1915-1919 (w=779; e=145) | 48.65 | 6.93 | 4.11 | 40.31 |
| Before 1915 (w=585; e=143) | 42.56 | 6.15 | 2.74 | 48.55 |
| **Religiosity** | | | | |
| Non-religious (w=1,131; e=202) | 61.27 | 7.07 | 4.07 | 27.59 |
| Religious (w=3,769; e=702) | 51.79 | 6.79 | 3.58 | 37.83 |
| **Education** | | | | |
| Secondary or more (w=2,874; e=506) | 59.08 | 7.03 | 3.93 | 29.96 |
| Primary or less (w=2,026; e=398) | 46.74 | 6.61 | 3.36 | 43.29 |
| **Region** | | | | |
| Flanders (w=2,189; e=400) | 49.15 | 6.26 | 3.43 | 41.16 |
| Wallonia (w=2,063; e=382) | 56.47 | 7.42 | 3.88 | 32.23 |
| Brussels (w=648; e=122) | 62.35 | 7.10 | 4.01 | 26.54 |
| **Health transition** | | | | |
| No disability (w=2,778; e=676) | 63.64 | 5.98 | 3.74 | 26.64 |
| Past disability (w=376; e=676) | 48.67 | 7.45 | 3.72 | 40.16 |
| Current disability (w=568; e=426) | 44.54 | 10.39 | 4.05 | 41.02 |
| Long-term disability (w=1,178; e=375) | 37.44 | 7.05 | 3.40 | 52.12 |
| **Recent hospitalisation** | | | | |
| No (w=3844; e=862) | 56.56 | 5.83 | 3.98 | 33.64 |
| Yes (w=1056; e=516) | 44.60 | 10.61 | 2.65 | 42.14 |
| **Ability to make ends meet** | | | | |
| Easily (w=1,828; e=531) | 64.11 | 6.73 | 3.61 | 25.55 |
| Fairly (w=1,553; e=616) | 53.06 | 7.60 | 3.54 | 35.80 |
| Hardly (w=1,519; e=441) | 42.73 | 6.25 | 3.95 | 47.07 |
| **Spousal health** | | | | |
| Not in couple (w=1,901; e=372) | 47.66 | 6.26 | 3.73 | 42.35 |
| Good (w=1,358; e=366) | 65.68 | 7.22 | 4.49 | 22.61 |
| Fair or bad (w=1,641; e=455) | 51.61 | 7.25 | 2.99 | 38.15 |
| **Number of children** | | | | |
| 0-1 child (w=1,578; e=248) | 62.55 | 6.53 | 2.92 | 28.01 |
| 2+ children (w=3,322; e=656) | 49.91 | 7.01 | 4.06 | 39.01 |
| **Number of daughters** | | | | |
| 0 daughter (w=1,329; e=248) | 66.29 | 5.57 | 2.26 | 25.88 |
| 1+ daughter(s) (w=3,571; e=656) | 49.40 | 7.34 | 4.23 | 39.04 |
| **Closest child proximity** | | | | |
| Cohabiting (w=549; e=120) | 56.65 | 5.65 | 3.83 | 33.88 |
| <10 Km (w=3,023; e=590) | 44.19 | 7.48 | 4.30 | 44.03 |
| 10 Km+/no child (w=1,328; e=315) | 75.15 | 5.95 | 2.26 | 16.64 |
| **Attrition status** | | | | |
| Attritor (w=1,815; e=516) | 52.84 | 7.27 | 3.53 | 36.36 |
| Non-attritor (w=3,085; e=388) | 54.65 | 6.61 | 3.79 | 34.94 |

**APPENDIX TABLE X-4:** Bivariate multinomial logistic mixed-model regression on 'care combination between-transition' *[T-COMBIBW]* (PSBH 1995-2002, n=4,900)

| | BIVARIATE REGRESSIONS | | | | | |
|---|---|---|---|---|---|---|
| **PREDICTORS** | Start*/No* OR | Stop*/No* OR | Continue*/No* OR | Stop*/Start* OR. | Continue*/Start* OR | Continue*/Stop* OR |
| **Gender** | AIC: 7,663.18 | | | | | |
| *rc: Man (w=2,158; e=404)* | | | | | | |
| Woman (w=2,742; e=500) | **1.28** ** | **2.54** *** | **3.36** *** | 1.08 | **3.01** *** | **1.67** ** |
| **Birth cohort** | AIC: 7,534.55 | | | | | |
| *rc: 1925-1929 (w=1,929; e=330)* | | | | | | |
| 1920-1924 (w=1607; e=286) | 1.10 | 1.17 | **2.09** * | 1.21 | 1.36 | 1.13 |
| 1915-1919 (w=779; e=145) | 1.22 | 1.37 | **2.96** ** | 1.19 | 1.61 | 1.25 |
| Before 1915 (w=585; e=143) | 1.23 | 1.04 | **6.68** *** | 0.78 | **3.19** *** | **2.68** ** |
| **Religiosity** | AIC: 7,587.61 | | | | | |
| *rc: Non-religious (w=1,131; e=202)* | | | | | | |
| Religious (w=3,769; e=702) | 1.12 | 1.11 | **5.05** *** | 0.92 | **2.95** *** | **2.11** ** |
| **Education** | AIC: 7,517.77 | | | | | |
| *rc: Secondary or more (w=2,874; e=506)* | | | | | | |
| Primary or less (w=2,026; e=398) | 1.19 | 1.08 | **4.74** *** | 0.91 | **4.08** *** | **3.36** *** |
| **Region** | AIC: 7,530.82 | | | | | |
| Flanders (w=2,189; e=400) | 0.97 | 1.02 | **2.74** *** | 1.05 | **2.88** *** | **1.88** ** |
| *rc: Wallonia (w=2,063; e=382)* | | | | | | |
| Brussels (w=648; e=122) | 0.87 | 0.94 | **0.42** * | 1.08 | 0.51 | 0.65 |
| **Health transition** | AIC: 7,428.81 | | | | | |
| *No disability (w=2,778; e=676)* | | | | | | |
| Past disability (w=376; e=676) | **1.63** ** | 1.30 | **1.75** ** | 0.80 | 1.16 | 1.54 |
| Current disability (w=568; e=426) | **2.48** *** | **1.55** * | **1.90** *** | 0.63 | 0.85 | 1.44 |
| Long-term disability | **2.00** *** | **1.54** ** | **6.23** *** | 0.74 | **2.85** *** | **3.54** *** |
| **Recent hospitalisation** | AIC: 7,497.93 | | | | | |
| *rc: No (w=3844; e=862)* | | | | | | |
| Yes (w=1056; e=516) | **2.31** *** | 0.84 | **1.29** * | **0.37** *** | **0.59** *** | **1.54** * |
| **Ability to make ends meet** | AIC: 7,526.23 | | | | | |
| *rc: Easily (w=1,828; e=531)* | | | | | | |
| Fairly (w=1,553; e=616) | **1.36** ** | 1.19 | **1.39** ** | 0.99 | 1.07 | 1.13 |
| Hardly (w=1,519; e=441) | **1.39** ** | **1.64** *** | **1.87** *** | 1.32 | **1.67** ** | 1.25 |
| **Spousal health** | AIC: 7,486.75 | | | | | |
| *rc: Not in couple (w=1,901; e=372)* | | | | | | |
| Good (w=1,358; e=366) | 0.84 | 0.87 | **0.11** *** | 1.04 | **0.13** *** | **0.14** *** |
| Fair or bad (w=1,641; e=455) | 1.07 | 0.74 | **0.26** *** | 0.69 | **0.25** *** | **0.43** *** |
| **Number of children** | AIC: 7,513.87 | | | | | |
| *rc: 0-1 child (w=1,578; e=248)* | | | | | | |
| 2+ children (w=3,322; e=656) | **1.35** ** | **1.75** *** | **3.66** *** | 1.30 | **2.73** *** | **1.81** ** |
| **Number of daughters** | AIC: 7,691.60 | | | | | |
| *rc: 0 daughter (w=1,329; e=248)* | | | | | | |
| 1+ daughter(s) (w=3,571; e=656) | **1.87** *** | **4.35** *** | **2.36** *** | **1.56** * | **2.30** *** | 1.45 |
| **Closest child proximity** | AIC: 7,422.53 | | | | | |
| Cohabiting (w=549; e=120) | 1.26 | **2.25** *** | **2.97** ** | **2.67** *** | **2.27** ** | 1.12 |
| <10 Km (w=3,023; e=590) | **2.14** *** | **3.24** *** | **7.21** *** | **1.86** ** | 1.81 ns | **1.61** * |
| *rc: 10 Km+/no child (w=1,328; e=315)* | | | | | | |
| **Attrition status** | AIC:7,702.38 | | | | | |
| *rc: Attritor (w=1,815; e=516)* | | | | | | |
| Non-attritor (w=3,085; e=388) | 1.15 | **2.96** *** | 0.79 | 1.35 | 0.87 | 0.84 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE X-5:** 'Care combination within-transition' over the transitional waves (PSBH 1995-2002) (%)

| CARE COMBINATION WITHIN-TRANSITION | W4 (n=276) | W5 (n=261) | W6 (n=219) | W7 (n=210) | W8 (n=184) | W9 (n=189) | W10 (n=183) | W11 (n=185) | W4-11 (n=1,707) |
|---|---|---|---|---|---|---|---|---|---|
| **Family-family** | 26.09 | 22.61 | 17.81 | 21.9 | 19.02 | 17.99 | 20.77 | 18.38 | 20.91 |
| **Mixed-Family** | 9.42 | 8.05 | 5.94 | 4.76 | 5.43 | 7.94 | 6.01 | 3.24 | 6.56 |
| **Family-Mixed** | 5.80 | 9.20 | 14.16 | 5.71 | 8.70 | 7.94 | 7.65 | 9.73 | 8.55 |
| **Mixed-mixed** | 58.7 | 60.15 | 62.1 | 67.62 | 66.85 | 66.14 | 65.57 | 68.65 | 63.97 |

**APPENDIX TABLE X-6:** 'Family care activities within-transition' over the transitional waves (PSBH 1995-2002) (%)

| FAMILY CARE ACTIVITIES WITHIN-TRANSITION | W4 (n=276) | W5 (n=261) | W6 (n=219) | W7 (n=210) | W8 (n=184) | W9 (n=189) | W10 (n=183) | W11 (n=185) | W4-11 (n=1,707) |
|---|---|---|---|---|---|---|---|---|---|
| **IADL-IADL** | 41.67 | 42.53 | 41.10 | 52.38 | 40.76 | 42.33 | 43.72 | 42.16 | 43.29 |
| **ADL-IADL** | 11.23 | 11.88 | 8.68 | 3.33 | 9.78 | 8.99 | 12.02 | 7.57 | 9.31 |
| **IADL-ADL** | 10.14 | 11.11 | 12.79 | 0.48 | 13.04 | 11.11 | 9.84 | 13.51 | 10.19 |
| **ADL-ADL** | 36.96 | 34.48 | 37.44 | 43.81 | 36.41 | 37.57 | 34.43 | 36.76 | 37.20 |

**APPENDIX TABLE X-7:** 'Care combination within-transition' of the 456 elderly (e) over the 1,707 person-transitional-waves (w), by characteristics (PSBH 1995-2002)

| | % OF THE 1,707 TRANSITIONAL WAVES | | | |
|---|---|---|---|---|
| **CHARACTERISTICS** | **Family-Family** (w=357) (e=146) | **Mixed-Family** (w=112) (e=96) | **Family-Mixed** (w=146) (e=119 ) | **Mixed-Mixed** (w=1,092) (e=331) |
| **Gender** | | | | |
| Man (w=641; e=183) | 25.43 | 6.08 | 8.27 | 60.22 |
| Woman (w=1,066; e=273) | 18.20 | 6.85 | 8.72 | 66.23 |
| **Birth cohort** | | | | |
| 1925-1929 (w=562; e=153) | 33.27 | 8.54 | 10.68 | 47.51 |
| 1920-1924 (w=558; e=145) | 22.76 | 7.17 | 9.50 | 60.57 |
| 1915-1919 (w=312; e=79) | 9.62 | 5.45 | 7.37 | 77.56 |
| Before 1915 (w=275; e=79) | 4.73 | 2.55 | 3.64 | 89.09 |
| **Religiosity** | | | | |
| Non-religious (w=311; e=92) | 24.44 | 7.40 | 8.68 | 59.49 |
| Religious (w=1,396; e=364) | 20.13 | 6.38 | 8.52 | 64.97 |
| **Education** | | | | |
| Secondary or more (w=845; e=233) | 20.36 | 6.39 | 8.88 | 64.38 |
| Primary or less (w=862; e=223) | 21.46 | 6.73 | 8.24 | 63.57 |
| **Region** | | | | |
| Flanders (w=887; e=219) | 21.65 | 6.20 | 7.44 | 64.71 |
| Wallonia (w=650; e=185) | 21.23 | 6.62 | 9.23 | 62.92 |
| Brussels (w=170; e=52) | 15.88 | 8.24 | 11.76 | 64.12 |
| **Health transition** | | | | |
| No disability (w=739; e=266) | 26.79 | 7.17 | 9.07 | 56.97 |
| Past disability (w=376; e=290) | 17.33 | 10.00 | 8.00 | 64.67 |
| Current disability (w=232; e=183) | 19.83 | 4.31 | 7.76 | 68.10 |
| Long-term disability (w=586; e=210) | 14.85 | 5.80 | 8.36 | 70.99 |
| **Recent hospitalisation** | | | | |
| No (w=1271; e=410 ) | 22.66 | 6.92 | 8.03 | 62.39 |
| Yes (w=436; e=225) | 15.83 | 5.50 | 10.09 | 68.58 |
| **Ability to make ends meet** | | | | |
| Easily (w=455; e=205) | 25.27 | 3.74 | 8.35 | 62.64 |
| Fairly (w=544; e=270) | 19.30 | 7.54 | 6.99 | 66.18 |
| Hardly (w=708; e=237) | 19.35 | 7.63 | 9.89 | 63.14 |
| **Spousal health** | | | | |
| Not in couple (w=798; e=217) | 11.03 | 5.76 | 6.89 | 76.32 |
| Good (w=299; e=122) | 41.81 | 8.03 | 11.04 | 39.13 |
| Fair or bad (w=610; e=207) | 23.61 | 6.89 | 9.51 | 60.00 |
| **Number of children** | | | | |
| 0-1 child (w=417; e=122) | 19.18 | 5.52 | 8.15 | 67.15 |
| 2+ children (w=1,290; e=334) | 21.47 | 6.90 | 8.68 | 62.95 |
| **Number of daughters** | | | | |
| 0 daughter (w=331; e=89) | 19.03 | 5.74 | 9.67 | 65.56 |
| 1+ daughter(s) (w=1,290; e=367) | 21.37 | 6.76 | 8.28 | 63.59 |
| **Closest child proximity** | | | | |
| Cohabiting (w=178; e=51) | 56.18 | 8.43 | 8.99 | 26.40 |
| <10 Km (w=1,320; e=360) | 16.36 | 6.36 | 8.71 | 68.56 |
| 10 Km+/no child (w=209; e=89) | 19.62 | 6.22 | 7.18 | 66.99 |
| **Attrition status** | | | | |
| Attritor (w=629; e=235) | 21.78 | 6.20 | 7.47 | 64.55 |
| Non-attritor (w=1078; e=221) | 20.41 | 6.77 | 9.18 | 63.64 |

**APPENDIX TABLE X-8:** Bivariate multinomial logistic mixed-model regression on 'care combination within-transition' *[T-COMBIWT]* (PSBH 1995-2002, n=1,707)

| | BIVARIATE REGRESSIONS | | | | | |
|---|---|---|---|---|---|---|
| | **Mix-Fam/ *Fam-Fam*** | **Fam-Mix/ *Fam-Fam*** | **Mix-Mix/ *Fam-Fam*** | **Fam-Mix/ *Mix-Fam*** | **Mix-Mix/ *Mix-Fam*** | **Mix-Mix/ *Fam-Mix*** |
| **PREDICTORS** | OR | OR | OR | OR | OR | OR |
| **Gender** | AIC: 2,731.05 | | | | | |
| *rc: Man (w=641; e=183)* | | | | | | |
| Woman (w=1,066; e=273) | **1.57** ** | **1.47** * | **2.32** * | 1.04 | 1.42 | 1.83 |
| **Birth cohort** | AIC: 2,677.75 | | | | | |
| *rc: 1925-1929 (w=562; e=153)* | | | | | | |
| 1920-1924 (w=558; e=145) | 1.23 | 1.30 | **3.29** ** | 1.01 | 2.02 | 1.94 |
| 1915-1919 (w=312; e=79) | **2.21** ** | **2.39** *** | **34.16** *** | 0.93 | **8.64** *** | **5.77** *** |
| Before 1915 (w=275; e=79) | 2.10 | **2.40** * | **359.5** *** | 0.87 | **51.25** *** | **25.14** *** |
| **Religiosity** | AIC: 2,737.05 | | | | | |
| *rc: Non-religious (w=311; e=92)* | | | | | | |
| Religious (w=1,396; e=364) | 1.05 | 1.19 | 2.25 | 1.22 | 1.65 | 1.50 |
| **Education** | AIC: 2,738.57 | | | | | |
| *rc: Secondary or more (w=845; e=233)* | | | | | | |
| Primary or less (w=862; e=223) | 1.00 | 0.88 | 0.81 | 0.80 | 0.85 | 1.03 |
| **Region** | AIC: 2,738.20 | | | | | |
| Flanders (w=887; e=219) | 0.92 | 0.79 | 1.15 | 0.96 | 1.26 | 1.31 |
| *rc: Wallonia (w=650; e=185)* | | | | | | |
| Brussels (w=170; e=52) | 1.66 | 1.70 | 2.16 | 0.95 | 1.10 | 0.95 |
| **Health transition** | AIC: 2,718.92 | | | | | |
| *No disability (w=739; e=266)* | | | | | | |
| Past disability (w=376; e=290) | **2.16** ** | 1.36 | **2.30** ** | 0.58 | 1.06 | 1.66 |
| Current disability (w=232; e=183) | 0.81 | 1.16 | **3.42** *** | 1.42 | **3.90** *** | **2.29** ** |
| Long-term disability (w=586; e=210) | 1.46 | **1.66** ** | **5.12** *** | 1.13 | **3.73** *** | **2.46** *** |
| **Recent hospitalisation** | AIC: 2,731.00 | | | | | |
| *rc: No (w=1271; e=410 )* | | | | | | |
| Yes (w=436; e=225) | 1.14 | **1.80** *** | **1.58** * | 1.54 | 1.60 | 1.13 |
| **Ability to make ends meet** | AIC: 2,723.71 | | | | | |
| *rc: Easily (w=455; e=205)* | | | | | | |
| Fairly (w=544; e=270) | **2.64** *** | 1.10 | 1.30 | **0.37** *** | 0.60 | 1.42 |
| Hardly (w=708; e=237) | **2.66** *** | **1.55** * | **2.56** *** | **0.50** ** | 0.86 | 1.45 |
| **Spousal health** | AIC: 2,678.77 | | | | | |
| *rc: Not in couple (w=798; e=217)* | | | | | | |
| Good (w=299; e=122) | **0.37** *** | **0.42** *** | **0.02** *** | 1.38 | **0.11** *** | **0.12** *** |
| Fair or bad (w=610; e=207) | **0.56** ** | **0.64** * | **0.08** *** | 1.29 | **0.30** *** | **0.26** *** |
| **Number of children** | AIC: 2,805.74 | | | | | |
| *rc: 0-1 child (w=417; e=122)* | | | | | | |
| 2+ children (w=1,290; e=334) | **1.70** ** | 1.01 | 0.99 | 0.85 | 0.81 | 1.19 |
| **Number of daughters** | AIC: 2,737.57 | | | | | |
| *rc: 0 daughter (w=331; e=89)* | | | | | | |
| 1+ daughter(s) (w=1,290; e=367) | 1.05 | 0.76 | 0.73 | 0.65 | 0.64 | 1.13 |
| **Closest child proximity** | AIC: 2,686.00 | | | | | |
| Cohabiting (w=178; e=51) | **0.47** * | **0.44** ** | **0.04** *** | 0.93 | **0.08** *** | **0.06** *** |
| <10 Km (w=1,320; e=360) | 1.22 | 1.46 | 2.05 | 1.05 | 2.06 | 1.87 |
| *rc: 10 Km+/no child (w=209; e=89)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (w=629; e=235)* | AIC: 2,736.71 | | | | | |
| Non-attritor (w=1078; e=221) | 1.17 | 1.31 | 0.75 | 1.17 | 0.58 | 0.53 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.

**APPENDIX TABLE X-9:** 'Family care activities within-transition' of the 456 elderly (e) over the 1,707 person-transitional-waves (w) by characteristics (PSBH 1995-2002)

| | % OF THE 1,707 TRANSITIONAL WAVES | | | |
|---|---|---|---|---|
| **CHARACTERISTICS** | **IADL-IADL** (w=739) (e=284) | **ADL-IADL** (w=159) (e=135) | **IADL-ADL** (w=174) (e=140) | **ADL-ADL** (w=635) (e=228) |
| **Gender** | | | | |
| Man (w=641; e=183) | 47.74 | 9.36 | 9.67 | 33.23 |
| Woman (w=1,066; e=273) | 40.62 | 9.29 | 10.51 | 39.59 |
| **Birth cohort** | | | | |
| 1925-1929 (w=562; e=153) | 50.53 | 8.90 | 8.54 | 32.03 |
| 1920-1924 (w=558; e=145) | 42.29 | 9.32 | 10.75 | 37.63 |
| 1915-1919 (w=312; e=79) | 41.03 | 7.69 | 9.29 | 41.99 |
| Before 1915 (w=275; e=79) | 33.09 | 12.00 | 13.45 | 41.45 |
| **Religiosity** | | | | |
| Non-religious (w=311; e=92) | 54.34 | 7.40 | 9.65 | 28.62 |
| Religious (w=1,396; e=364) | 40.83 | 9.74 | 10.32 | 39.11 |
| **Education** | | | | |
| Secondary or more (w=845; e=233) | 50.41 | 8.17 | 9.59 | 31.83 |
| Primary or less (w=862; e=223) | 36.31 | 10.44 | 10.79 | 42.46 |
| **Region** | | | | |
| Flanders (w=887; e=219) | 24.13 | 10.26 | 10.94 | 54.68 |
| Wallonia (w=650; e=185) | 62.00 | 8.92 | 9.85 | 19.23 |
| Brussels (w=170; e=52) | 71.76 | 5.88 | 7.65 | 14.71 |
| **Health transition** | | | | |
| No disability (w=739; e=266) | 55.89 | 8.53 | 9.07 | 26.52 |
| Past disability (w=376; e=290) | 39.33 | 12.67 | 8.67 | 39.33 |
| Current disability (w=232; e=183) | 34.91 | 6.90 | 15.95 | 42.24 |
| Long-term disability (w=586; e=210) | 31.74 | 10.41 | 9.73 | 48.12 |
| **Recent hospitalisation** | | | | |
| No (w=1271; e=410 ) | 47.21 | 9.83 | 8.58 | 34.38 |
| Yes (w=436; e=225) | 31.88 | 7.80 | 14.91 | 45.41 |
| **Ability to make ends meet** | | | | |
| Easily (w=455; e=205) | 54.07 | 7.69 | 8.57 | 29.67 |
| Fairly (w=544; e=270) | 39.52 | 10.48 | 11.40 | 38.60 |
| Hardly (w=708; e=237) | 39.27 | 9.46 | 10.31 | 40.96 |
| **Spousal health** | | | | |
| Not in couple (w=798; e=217) | 38.22 | 10.03 | 11.90 | 39.85 |
| Good (w=299; e=122) | 50.50 | 9.03 | 7.36 | 33.11 |
| Fair or bad (w=610; e=207) | 46.39 | 8.52 | 9.34 | 35.74 |
| **Number of children** | | | | |
| 0-1 child (w=417; e=122) | 44.36 | 7.43 | 9.83 | 38.37 |
| 2+ children (w=1,290; e=334) | 42.95 | 9.92 | 10.31 | 36.82 |
| **Number of daughters** | | | | |
| 0 daughter (w=331; n=89) | 49.24 | 6.65 | 7.85 | 36.25 |
| 1+ daughter(s) (w=1,290; e=367) | 41.86 | 9.96 | 10.76 | 37.43 |
| **Closest child proximity** | | | | |
| Cohabiting (w=178; e=51) | 32.02 | 5.06 | 8.99 | 53.93 |
| <10 Km (w=1,320; e=360) | 44.47 | 9.24 | 10.53 | 35.76 |
| 10 Km+/no child (w=209; e=89) | 45.45 | 13.40 | 9.09 | 32.06 |
| **Attrition status** | | | | |
| Attritor (w=629; e=235) | 41.81 | 10.02 | 11.61 | 36.57 |
| Non-attritor (w=1078; e=221) | 44.16 | 8.91 | 9.37 | 37.57 |

**APPENDIX TABLE X-10:** Bivariate multinomial logistic mixed-model regression on 'care combination within-transition' *[T-COMBIWT]* (PSBH 1995-2002, n=1,707)

| | BIVARIATE REGRESSIONS | | | | | |
|---|---|---|---|---|---|---|
| | **ADL-IADL /*IADL-IADL*** | **IADL-ADL /*IADL-IADL*** | **ADL-ADL /*IADL-IADL*** | **IADL-ADL /*ADL-IADL*** | **ADL-ADL /*ADL-IADL*** | **ADL-ADL /*IADL-ADL*** |
| **PREDICTORD** | OR | OR | OR | OR | OR | OR |
| **Gender** | AIC: 3,489.25 | | | | | |
| *rc: Man (w=641; e=183)* | | | | | | |
| Woman (w=1,066; e=273) | 1.17 | 1.28 | **2.43** ** | 1.06 | 1.64 | 1.27 |
| **Birth cohort** | AIC: 3,484.18 | | | | | |
| *rc: 1925-1929 (w=562; e=153)* | | | | | | |
| 1920-1924 (w=558; e=145) | 1.25 | **1.50** * | **2.71** ** | 1.19 | 1.80 | 1.05 |
| 1915-1919 (w=312; e=79) | 1.07 | 1.34 | **3.27** ** | 1.28 | **2.39** * | 1.30 |
| Before 1915 (w=275; e=79) | **2.06** *** | **2.41** *** | **3.85** ** | 1.06 | 1.37 | 0.87 |
| **Religiosity** | AIC: 3,484.24 | | | | | |
| *rc: Non-religious (w=311; e=92)* | | | | | | |
| Religious (w=1,396; e=364) | 1.75 ** | 1.42 ns | 3.09 ** | 0.80 | 1.34 | 1.77 |
| **Education** | AIC: 3,466.54 | | | | | |
| *rc: Secondary or more (w=845; e=233)* | | | | | | |
| Primary or less (w=862; e=223) | **1.78** *** | **1.56** *** | **4.86** *** | 0.88 | **2.19** ** | **1.92** ** |
| **Region** | AIC: 3,323.92 | | | | | |
| Flanders (w=887; e=219) | **2.95** *** | **2.85** *** | **39.70** *** | 0.83 | **6.06** *** | **7.01** *** |
| *rc: Wallonia (w=650; e=185)* | | | | | | |
| Brussels (w=170; e=52) | 0.57 | 0.67 | 0.47 | 1.30 | 0.88 | 0.83 |
| **Health transition** | AIC: 3,448.04 | | | | | |
| *rc: No disability (w=739; e=266)* | | | | | | |
| Past disability (w=376; e=290) | **2.11** ** | 1.36 | **2.94** *** | 0.64 | 1.32 | 1.72 |
| Current disability (w=232; e=183) | 1.29 | **2.82** *** | **3.62** *** | **2.01** ** | **2.63** *** | 1.04 |
| Long-term disability (w=586; e=210) | **2.15** *** | **1.89** *** | **4.44** *** | 0.84 | **2.01** ** | **1.89** ** |
| **Recent hospitalisation** | AIC: 3,460.82 | | | | | |
| *rc: No (w=1271; e=410 )* | | | | | | |
| Yes (w=436; e=225) | 1.17 | **2.57** *** | **2.36** *** | **2.16** *** | **2.06** *** | 0.93 |
| **Ability to make ends meet** | AIC: 3,480.16 | | | | | |
| *rc: Easily (w=455; e=205)* | | | | | | |
| Fairly (w=544; e=270) | **1.86** *** | **1.82** *** | **2.06** *** | 0.97 | 0.93 | 1.20 |
| Hardly (w=708; e=237) | **1.69** ** | **1.66** ** | **2.68** *** | 0.95 | 1.21 | 1.60 |
| **Spousal health** | AIC: 3,485.63 | | | | | |
| *rc: Not in couple (w=798; e=217)* | | | | | | |
| Good (w=299; e=122) | 0.68 | **0.47** *** | **0.48** * | 0.65 | 0.76 | 1.16 |
| Fair or bad (w=610; e=207) | **0.70** * | **0.65** ** | 0.77 | 0.89 | 1.04 | 1.27 |
| **Number of children** | AIC: 3,493.92 | | | | | |
| *rc: 0-1 child (w=417; e=122)* | | | | | | |
| 2+ children (w=1,290; e=334) | 1.38 | 1.08 | 0.97 | 0.70 | 0.73 | 0.86 |
| **Number of daughters** | AIC: 3,487.30 | | | | | |
| *rc: 0 daughter (w=331; e=89)* | | | | | | |
| 1+ daughter(s) (w=1,290; e=367) | **1.76** ** | **1.61** ** | 1.24 | 0.87 | 0.69 | 0.75 |
| **Closest child proximity** | AIC: 3,494.82 | | | | | |
| Cohabiting (w=178; e=51) | 0.54 | 1.40 | 2.58 | **2.52** * | **4.35** *** | 1.66 |
| <10 Km (w=1,320; e=360) | 0.71 | 1.18 | 1.13 | 1.70 | 1.35 | 0.87 |
| *rc: 10 Km+/no child (w=209; e=89)* | | | | | | |
| **Attrition status** | | | | | | |
| *rc: Attritor (w=629; e=235)* | | | | | | |
| Non-attritor (w=1078; e=221) | 0.84 | 0.76 | 1.06 | 0.91 | 1.30 | 1.30 |

*Note:* *= 0.05<p value <0.1; **= 0.01<p value <0.05; ***= p value <0.01.