SCIENTIFIC EVALUATION OF PROJECTS

OF ALTERNATIVE FORMS OF CARE OR SUPPORT OF CARE FOR FRAIL ELDERLY, IN ORDER TO ALLOW THEM TO MAINTAIN THEIR AUTONOMY AND TO LIVE INDEPENDENTLY IN THEIR HOMES

"PROTOCOL 3"

INTEGRATED REPORT

THE CONSORTIUM

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1 Recommendations

1.1 Case management interventions

. Firstly, long-term case management may be useful for highly impaired frail older persons.
However,

(1) the lack of fulfilling the requirements on workforce, use of clinical and managerial information and system requirements (embeddedness) may impede proper effectiveness (this is the case for projects of case management and psychological services and case management with occupational therapy);
(2) Measuring alternative outcomes (cfr. « I » statements[1]) may be of interest to document other possible benefits of such interventions.

. Secondly, two types of case management may be less sensitive to key requirement (workforce, information and system):

(1) Short-term case management (<30 days in a residential setting) for frail older person (FOPs) coming out of the hospital appears to be an efficient intervention to delay institutionalization.
(2) Case management with institutional services may be less sensitive to poor level of requirements in comparison with other projects.

. Thirdly, case management provided alone could not be fully evaluated because of lack of data.

1.2 Psychological services and occupational therapy provided alone

. Firstly, Psychological and Occupational therapy services provided as a stand-alone may bring a better ratio of project cost for the NHIDI over reduced institutionalization than case management for low impaired frail older people. This may be at the expense of financial accessibility as some projects ask a payment.

. Secondly, these projects bring about good results for highly impaired frail older person, provided that informal caregiver invests a substantial amount of time to the care to FOPs.

. Thirdly, some of these projects met difficulties in the uptake of FOP. The relation with primary care services (GPs and home care services) may improve the accessibility to them (particularly psycho services).

1.3 Night care and day care projects

. Firstly, these projects target severely impaired older people.

. Secondly, night care services encompassing one provider per FOP per night and night hostels result in more institutionalizations than the control group. These projects might be a good intervention to prepare the dyad of FOP and ICG for institutionalization

. Thirdly 'night tour' (one provider for several FOP per night) have variable results amongst regions. They need to be provided in articulation with alternative providers to deliver such type of care.

. Fourthly, flexibility seems to be important in night care services with the following important requirements:

(1) Supplying different options: combination with night hostel, planned or not, for emergency situations seems to be an asset;
(2) Relevance of 'passive lists': once a FOP is in the project, response an urgent situation can be provided quasi-immediately;
(3) Importance of monitoring of the FOP situation.

1.4 'Other' types of projects

Other, sometimes very innovative projects such as medication delivery, assistance to FOP from a distance to give structure to their day planning and remind them of things, alternative housing and respite care could not be fully evaluated by lack of data. However, implementation analysis data brings evidence of need for respite care. Furthermore, design of such a service must take into account the acceptability of the services regarding FOPs and ICGs' values and social norms.

[1] « I » Statements is a UK-based project. It reflects a sector wide commitment to personalization of care. It is grounded in the expectations of beneficiaries and can be used « to improve current practices, identify areas for change and develop plans for action »

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2 Executive summary

2.1 Introduction

The aging population is a challenge to the healthcare systems. Indeed, a growing proportion of the elderly people develop the frailty syndrome, an independent predictive factor for incidental falls and worsening disability, hospitalization, and death (1). As a consequence, they experience functional decline requiring assistance for most of their activities.

Many high income countries are implementing large scale home-based programs targeting frail older people living at their home. In Belgium, following an agreement between federal state, regions and communities (protocol 3 agreement), the National Institute for Health and Disability Insurance (NIHDI) launched a funding programme (protocol 3 program) of bottom-up innovative projects for community-dwelling frail older people's care and support in the entire country. These projects should reduce the risk of frail older people's institutionalization in a nursing home. Promising projects designs may get structural financing provided that they are positively evaluated by a university consortium.

The projects that are reviewed in this report started from April 2010. The evaluation aimed to answer a series of research questions related to characteristics of the interventions, the beneficiaries, the association with outcomes and costs, and finally the explanatory theories. The goal of the evaluation was to find answers to the following questions: what are the interventions all about and how can we expect them to work? Who benefits from the intervention? Are interventions associated with changes in measurable outcomes? For which population? In which context or conditions? Through what mechanisms? What does the intervention cost? And finally, what are the consequences of the intervention on the cost of other services paid by NIHDI or by other funding sources?

2.2 Methods

The program implemented as part of Protocol 3 agreement can be considered as a large-scale program of multiple bottom-up projects. Specificities of large scale program evaluation and its relevance has recently come under scrutiny. On the one hand, this type of program gives the opportunity to identify mechanisms and conditions for effective intervention in "real life". On the other hand, the bottom-up conception of projects leads to high variety of organisational and services features. This needs a special effort to describe and group projects in specific types.

The evaluation of the projects followed a triangulation process to build a comprehensive perspective: (1) the description of the projects as a set of intervention aiming at improving frail older person and informal caregiver outcome; (2) the evaluation of the (statistical) association between a given type of population, intervention, outcome and cost; (3) the analysis of the implementation process as a way to identify mechanisms and conditions for project effectiveness.

2.2.1 The description of the project as a set of interventions

Since the beginning of the evaluation process, the projects have been grouped into homogeneous strata, to allow for comparisons. The classification was based on their key services. These key services were identified in the project proposal (submission file) the projects submitted to NIHDI and by means of a yearly questionnaire (Dec 2010 or Dec 2011). Only services that were delivered on a permanent basis in a project were retained for the classification, and grouped following an operational typology.

2.2.2 The evaluation of the (statistical) association between a given type of population, intervention, outcome and cost

The evaluation of the (statistical) association between a given type of population, intervention, outcome and cost has used two sources of data: the IMA-AIM[2] database[3] and the data collected via the BelRAI website. These have been linked for the beneficiaries.

The variables have been selected by means of a literature review. A framework coming as a result of it was used to select variables in the IMA-AIM database and in the InterRAI Home Care instrument.

The IMA-AIM database provided data for health care cost reimbursed by NIHDI and for the main outcome variable for the P3 beneficiaries, that is the definitive 'institutionalization'(defined as a stay of 90 consecutive day).Relative risk (RR) was used as an association measure for this variable.

The InterRAI-HC instrument provided data for the following main variables: ADLH scale to measure a person's functional performance in ADLs; IADLp scale to measure a person's functional performance in IADL; CPS2 scale describing a person's cognitive status; Depression scale (DRS) used as a clinical screening for depression. Other scales were annexed to **interRAI HC** instrument: the Zarit Burden interview (to measure informal caregiver's burden, of which we used the short, 12-item version – ZBI-12), the WHO-QoL-8[4] (to measure client's perceived generic quality of life) and an ad hoc economic questionnaire. Some of these scales were dichotomized, using a validated cutoff. As results, odds ratio (OR) was used as an association measure for ADLH, IADLp, DRS, CPS2 and ZBI-12 .

In order to perform the analysis, comparison groups were defined. Two different strategies have been used to constitute the "control" or "comparison" arm of the study: (1) the control group in the "Belrai" data is constituted by the people allocated to the projects that are the cheapest and the least "effective" (i.e. the closest to not doing anything) (2) The other control group is extracted from the Permanent Sample (EPS) of Socially Insured Persons and data is provided by IMA-AIM .

The main limitation of the first strategy (choosing a group benefiting from a "generic" project) is that these people already benefit from an intervention in one of the P3 projects, but indeed clinical data can be used. The limitation for the second strategy (EPS control group, from IMA-AIM) is the limited number of variables that are available, without recorded clinical data. Furthermore, data of the EPS data were only available 18 months after the service delivery.

Four types of statistical analysis were performed to assess association between projects interventions and outcomes and costs : (1) Poisson regression for relative risk calculation for definitive institutionalization and death; (2) logistic regression for Odds Ratio for ADL, IADL, DRS and ZBI-12 scales (all having a validated cut-off -point); (3) multivariate models for means comparison for perceived quality of life (WHO-QoL-8). (4) Gamma regression model to test the variation of the health care costs before and after intervention (over a 6 month-period).

[2] Intermutualistic Agency, InterMutualistisch Agentschap, Agence InterMutualiste, aiming to collect and analyse data routinely recorded by the 7 healthcare mutualistic agencies responsible of the reimbursements of healthcare system.

[3] The data base is composed of different types of data on: drugs consumption (date, codes, prescriber…), population administrative characteristics (age, gender, social benefit, employment status, invalidity status, etc.) and the health consumption (cost for NIHDI and patient, date of provisions, nomenclature codes of provisions, type of admission date in health care institution, type of institution, …)

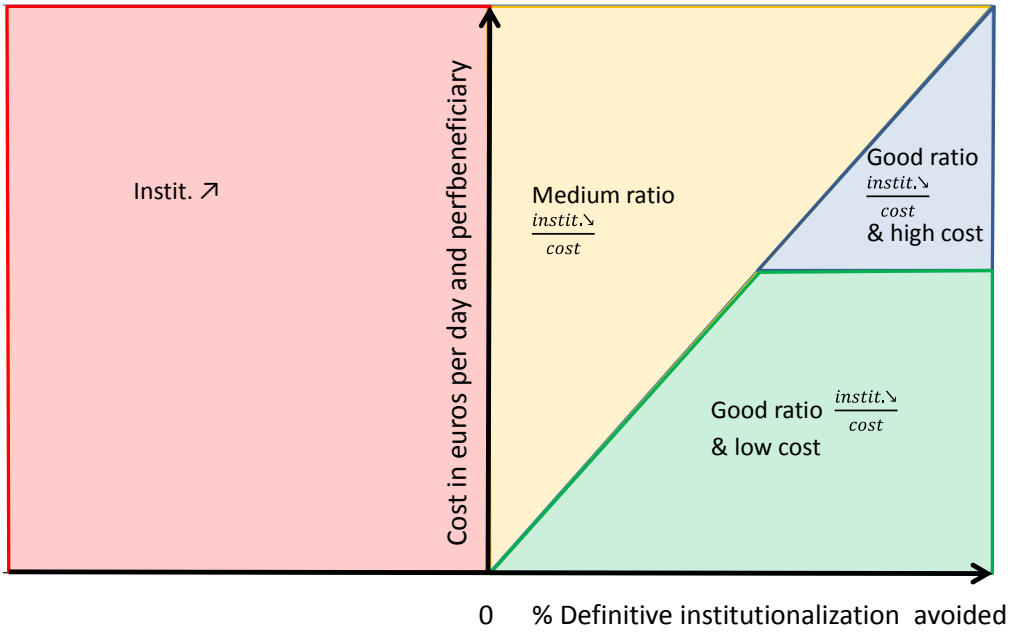
[4] WHO Study on global AGEing and adult health (SAGE) http://www.who.int/healthinfo/systems/WHO-INDEPTH_SAGE_A.pdf

In each of the analyses, potential confounding variables were included, when data was available. It included age, gender, ADL score at baseline, CPS score at baseline (cognitive functioning), DRS at baseline (depression scale score).

As a result, four different figures were done to combine analysis of relative risk (RR) of definitive institutionalization ratio after 6 months with daily costs: RR combined with (1) cost for beneficiaries (including informal caregiver time spend in care); (2) the daily cost for NIHDI and beneficiaries (including out of pocket expenses for nursing, physiotherapy and speech therapy) to keep frail older person at home (including cost of nursing, physiotherapy and speech therapist care; and cost of the project); (3) the daily cost of the project only; (4) the total cost combining the cost for NIHDI, beneficiaries and their main informal caregivers.

Four types of situations were then identified: (1) projects with a good ratio ($instit.\searrow/cost$) & low cost; (2) projects with a good ratio ($instit.\searrow/cost$) & high cost; (3) projects with a medium ratio ($instit.\searrow/cost$); (4) projects with a higher proportion of institutionalization than control group. These are represented in the figure 1.

Figure 1: four situations of projects



2.2.3 The analysis of the implementation process

The purpose of the third process of evaluation is to understand why an intervention (part of a project) gives an outcome when implemented in its local context.

In order to collect more specific and in depth information, 21 multiple, embedded case studies were conducted during the entire span of the project. The three aims of the case studies were: (1) to provide a precise and narrative description of the project components (structure and process factors) that would likely lead to positive beneficiary outcomes; (2) to identify the contextual factors that played a role during the implementation process of projects and the way they adapted to changes (like change of reimbursement modalities, turnover of professionals etc.); (3)to build an overall analytical framework to explain success or failure of projects.

As the relation between the type of projects and the outcome for frail elderly was initially unknown, cases were selected to obtain as much diversity as possible in the projects' characteristics. These features included the type of services provided, the geographic location, the size of the project (staff or intended caseload), the definition of the target population, the number of different disciplines, the size of the partnership, etc.

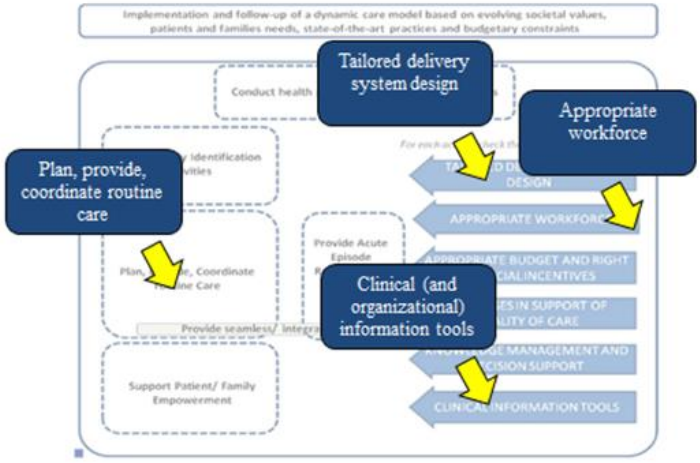
Key component of projects identified through case studies were used to analyse other similar projects. They were seen from a normative point of view. This means that we described how well the projects expected their services to improve older people's outcomes. Therefore, we looked into the objectives set by the projects, which activities they planned to perform to achieve these objectives and if, according to their statements, they actually did these activities.

All experts in qualitative research of the team identified the components explaining the success of the project individually for one group of projects (through case study analysis, yearly questionnaire analysis and literature review). Each list of components, with its list of relevance criteria was reviewed by another researcher who had participated in the case study analysis of the same group of projects. These components were displayed along with the domains of the Chronic Care Model that was adapted by the KCE to the Belgian context (see figure 2).

We finally focused on three requirements that appeared particularly relevant: characteristics of workforce; characteristics of clinical (and organizational) information tools; tailored delivery system design.

This analysis appeared particularly relevant for projects of case management. For these projects we summarized description of the requirements through a reduced number of criteria. For appropriateness of workforce, we looked specifically at turnover of providers; ratio of FOP per case managers (≤ 40); training of professionals and presence of intervision between co-workers in the projects. For characteristics of clinical (and organizational) information tools we looked at the use of BelRAI for care plan design; the use of register for follow-up of frail older person; the use of locally agreed and evidence-based interdisciplinary protocols. For the tailored delivery system design, we looked at the provision of feed-back of the FOP to the general practitioner and the partnership with local coordination services (like SISD/SEL/GDT or CCSSD).

Figure 2 : extracted from Paulus D, Van den Heede K, Mertens R. Position paper: organisation of care for chronic patients in Belgium . Health Services Research (HSR). Brussels: Belgian. Health Care Knowledge Centre (KCE). 2012. KCE Reports 190Cs. D/2012/10.273/84. The yellow arrows point at the special attention of the qualitative research part.



2.3 Results

2.3.1 The beneficiaries

Over 10773 beneficiaries that were included in the P3 projects, complete data from BelRAI is available for 8332 beneficiaries[5] and complete data from the IMA-AIM for 6424 beneficiaries. Data from BelRAI were mostly analysed by dividing the beneficiaries in 2 groups: those with low impairment (ADL<3 and CPS<3) (n=3018) and those with high impairment (ADL≥3 or CPS≥3). Data from IMA allowed a further subdivision of the highly impaired group in two subgroups: those with high functional impairment (ADL≥3) and recent hospitalization (in the previous two months) (n=733), and those with high impairment (ADL≥3 or CPS≥3) without recent episode of hospitalization (n=3829). Main characteristics of low and highly impaired groups are presented on the table 1, with proportions, confidence interval at 95% and number of respondents.

Table 1: characteristics of beneficiaries

	Low impaired (with ADL<3 and CPS<3)	High impaired (with ADL≥3 or CPS≥3)
Depression (DRS ≥3)	24.2% [22.7 ; 25.8] (n = 2941)	32.8% [31.3 ; 34.3] (n = 3695)
Burden for the informal caregiver (ZBI-12≥10)	50.5% [48.3 ; 52.8] (n = 1886)	64% [62.3 ; 65.7] (n=2828)
Important difficulties with IADL (≥24)	56.9% [55 ; 58.7] (n = 2705)	90.7% [89.7 ; 91.7] n = 3238
Important functional decline ADL≥3		79.5% [78.3 ; 80.8] (n = 3829)
Important cognitive decline CPS≥3		54.5% [52.9 ; 56.1] (n = 3767)

2.3.2 The projects

Sixty three projects were financed. Twenty two of them provided Case management in different modalities, 7 provided occupational therapy with a focus on home adaptation and sometimes rehabilitation, 7 provided psychosocial support and sometimes therapy, 10 provided support to daily life activities through day care centres, and 11 through night care. Five projects provided other type of services.

Projects with a component of case management are performing (a) individualized needs and preferences' assessment, (b) planning of services, according to the results of this assessment, (c) patient-centered care coordination and (d) re-evaluation and adjustment of the care coordination.
Among these, there are projects providing only services at home and projects combining a component of case management with services outside the FOP's home. Besides delivering case management, those six projects provide either revalidation services in a short term accommodation (2 projects targeting mainly people at the end of an acute episode of illness including post-acute

[5] For BelRAI data, projects were allowed to exclude a maximum of 25% of their population. These were often patients of which they could not have an informed consent. Qualitative data from the case studies suggest that this population did not differ from included patients.

hospital rehabilitation), respite in a short term accommodation (2 projects) or night care (2 projects). Moreover, three of those projects are delivering occupational therapy and one, nutritional support.

Projects with occupational therapy and physiotherapy components provide mainly home adaptation in order to: (1) make the patient's living environment more adapted to their current conditions, and (2) offer better work conditions to home caregivers. Three projects also offered rehabilitation services in addition to home adaptation. This type of activity is comparable to what an occupational therapist is used to perform in revalidation service in a hospital (e.g., patient education in case of hip prosthesis, strengthening of the upper and lower limbs, advice to prevent falls, rehabilitation in activities of daily living, etc.). Combined with a home modification, the rehabilitation might give better results in terms of independence, safety and home maintaining.

Projects with psychological services component deliver psychological, psychosocial support or psychotherapy at home by a trained psychologist or psychotherapist. These projects share the aim to maintain frail elderly people in their homes by providing psychological support to the elderly and their informal caregivers. The way they concretize psychological support often differs between projects.

Projects providing services in day care centers described their services as customized care, customized assistance, differentiated care, etc. The emphasis was on the individual counselling of clients according to their individual needs and preferences. Activities were organized to improve the independence of the elderly. Older people often also got psychological support. In addition, group activities were organized in order to encourage social contact. Most projects also provided information and/or support to informal caregivers. Nevertheless, it was unclear how the individual daily program of an older person was determined and adapted.

Projects with night care components represent a category of projects whose interventions occur at night, between 10 pm to 5 am. They mainly offer nursing care at night or surveillance for FOP with clinical or psychological needs during the night. They seem designed for FOP aged 60 years and above needing surveillance and/or care during the night (change of incontinence material, pressure ulcer prevention, surveillance and support of home dialysis, support for going to bed).

2.3.3 The control groups

Two comparison groups for low impaired and two comparison groups for high impaired were respectively defined. Indeed, in each of the subgroup, one comparison group was defined to analyse BelRAI data (i.e. the "BelRAI comparison group") and one to analyse IMA data (i.e. the "IMA" comparison group).

The low impaired BelRAI comparison group included beneficiaries from the 7 "cheapest" and "least effective" projects. These are projects of occupational therapy (3 project), case management delivered alone (2 projects), psychological support (2 projects). Although there are no statistically significant differences between control and intervention group, values of the scale show an initial worse health status for intervention group than for control group (with the exception of DRS).

There is a higher risk of institutionalization over 6 months for the comparison group IMA compared with BelRAI comparison group and intervention group. The difference between absolute risk of death is not statistically different between the 3 groups

The high impaired BelRAI comparison group included beneficiaries from the 8 "cheapest" and "least effective" projects. These are projects of psychological support (3), occupational therapy (2), case management delivered alone, night care, case management and psy / occupational therapy. There is a statistically significant lower proportion of DRS≥3 and of ZBI-12≥10 in the intervention group than

in the comparison group. Also, though not statistically significant, there is a higher proportion of ADL≥3, in the intervention group than in the comparison group.

Absolute risk of institutionalization is higher though not statistically significant in the comparison group IMA compared to the 2 other groups. Risk of death is higher in control group BelRAI compared to the 2 other group, but this is not statistically significant.

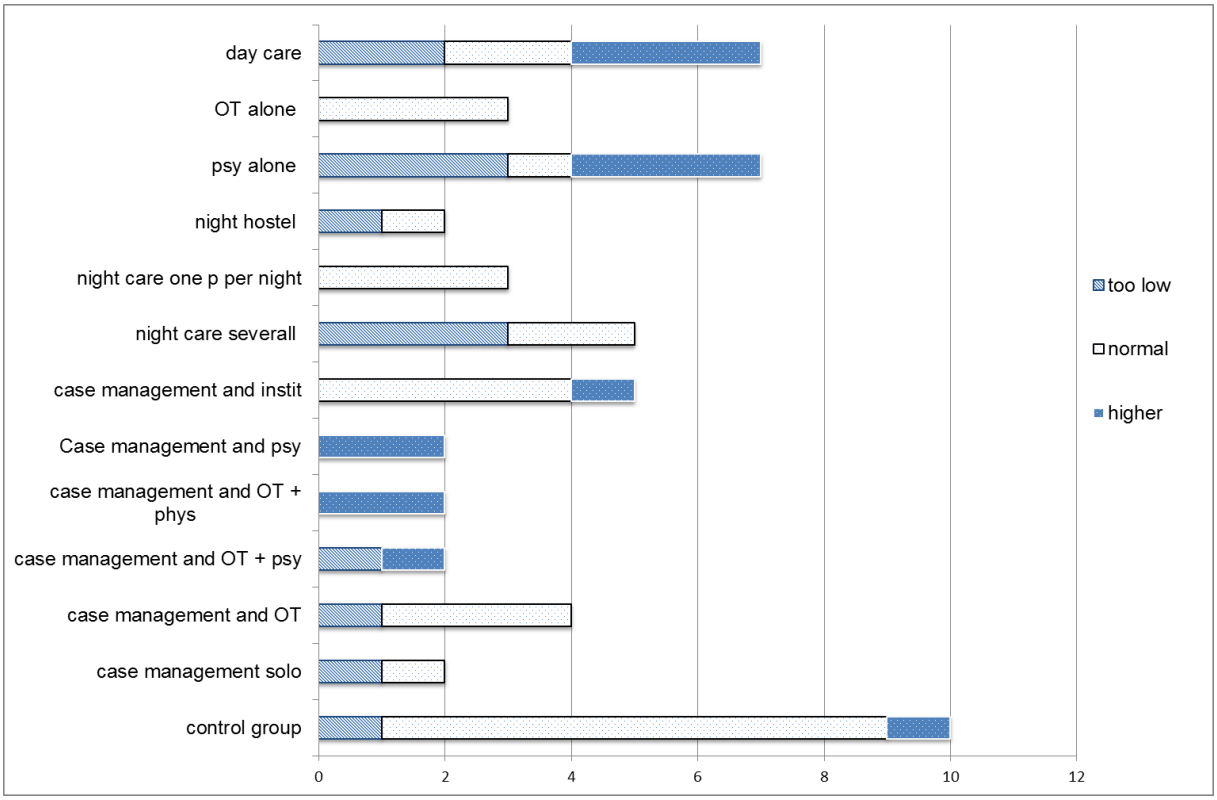
2.3.4 Missing data

Interpretation of results must be done in function of the missing data. We characterized the beneficiaries with and without missing data. Generally, the group with missing data has a worse health status (and as a consequence a higher risk of institutionalization) than the group with data completed.
Also, in almost all cases, there are more missing data for BelRAI control groups than for intervention groups. As a consequence, The possible bias introduced by missing variable probably underestimates the effect of projects.

2.3.5 The uptake of patients

The different group of projects have met difficulties in including beneficiaries. Some projects had a caseload lower than expected and others had a caseload higher than expected. This is summarized on figure 3.

Figure 3: caseload per projects



* Control group reported in the figure is the one for BelRAI data (i.e. including beneficiaries from the projects expected to be the cheapest and the least effective).

2.3.6 The results on outcomes and cost

Results on cost and outcome are summarized on the table2. Initials used are explained on table 3. Some projects such as case management with revalidation services post-hospitalization, case management for visually impaired older person are associated with good outcomes because targeting a particular type of population. Others, such as night care projects are associated with a bad outcome because targeting people in severe functional decline and for whom a definitive institutionalization might be a good outcome. Other projects have variable results. Specific recommendations are suggested here after.

Table 2: synthetic results of cost and outcomes per groups of projects

	Type of benef.	Total Cost / instit.	Project cost / instit.	NIHDI Cost / Instit.	Change Cost N.P.S.	Benefic. Cost / instit.	OR DRS	OR ADL	OR IADL
CM & rev posthop	□	*	*	*	↗*	*	0.38*	0.1*	0.22*
	△	*	*	*	NS	*	0.25*	0.3*	NS
CM OT	▲				↗*		NS	NS	NS
	■	*	*	*	NS	*	NS	NS	NS
CM vis. Imp	■	*	*	*	NS	*	0.39*	NS	NS
CM OT & physio 2	▲				↗*		NS	2.33*	NS
	■				NS		0.25*	NS	NS
CM psy	△				NS		NS	NS	NS
	□	*	*	*	NS	*	0.36*	NS	NS
CM & resid	▲	*	*	*	NS	*	0.59*	NS	NS
OT	▲	*	*	*	↗*	*	NS	NS	NS
	■	*	*	*	↗*	*	NS	NS	NS
Psy alone	△				NS		NS	NS	NS
Day care	△				↗*		NS	NS	NS
Night care one/prov	▲	*	*	*	↗*	*	NS	NS	NS
Night care sev/provider	▲				NS		NS	5*	NS

*	Statistically significant compared to EPS control group
NS	Statistically non-significant compared to BelRAI control group
N.P.S.	Nursing, physiotherapy and speech therapy
OR ADL	Odds ratio ADL≥3 at 2d measurement
OR IADL	Odds ratio IADL≥24 at 2d measurement

More institutionalization than control
High cost and less institutionalization than control
Cost medium and less institutionalization than control
Low cost and less institutionalization than control

Table 3: initials used on the synthetic table of results

Type of beneficiaries
Low impaired
- And with high proportion of IADL≥24 ■
- And with high proportion of DRS≥3 or ZBI≥10 □
- And recent (past 2 month) episode of hospitalisation ▣

Highly impaired
- And with high proportion of IADL≥24 ▲
- And with high proportion of DRS≥3 or CPS≥3 or ZBI≥10 △
- And recent (past 2 month) episode of hospitalisation △

Type of projects
- CM & rehab. : case management and rehabilitation post hospitalisation
- CM OT: case management with occupational therapy
- CM OT & physio: case management with occupational therapy and physiotherapy
- CM vis. Imp.: case management and occupational therapy for visual impaired
- CM psy: case management and psychological services
- CM & resid: case management and residential services
- OT : occupational therapy alone
- Psy alone: psychological services alone
- Day care: day care centres
- Night care one/prov: night care services by one provider visiting several beneficiaries during the night
- Night care sev/provider: night care services by one provider visiting one beneficiary per night

Type of results
- Total cos/instit.: total cost over definitive institutionalization avoided over 6 months
- Project cost/instit.: project cost over definitive institutionalization avoided over 6 months
- NIHDI cost/instit.: NIHDI cost over definitive institutionalization avoided over 6 months
- Change cost N.P.S.: change in the NIHDI cost for nursing care, physiotherapy or speech therapy
- Benefic. Cost/instit.: cost for beneficiaries over definitive institutionalization avoided over 6 months
- OR DRS: odds ratio for DRS≥3
- OR ADL: odds ratio for ADL≥3
- OR IADL: odds ratio for IADL≥24

2.3.7 Implementation and fulfilment of requirements

Although analyses have been done for all types of projects, we summarize here the analysis done for the different types of case management for three key requirements: characteristics of workforce; characteristics of clinical (and organizational) information tools; tailored delivery system design. Thus us summarized on table 4 (workforce), 5 (information) and 6 (system design).

Globally, as illustrated by the colors (red for a low proportion of projects meeting the criteria, and green for high proportion of projects meeting the criteria), most of the types of case management projects are implemented in a sub-optimal way. This has different consequences on results of the projects as summarized in the recommendations.

Table 4: number of projects fulfilling requirement per criteria on workforce

	Turnover of case managers	Training of professionals (excl. BelRAI)	Number of FOP per CM (≤40 FOP/CM)	Presence of intervisions/planned supervisions and MD group meetings to enhance the knowledge of case managers
CM & rehab.	0/3	0/3	3/3	1/3
CM OT	1/3	2/3	3/3	½
CM vis. Imp	0/1	0/1	1/1	1/1
CM OT & physio	1/3	1/3	2/3	1/3
CM psy	1/5	5/5	3/3	4/5
CM & resid	2/3	1/3	2/3	0/3
CM alone	¼	¼	¼	¾

Table 5: number of projects fulfilling requirement per criteria on clinical and managerial information

	Care plans use (established collaboratively and include the results of the BelRAI)	Registry (list of beneficiaries of the projects) –including prompts for care plan implementation	Presence of agreed, evidence-based interdisciplinary protocols
CM & rehab.	2/3	1/3	0/3
CM OT	3/3	1/3	0/3
CM vis. Imp	1/1	1/1	0/1
CM OT & physio	3/3	0/3	0/3
CM psy	1/5	2/5	0/5
CM & resid	3/3	1/3	1/3
CMS	0/4	¼	¼

Table 6: number of projects fulfilling requirement per criteria on system design (mainly embeddedness)

Project	Provision of feed-back of the FOP to the GP (feed-back provided about the results of the intervention or of the BelRAI)	Partnership with coordination service (SISD/SEL/GDT or CCSSD) are reported through planned project meetings
CM & rehab.	2/3	1/3
CM OT	3/3	3/3
CM vis. Imp	0/1	0/1
CM OT & physio	2/3	3/3
CM psy	0/5	2/5
CM & resid	3/3	0/3
CMS	0/4	2/4

Introduction

The aging population is a challenge to the healthcare systems. Indeed, a growing proportion of the elderly people develop the frailty syndrome, an independent predictive factor for incidental falls and worsening disability, hospitalization, and death (1). As a consequence, they experience functional decline requiring assistance for most of their activities.

Several experimental studies have tested interventions or programs to improve the community-dwelling frail older peoples' autonomy and quality of life at an affordable and sustainable cost to society (2-4). A review of 43 randomized controlled trials (RCT) related to 40 intervention highlighted a number of key features (5). Firstly, similar outcomes were used across studies. The most common were functional status, quality of life and risk of institutionalization. For informal caregivers (ICG, usually the spouse or family members caring for the frail older person), outcome relates to burden or health-related outcomes. The health status of both frail older person and informal carers are highly intertwined. Furthermore, the health status of the ICG is known to be a major determinant of risk of premature admission in nursing homes. Secondly, most interventions are a combination of various "ingredients"[6] and classical RCT are mostly not conclusive as results are not coherent from one to another study. However, a closer look at interventions showed some promising, frequently combined components: a (comprehensive) geriatric assessment; an integrated care plan; a care provider identified as a case manager, an organized medical and nursing care follow-up after assessment, day to day support services and educational support (6).

Many high income countries are implementing large scale home-based programs targeting frail older people living at their home. In Belgium, the Belgian Federal Government by means of the National Institute for Health and Disability Insurance (NIHDI) launched a funding programme of bottom-up innovative projects for community-dwelling frail older people's care and support in the entire country. Those should reduce the risk of frail older people's institutionalization in nursing home. Promising projects designs may get structural financing provided that they are positively evaluated by a university consortium.

The projects that are reviewed in this report started from April 2010. The evaluation aimed to answer a series of research questions related to characteristics of the interventions, the beneficiaries, the association with outcomes and costs, and finally the explanatory theories. The goal of the evaluation was to find answers to the following questions: what are the interventions all about and how can we expect them to work? Who benefits from the intervention? Are interventions associated with changes in measurable outcomes? For which population? In which context or conditions? Through what mechanisms? What does the intervention cost? And finally, what are the consequences of the intervention on the cost of other services paid by NIHDI or by other funding sources?

This report is an integration of other reports (annexed to this synthetics report). It is subdivided in a chapter on methods, the results, key points of discussion and recommendation.

[6] Guise JM, Chang C, Viswanathan M, Glick S, Treadwell J, Umscheid C, Whitlock E, Fu R, Berliner E, Paynter R, Anderson J, Motu'apuaka M, Trikalinos T. Systematic Reviews of Complex Multicomponent Health Care Interventions. Research White Paper. AHRQ Publication No. 14-EHC003-EF. Rockville, MD: Agency for Healthcare Research and Quality. March 2014. www.effectivehealthcare.ahrq.gov/reports/final.cfm.]

4.1 A large-scale program of bottom-up projects within Belgian health system to enhance care for frail older people living in their homes

The Belgian health system is a pluralistic system. Care for community dwelling frail older people is provided by a mix of family practitioners and private nurses working in solo, organizations owned by mutuality (catholic, socialist, liberal, others), by municipalities, or may be purely private. It is mainly regulated and financed by two public authorities' levels, i.e. federal and regional. The Federal Government is, among other things, responsible for the regulation and the financing of the compulsory health insurance. The regional governments are, notably, responsible for various aspects of older people care. This responsibility is expected to increase dramatically as an important transfer of competences has been decided by the actual government. The health system is primarily funded through social security contributions and taxation, but also a large out of pocket shared by patients (about 25%). The Belgian health system is based on the principles of equal access and freedom of choice (7).

Protocol 3 comes as a result of an agreement between federal, and the regional authorities having competencies in the care organisation for older people. Through an agreement about 35.10^6 Euros were allocated to finance and test alternative forms of care and support of care during four years. The program was launched in 2009. In July of that year, the Belgian National Institute for Health and Disability Insurance (NIHDI) launched a first call for projects of innovative care and support of care. The aim of the call was to identify efficient interventions to enable frail older people to stay at home with a good quality of life. In order to identify those interventions, NIHDI asked a consortium of universities to evaluate those bottom-up projects. From April 2010 onwards, 66 selected projects received financing. These projects planned very heterogeneous interventions targeting diverse groups of frail older people, involving a variety of professionals and organization in different contexts. A second call for project is actually under way (March 2014) and new projects are expected to start in September 2014, later than foreseen in the initial legislation.

The program implemented as part of Protocol 3 agreement can be considered as a large-scale program of multiple bottom-up projects. Specificities of large scale program evaluation and its relevance has recently come under scrutiny (8;9). On the one hand, this type of program gives the opportunity to identify mechanisms and conditions for effective intervention in "real life". On the other hand, the bottom-up conception of projects leads to high variety of organisational and services features. This needs a special effort to describe and group projects in specific types.

4.2 A triangulation process as a methodological responses to face challenges and build on opportunities from large scale program evaluation

The evaluation of the projects followed a triangulation process to build a comprehensive perspective: (1) the description of the projects as a set of intervention aiming at improving frail older person and informal caregiver outcome; (2) the evaluation of the (statistical) association between a given type of population, intervention, outcome and cost; (3) the analysis of the implementation process as a way to identify mechanisms and conditions for project effectiveness.

4.2.1 The description of the projects as a set of intervention aiming at improving frail older person and informal caregiver outcome

Since the beginning of the evaluation process, the projects have been grouped into homogeneous strata, to allow for comparisons. The classification was based on their key services. These key services were identified in the project proposal (submission file) the projects submitted to NIHDI and by means of a yearly questionnaire (Dec 2010 or Dec 2011). Only services that were delivered on a permanent basis in a project were retained for the classification, and grouped following an operational typology.

For a minority of more simple projects (n = 18), the classification was straightforward. This was mainly the case for projects delivering occupational therapy at home or psychological support. For these projects, the professionals delivering the services mostly had a degree that would be expected in such projects (an occupational therapist to provide occupational therapy, a psychologist to deliver psychotherapy or psychological support at home).

For the remaining projects (N=44), we had to follow different steps. Three researchers independently coded the services, step by step taking into account some key features like characteristics service it aimed to provide, the professionals delivering this service, the target population, the place of delivery of the service, the frequency of the service delivery. All coding was cross-checked and, in case of conflicting results, findings were discussed until consensus was reached. Only after this step, a project was allocated to groups of homogenous projects[7].

4.2.2 The evaluation of the (statistical) association between a given type of population, intervention, outcome and cost

This process of evaluation aimed to assessing the (statistical) association between a population, an intervention, cost and outcome.

Two sources of data have been used and matched[8] for the beneficiaries of projects: the IMA-AIM[9] database[10] and the data collected via the BelRAI website. The variables have been selected by means of a literature review. Through this were identified the items most frequently used in the evaluation of interventions aiming at maintaining frail older persons at home. We used this as a framework to select variables in the IMA-AIM database and in the InterRAI HC instrument. The main variable that were used include ADLH scale to measure a person's functional performance in ADLs; IADLp scale to measure a person's functional performance in IADL; CPS2 scale that describes a person's cognitive status; Depression scale (DRS) used as a clinical screening for depression.

The **IMA-AIM database** is an official government database which contains all administrative information about refunded healthcare consumption. The main outcome variable for the P3 beneficiaries is the definitive 'institutionalization', which is defined as a stay of 90 consecutive days

[7] Classification can be found in the excel doc "within Group Descriptive" and in the doc "For typology"

[8] See the declaration of the commission for the protection of the privacy (CSSS/12/105) for matching these 2 databases for the beneficiaries (with a restriction on dates, only month of provisions are known).

[9] Intermutualistic Agency, InterMutualistisch Agentschap, Agence InterMutualiste, aiming to collect and analyse data routinely recorded by the 7 healthcare mutualistic agencies responsible of the reimbursements of healthcare system.

[10] The data base is composed of different types of data on: drugs consumption (date, codes, prescriber…), population administrative characteristics (age, gender, social benefit, employment status, invalidity status, etc.) and the health consumption (cost for NIHDI and patient, date of provisions, nomenclature codes of provisions, type of admission date in health care institution, type of institution, …)

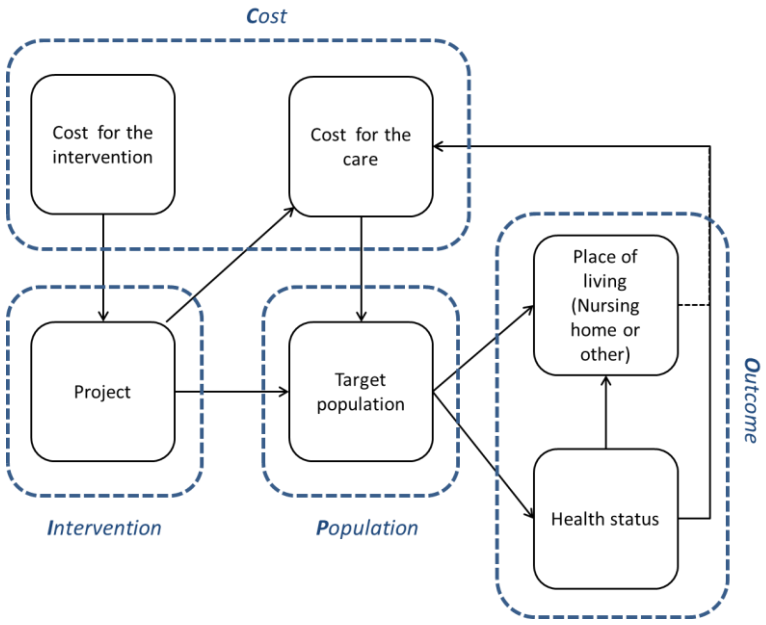
(less than 4 days between two stays) in a nursing home (directly provided by the IMA-AIM as dates were not authorized for privacy reasons).

The **InterRAI HC** instrument is an internationally validated instrument measuring several domains such as cognitive functioning, ADL, social and psychological wellbeing, health status, environmental characteristics, etc.

The BelRAI database contains the **interRAI HC** instrument data and data from other scales such as the Zarit Burden interview (to measure informal caregiver's burden, of which we used the short, 12-item version), the WHO-QoL-8[11] (to measure client's perceived generic quality of life) and an ad hoc economic questionnaire. Professional ccaregivers are asked to fill out these instruments at inclusion of the frail older person in the project (baseline), at exit from the project and 6 months after baseline (even if the older person is no longer in the project) And also, in the case of significant change in health status. Additionally, if clients stay longer than 6 months in the project, professional caregivers have to do a follow-up every 6 months until the moment the client leaves the project. The data collection ended in September 2013. Therefore, a client follow-up period will vary between 6 to 36 months. Criteria for exiting the project are: no longer receiving services from the project, institutionalization for longer than 3 months, or death.

We use a PICCO structure to explain the data collection and the analysis. There are series of hypotheses to test on the interrelationship between the various components of the framework shown in figure 1:
(1) A given type of intervention (*the project*) with financing received from NIHDI (*cost for the intervention*) will have an effect on given outcome (*the health status* and the *place of living of the target population*).
(2) The same given type of intervention will have an effect on the cost of the care provided to the target population.
(3) The cost of the care will change as a consequence of the change in health status.
(4) The outcome will be influenced by the amount of care consumed (measured by the cost of care).

Figure 4



[11] WHO Study on global AGEing and adult health (SAGE) http://www.who.int/healthinfo/systems/WHO-INDEPTH_SAGE_A.pdf

Concerning **the Population**, only frail older people living at their home are allowed to benefit from the intervention. At the beginning of the evaluation, the following inclusion criteria were decided upon: being 60 year of age[12] or more **AND** having a score on the Edmonton Frail Scale [17, 18] of 6 or more **OR** having a dependence status of A, B or C assessed by a Katz score (home scale) OR B, C or Cd (residential scale **OR** having been diagnosed with dementia by a geriatrician, neurologist or psychiatrist.

Furthermore, different population groups (leading to different strata for analysis) benefited from a project. We stratified the population to two groups of criteria. We did a first stratification according to functional or cognitive status: a group in early functional or cognitive decline (low impaired) and a second group in severe functional or cognitive decline (high impaired). We used the ADL (to measure capacity to perform activities of daily life) and CPS scales (to measure cognitive status) (from BelRAI) with a cut-off point of 3[13], in order to differentiate between both groups. Among these two groups, we differentiated between those people getting out of hospital [14] and the people that did not.

Some other additional variables that are used to describe the population or as an outcome have also been dichotomized, using a validated cutoff: 24 for siadlp (scale to measure capacity to perform instrumental activities of daily life), 10 for ZBI-12[15] and 3 for DRS[16] (scale to measure depression).

Two different strategies have been used to constitute the **"control" or "comparison" arm** of the study: (1) the control group "BelRAI" is constituted by the people allocated to the projects that are the cheapest and the least effective (i.e. the closest to not doing anything) (2) The other control group is extracted from the Permanent Sample[17](EPS) of Socially Insured Persons.

The main limitation of the first strategy (choosing a group benefiting from a "generic" group) is that people already benefit from an intervention. The limitation for the second strategy (EPS control group) is the limited number of variables that are available. Furthermore, data of the EPS data were only available 18 months after the service delivery.

Concerning the **control group BelRAI**, we defined one control group for low impaired and one for the high impaired strata. We selected the «control group » amongst the projects with the lowest effectiveness and the lowest cost

- For the effectiveness

[12] Exceptions were possible

[13] These cut-offpoints have been validated in Paquay et al., 2007 (Paquay L, De Lepeleire J, Schoenmakers B, Ylieff M, Fontaine O, Buntinx F., Comparison of the diagnostic accuracy of the Cognitive Performance Scale (Minimum Data Set) and the Mini-Mental State Exam for the detection of cognitive impairment in nursing home residents. Int J Geriatr Psychiatry. 2007 Apr;22(4):286-93.) for CPS and Burrows et al., 2000 for DRS (Burrows AB, Morris JN, Simon SE, Hirdes JP, Phillips C. Development of a minimum data set-based depression rating scale for use in nursing homes. Age Ageing. 2000 Mar;29(2):165-72.)

[14] A discharge from an hospital in the last two month before the entry date in projects

[15] O'Rourke N1, Tuokko HA. Psychometric properties of an abridged version of The Zarit Burden Interview within a representative Canadian caregiver sample.Gerontologist. 2003 Feb;43(1):121-7.

[16] Burrows AB, Morris JN, Simon SE, Hirdes JP, Phillips C. Development of a minimum data set-based depression rating scale for use in nursing homes. Age Ageing. 2000 Mar;29(2):165-72

[17] EPS: Echantillon Permanent(e) Steekproef is a database extracted from the administrative data base of the reimbursed healthcare consumption (including all persons who are a member of one of the seven Health Insurance Organizations). The sampling fraction of the Permanent Sample is 1/20 for the population of 65.

    - We compared projects (each project compared to all the others). We computed OR for ADL, DRS, IADL, ZBI-12 scales by using the validated a cutoff. We also computed the RR of institutionalization more than 90 days (to confirm)
    - We computed the median value of the OR and RR for each project
    - We selected the projects with a median > P 66 (the "least effective")
- For the cost:
    - We used the cost for the projects per beneficiaries
    - We selected the projects with a cost < P40 (the "cheapest")

For the control group "Low impaired", we chose a median of the OR and the RR for a project that was ≥1.6 (corresponding to the 33% the least "effective" projects) and a cost of <2000 euros per year and per beneficiary.

For the control group "high impaired", we chose a median of the OR and the RR that was ≥1.3 (corresponding to the 33% the least "effective" projects) and a cost of <2000 euros per year and per beneficiary (corresponding to the 40% cheapest projects)

Concerning the ESP control groups, we constituted 2 groups with the aim of having a population with a health status similar to the 2 "BelRAI" control groups. Given the absence of a variable measuring directly the health status in the EPS database, we used drugs or services consumption as a proxy. Various scenarios were tried.

Finally we used a combination of 4 variables to identify the control group from EPS:

- The combined cost of nursing, physiotherapy and speech therapy at home before admission in the project (variable **a**)
- The age (variable **b**)
- The KATZ B or C (variable **c**)
- The use of drugs[18] for dementia (variable **d**)

For the control group "low impaired", we selected people from the permanent sample having a value between P35 and P65 of the corresponding control group BelRAI, for the variable a, b, and c.

For the control group "highly impaired", we selected from the permanent sample people having a value between P35 and P65 for the age, plus, with KATZ C or taking drugs for dementia.

Since the aim of all the projects was to keep frail people at home for as long as possible, the permanent institutionalization, defined as ≥90 consecutive days in nursing home was the main **outcome** in this study.

Considering that keeping frail people at home cannot be an absolute and unique outcome criteria for the effectiveness of an intervention, other outcomes have also been measured. These include health outcomes (mentioned before) and other healthcare utilization outcomes.

Three type of statistical analysis were performed to assess association between projects interventions and outcomes: (1) Poisson regression for relative risk calculation for definitive institutionalization and death; (2) logistic regression for Odds Ratio for ADL, IADL, DRS and ZBI-12

[18] Van den Bosch K, Willemé P, Geerts J, Breda J, Peeters S, Van De Sande S, Vrijens F, Van de Voorde C,Stordeur S. Soins résidentiels pour les personnes âgées en Belgique : projections 2011 – 2025. Health Services Research (HSR). Bruxelles: Centre fédéral d'expertise des soins de santé (KCE). 2011. KCE Reports 167B. D/2011/10.273/64

scales (all having a validated cut-off -point); (3) multivariate models for means comparison for perceived quality of life (WHO-QoL-8).

In each of the analyses, potential confounding variables were included, when data was available. It included age, gender, ADL score at baseline, CPS score at baseline (cognitive functioning), DRS at baseline (depression scale score) are measured to detect potential variables.

In order to include the effect of potential confounding variables, we included them in the various regression models. Furthermore, we performed a stratification of the population (see above population description).

The relative risk of institutionalization was calculated for six months or one year. For its calculation, we used a Poisson regression model fitting the covariates and confounders for a fixed period of time of six months or one year. In our study, we use a robust form of Poisson regression and we adjust the regression for confounders. We use the 'vce (robust)' option in STATA option to obtain robust standard error for the parameter estimates as recommended by Cameron and Trivedi (2009) to control for mild violation of underlying assumptions.

For the measurement of the effect of the intervention on the health status outcome (ADL, DRS), on perceived quality of life (WHO-QoL-8) and burden of the informal caregiver (ZBI-12), there were two assessment that were initially set six months interval (one at admission, and the other one after 6 months). However, in practice the time varied between participants. Therefore, the time span between measurements was included in the multivariate model as one of the independent variables, additionally to the value at initial assessment, and other potential confounding variables. A logistic regression model was used to find the equation that best predicts the probability of change in several outcome variables, such as change in ADL, IADL, DRS, or in informal caregivers' burden. These variables have been dichotomized. ORs were calculated for the 2nd measurement of the abovementioned scales.

For both RR and OR calculation a backward procedure has been followed in order to select the best set of potentially confounding values,

For the calculation of the outcome variable WHO-QoL-8 score, we use a multivariate linear regression model, mainly due to the fact that this variable has no validated cut off value according to known on the scientific literature. The outcome score is a variable that varies from 0 to 48. A high score mean a low level of perceived quality of life.

The **cost evaluation** has been divided into two main parts:

- the evaluation of the direct cost, the cost of intervention itself and
- the estimation of the cost impact of interventions on healthcare consumption and social home-based support services use.

Concerning the evaluation of the direct cost, **the cost of intervention itself**, the aim has been to exhaustively assess the direct costs of the resources used per beneficiary (frail old person) for providing services[19]: all resources used in the intervention were included in the cost estimation.

[19] Except for residential services and for day care interventions, resources used for accommodation, catering and premises to hosting beneficiaries, are not included in the cost analysis for several reasons: the design of the data collection did not allow to distinguish the quantity of the resource used in P3 from possible utilizations by other organizations (standardized self-administered questionnaire). Indeed, these types of resources are mainly dedicated to other intervention than P3 projects.

The assessment of the total cost is based on the 2012 data collection. The questionnaire for 2012 consisted of 4 parts: (1) the funding sources, (2) the description of human resources, (3) The equipment used and travel costs, and (4) the description of the services provided.
A very important stage for the estimation of the cost of project has been the cleaning of the data: for each inconsistent answer in the human resources part of the questionnaire in 2012, projects have been contacted (by e-mail or by phone) to either correct information or either to validate the cleaning proposed by the researcher for minor mistakes (e.g. typing errors). In the equipment survey, projects had a supplementary delay for filling out the questionnaire, as some projects only declared the equipment purchased in 2012, instead of the current equipment used. Furthermore, projects have been also directly contacted to correct some inconsistencies in the equipment questionnaire. A classification of all equipment has been elaborated in order to better describe the resource used by projects.

The yearly cost per client was calculated using the total cost estimated per project and dividing it by the total number of clients in 2012 (all beneficiaries who have spent at least one day in 2012 in projects). This type of assessment allows for determining the average cost for each type of intervention but is not suitable for estimating differences in individual costs (e.g. according to dependence levels) since no direct observation of the use of resources is performed per client.

Cost was subdivided in human resources, and equipment:

For human resources, the cost estimation was based on the total number of professionals employed at the time of the yearly survey, including the persons who were absent for whatever reason (maternity, sickness leave, holiday, ...). The total cost paid by the employers is asked (gross salary and all taxes) only for their time working in the P3 projects.

For the costs of the equipment in the P3 projects, mostly open questions were asked, except for generic material such as communication means (brochures, business cards and other) and office supplies (office desks, PC, printers, software, website development and telephones…). For all materials, the amount of each item was asked, as well as the price per unit and the name of the organization financing this material. Projects were also questioned about the costs of transportation, including both the cost of purchasing the vehicle and the amount of distance per km covered with each vehicle in the P3 activities.

Concerning the impact on the costs, the hypothesis was that project intervention has an impact of the healthcare consumption. Innovative projects might influence the care consumption (mainly the one linked to the loss of autonomy). They may either improve the quality of care (care more adapted to the individual patient situations) or change the quantity of care provided (e.g. increasing health consumption or services shifts). Only the quantitative changes were assessed in this analysis.

We therefore, measured the extra costs/economies of the services use for maintaining frail elderly at home when innovative interventions are implemented compared to the current situation without projects. This cost was approximated using data for three types of services that may influence a P3 project implementation: (1) social services, provided for supportive community living (e.g. family assistant, cleaner, and meals on wheels…), (2) informal care and (3) reimbursed healthcare services linked to the dependence.

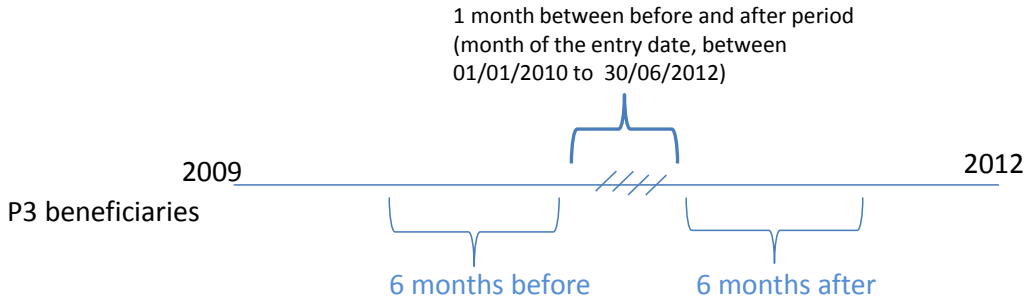
(3) Two types of reimbursed healthcare consumptions can be potentially influenced by home-based innovative healthcare services: healthcare directly related to loss of autonomy at home and hospitalisations.

First, healthcare services directly related to physical or cognitive impairments may increase, as projects may better identify needs. This may concern the following services: physiotherapist, speech therapy, nursing care. We measured this cost from the IMA-AIM database. We measured the total cost of physiotherapy, speech therapy and nursing care aggregated and calculated per patient (for P3 beneficiaries and control group from permanent sample[20]) per day at home. Only the number of days spent at home is counted in the calculation, by taking out the total days of short term stays in nursing home and hospitalisations.

Second, both the number of admissions and the duration in the hospital may decrease, so assuming a better home-based support of frail elderly. Therefore, from the data reimbursed healthcare database, the daily cost of hospitalisation was calculated.

For all types of cost, calculation was done 6 months [21] before and after the entry date in projects in order to compare any cost change due to projects. This was compared to the total cost of consumption over 6 months for a control group with same level of frailty but close to the situation "to do usual care"[22]

In the IMA-AIM data base, only the months of the healthcare provision are recorded (to prevent identification of patients). Therefore, to ensure that there was no overlap between the two periods of 6 months before and after the intervention, a whole month was considered between the two periods, i.e. the month of the entry date in a project. Per beneficiary, the period before and after is determined according to the month of the entry date in projects and defined as 6 calendar months before and after the month of entry dates. Over the six-month period, the total number of days may differ between patients according to the months included. Nevertheless, this distortion disappears because the cost calculation is calculated per day, with the right number of days over the two periods for each beneficiary.



The daily cost of nursing, physiotherapy and speech therapy was calculated per patient by using all codes of the corresponding reimbursed healthcare nomenclature. Since, only the month of the provision is known, the date is recoded at the 15th of each month. The number of days in hospital and/or nursing home was deduced to obtain an accurate total number of days at home in a given period of time. For all stays, the exit date was recalculated from the 15th and the total number of days recorded per stay because of possible inconsistencies between the admission date, the number of days and the exit date.

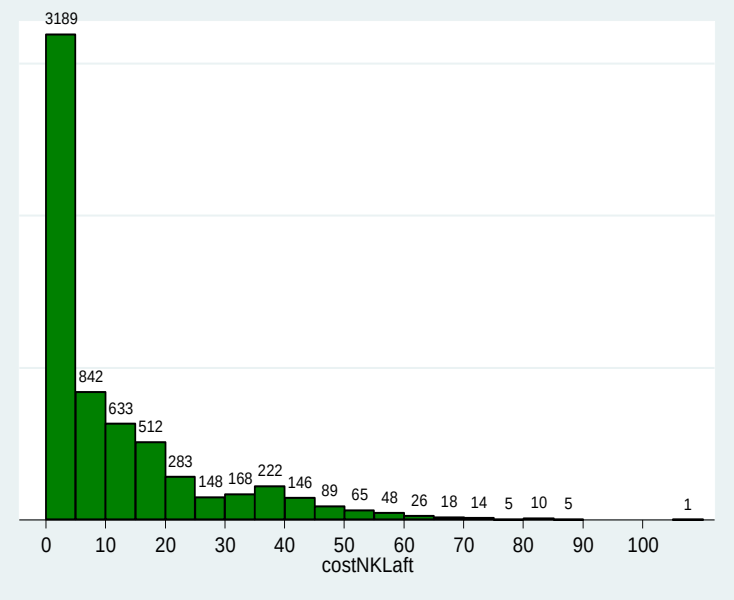
[20] A fictive date is randomly attributed (linear attribution per day, equal number of patients per day) to any patient in the permanent sample, from January 2010 until 30 june 2011.
[21] The results are calculated in 2012 euro, using the following yearly inflation rates: 2010: 1,0093; 2011: 1,0140 and 2012: 1,0299
[22] Drummond MF, Sculpher MJ, Torrance GW, O'Brien BJ, Stoddart GL. Methods for the economic evaluation of healthcare programmes. Third Edition 2005. Oxford University Press; 2005

The daily cost of hospitalisation was calculated as following [23] : the general costs (Financiers Budget of Financial Means) for non-medical activities of the admission and stays, which are partly recorded in the IMA-AIM database, the pharmaceutical and the physician and technical services.[24]

For each stay in hospital, a daily cost was calculated (total costs/total number of days in hospital). The hospitalisation cost was then defined by the number of days included in the 6 months assessment. To obtain the daily cost of hospitalisation, the total hospitalisation cost (only for the days included in the period considered) was then divided by the total number of days over the 6-month period.

The type of distribution of the daily cost per patient was not normal as shown in the figure 5.

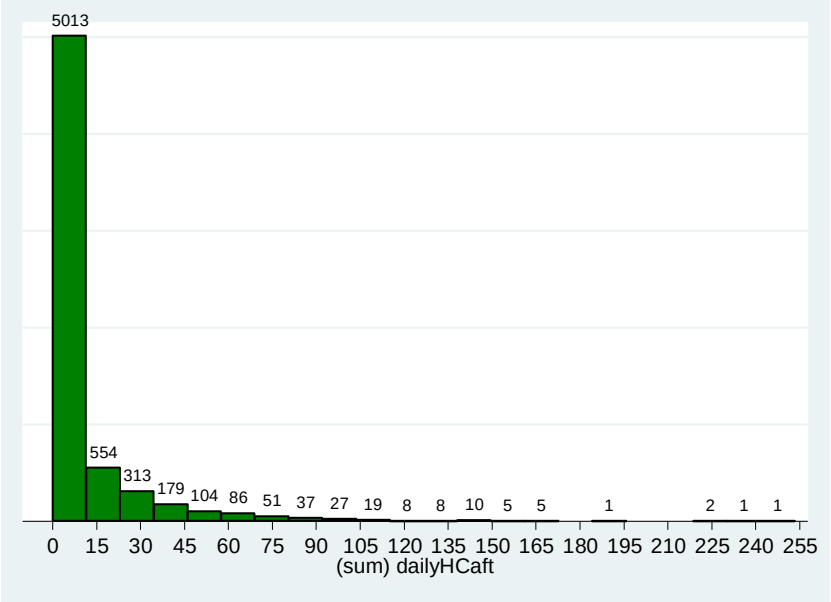
Figure 5 : Daily cost of nursing, physiotherapy and speech therapy over 6 months after the entry date in projects.



[23] The variables in the IMA-AIM database are: SS00060_ADM for the admission lump sum SS00060_JE for the reimbursed daily lump sum (representing approximately 20% of the total cost of stays), SS00060_SS for the medical provisions and SS00060_PH for pharmaceutical prescriptions.

[24] Van De Sande S, De Ryck D, De Gauquier K, Hilderson R, Neyt M, Peeters G, Swartenbroekx N, Tambeur W, Vanden Boer G, Van de Voorde C. Étude de faisabilité de l'introduction en Belgique d'un système de financement « all-in » par pathologie. Health Services Research (HSR). Bruxelles: Centre fédéral d'expertise des soins de santé (KCE). 2010. KCE Reports 121B. D/2010/10.273/02.

Figure 6 : Daily cost of hospitalisation over 6 months after the entry date in projects



The Generalized Linear Model with a log-link function specifying Gamma distribution[25] is used to model the dependent variable (also using 'VCE(robust)' option for robust standard errors). The option offset for the variable "cost before intervention"[26] is inserted in order to model the ratio cost before and after. Indeed, the ultimate goal of the modelling is the variation, not the absolute value after. Several confounders (as independent variables) were tested according to the backwards method: the level of daily cost before the entry in projects, age, nursing lump sum (A B C), and hospitalisation discharge in the two months before the month of the entry in projects, the death in the 6 month after the entry, some chronic diseases (Chronic Obstructive Pulmonary Disease, Parkinson, diabetes, hip fracture, dementia), identified by the criteria of the daily dose of drugs[27].

(2) For estimating the informal care cost, an ad-hoc questionnaire has been built in order to exhaustively assess the resources used by frail elderly living at home: home-based social services used and the time [28]of the main informal caregiver. The first part is be filled out by the elderly while the second part of the questionnaire is be filled out by the main informal caregiver (if several IC exist, this is the person who spends the most time on caregiving[29]) and aims to describe:

- the profile of the main informal caregiver,
- the time regularly spent to care,
- the consequences on the professional working time and his desire for the elderly living environment.

[25] Griswold M., Parmigiani G., Potosky A., Lipscomb J. Analyzing Health Care Costs: A Comparison of Statistical Methods Motivated by Medicare Colorectal Cancer Charges, Biostatistics (2004), 1, 1, pp1-23

[26] Dunn G., Mirandola M., Amaddeo F., Tansella M. Describing, explaining or predicting mental health care costs: a guide to regression models, British Journal of Psychiatry (2003) ,183, 398 -404

[27] Van den Bosch K, Willemé P, Geerts J, Breda J, Peeters S, Van De Sande S, Vrijens F, Van de Voorde C,Stordeur S. Soins résidentiels pour les personnes âgées en Belgique : projections 2011 – 2025. Health Services Research (HSR). Bruxelles: Centre fédéral d'expertise des soins de santé (KCE). 2011. KCE Reports 167B. D/2011/10.273/64

[28] B. van den Berg W. B. F. Brouwer M. A.Koopmanschap Eur J Health Econom 2004 · 5:36–45 Economic valuation of informal care, An overview of methods and applications

[29] This is the FOP who identifies the main informal caregiver.

49.2 %of the informal caregivers have filled out the questionnaire (82.7% of the beneficiaries have an informal caregivers). This result may be explained by an overrepresentation of the informal caregivers who live with the beneficiary. Indeed, the interviews of the informal caregivers who do not live the beneficiary are less easily organised.

The time spent on caregiving is defined as the time spent on the following activities:

- the Activities of Daily life: bathing and showering, dressing, functional mobility, eating, toilet use, continence
- the Instrumental Activities of Daily Life: meals, drugs management, shopping, housework, phone use, stair use, transport, finance management
- The supervision of both FOP and formal care

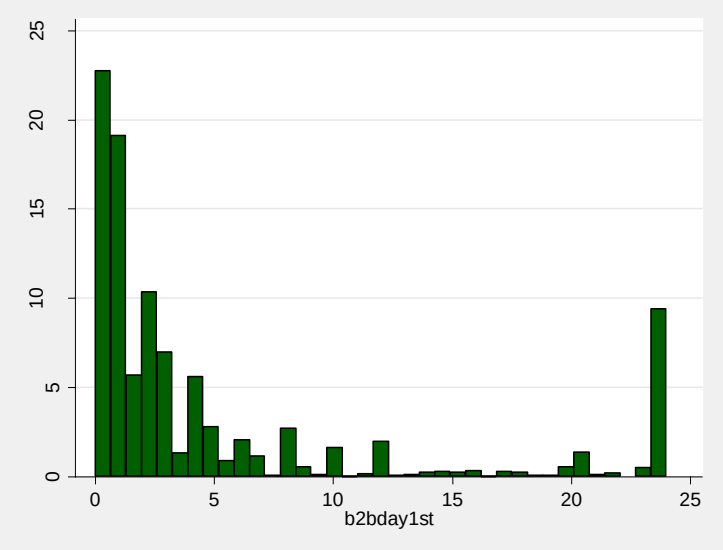
In the questionnaire, the estimation of the time is a global estimation through one single question, the ICG is asked to cumul the time for the different tasks. The time is counted only once if tasks are done in a same time. For informal caregivers living with the FOP, the time for additional housework due to the health status of the recipient, is not included in the study for several reasons:

- this activity is a public commodities, benefiting to both of the coresidents.
- the ICG would have to do the housework if the person lives alone
- there is a risk of discrimination according to the gender of the ICG, So coresidents shall not include any housework activities in the calculation . The time estimation is global, asked through one single question, the respondent has to cumulate the time spent on the different tasks before answering.

The time of the informal caregiver is valued by using *"The proxy good method or market cost method values time spent on informal care at the (labor) market prices of a close market substitute."* [30] [31] Despite the strong hypothesis underlying (perfect substitute of informal and formal care), the main advantage of the methods is to be rather simple.

The rate chosen is the rate of the "cheques titres-services"[32] , provided for funding family help and household services: 21,72 € per hour in 2012.

Figure 7 : Daily time spent on caregiving (in hour)



[30] B. van den Berg W. B. F. Brouwer · M. A.Koopmanschap Eur J Health Econom 2004 · 5:36–45 Economic valuation of informal care, An overview of methods and applications

[31] Davin Bérengère *et al.*, « Entre famille et marché : déterminants et coûts monétaires de l'aide formelle et informelle reçue par les personnes âgées en domicile ordinaire », *Management & Avenir* 6/ 2009 (n° 26), p. 190-204

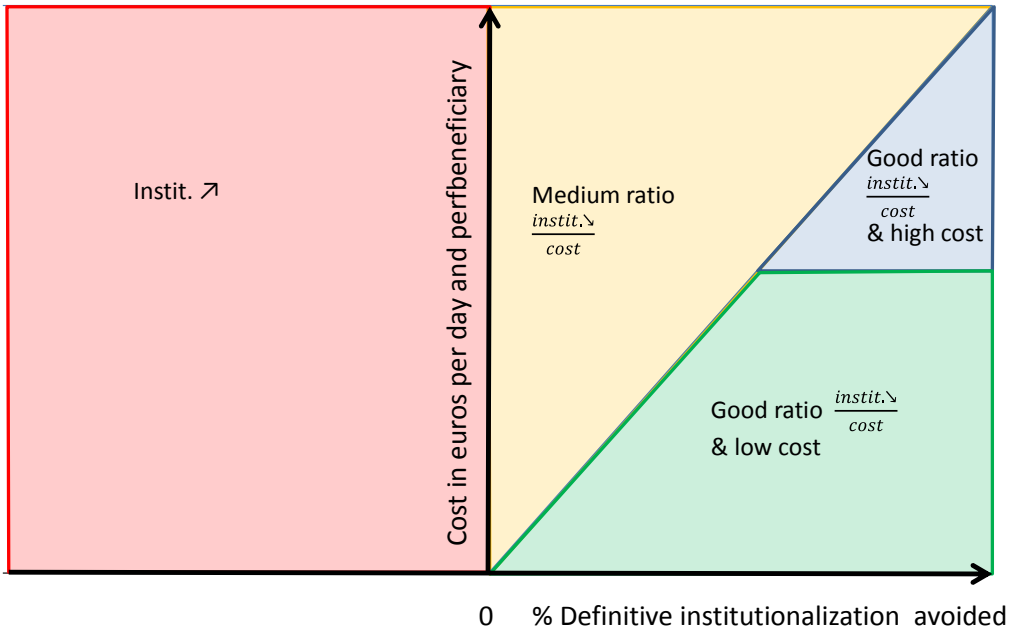
[32] http://www.emploi.belgique.be/defaultNews.aspx?id=36951

The regression model is the same as for hospital and NPS costs.

As a result of cost and outcome statistical analysis, four different figures were done to combine analysis of relative risk (RR) of definitive institutionalization ratio after 6 months with daily costs: RR combined with (1) cost for beneficiaries (including informal caregiver time spend in care); (2) the daily cost for NIHDI and beneficiaries (including out of pocket expenses for nursing, physiotherapy and speech therapy) to keep frail older person at home (including cost of nursing, physiotherapy and speech therapist care; and cost of the project); (3) the daily cost of the project only; (4) the total cost combining the cost for NIHDI, beneficiaries and their main informal caregivers.

Four types of situations were then identified: (1) projects with a good ratio $(instit. \searrow)/cost)$ & low cost; (2) projects with a good ratio $(instit. \searrow)/cost)$ & high cost; (3) projects with a medium ratio $(instit. \searrow)/cost)$; (4) projects with a higher proportion of institutionalization than control group. These are represented in the figure 1.

Figure 8: four situations of projects



4.2.3 The analysis of the projects implementation process

The purpose of the third process of evaluation is to understand why an intervention (part of a project) gives an outcome when implemented in its context.

In order to collect more specific and in depth information, 21 multiple, embedded **case studies** were conducted during the entire span of the project. The three aims of the case studies were:

1. To provide a precise and narrative description of the project components (structure and process factors) that would likely lead to positive beneficiary outcomes;
2. To identify the contextual factors that played a role during the implementation process of projects and the way they adapted to changes (like change of reimbursement modalities, turnover of professionals etc.);
3. To build an overall analytical framework to explain success or failure of projects.

As the relation between the type of projects and the outcome for frail elderly was unknown from the start of the projects, cases were selected to obtain as much diversity as possible in the projects' characteristics. These features included the type of services provided, the geographic location, the size of the project (staff or intended caseload), the definition of the target population, the level of multidisciplinarity, the size of the partnership, etc.

For the organisation of the data, templates were used in the case studies. They allowed for the standardised collection of data of the 21 cases among the five researchers involved in the process, as recommended by Yin (2009). Moreover, the methodology aimed to summarise the information about each project over time. These elements of information were stored under the following headings, representing the different contextual and organisational components of the projects:

1. **The context in which the project was implemented**;
2. **The preparatory process of the project;**
3. **The description of the project as planned** including:
    1) **Structural components** as - a definition of a target population, - an area of activity, - an expected caseload, - core objectives, - a staff of professionals, - a partnership of organisations, - some logistic and financial means
    2) **Process** organizing the way the intervention was to be delivered as a sequential model of intervention, some coordination and collaboration tools.
    The description of the project as planned helped to define its boundaries: where did the project stop and usual care begin?
4. **The description of the project as implemented in real-world conditions,** including the adaptive strategies of the projects, the factors having facilitated or hindered the implementation process regarding specific challenges of their context;
5. **The summary of the main "lessons learned"** from the implementation process of the project, including the description of the differences between the 'model' of the project as planned and the project as implemented in practice.
6. **The summary of the logic of the intervention, or "programme theory":** Which objectives were aimed by the projects? Which activities were displayed to reach these objectives? By which mechanisms the actors of the projects expected these activities to impact FOPs or ICGs' outcomes? This information, based on the information gathered and summarized in each template, drew upon Ridde and Haddad's article about pragmatic evaluations of complex interventions (2013).

Besides allowing a dynamic and standardized data collection about projects over time, the templates also helped in the preparation of the interview guides for interviews with projects, which focused on the missing data or on contradictions labelled as "grey zone" in the description process. These "grey zones" were translated into interview questions. This process allowed both a standardized and tailored approach of each case, and enabled a deep exploration of the data.

The case studies combine multiple sources of qualitative and quantitative data, used in a complementary way (Eisenhardt, 1989; Yin, 2008). Case studies used the following sources of qualitative data:

1. Project submission files. Submitted in December 2009 and now available on the NIHDI website. They were the basis upon which the jury decided to finance the projects during four years.
2. Three yearly rounds of semi structured Interviews with the key professionals working in projects (coordinators, persons responsible of the implementation of the project and frontline workers). All the interviews were conducted by at least two researchers, in order to harmonize the case study process.
3. Yearly questionnaires. Each year, projects filled out electronic questionnaires, in order to collect data about the organisational functioning and about adaptations in the components of their projects. Researchers took the extra precaution to provide feed-back of their own understanding of the data, in order to validate it. This was done by means of telephone interviews.

4. Documentation. Documentation about projects was also gathered by means of documents publicly available, such as advertising flyers, projects website, etc.

It is important to highlight at this point that all these data are self-reported data, gathered by the professionals in the Protocol3 projects, except for the field notes, which were written by the members of the research team. They reflect the perception of the reality of the members of the project teams (see overall methodology).

During the first two years of the evaluation process, focus groups were organized, in order to validate some key findings from the case studies. Four groups were organized, two per language group (French and Dutch), each one with managers and coordinators, the other with front-line professionals. In the final phase we also were able to include some quantitative date that gave extra insight in the above qualitative data.

4.2.4 Normative analysis

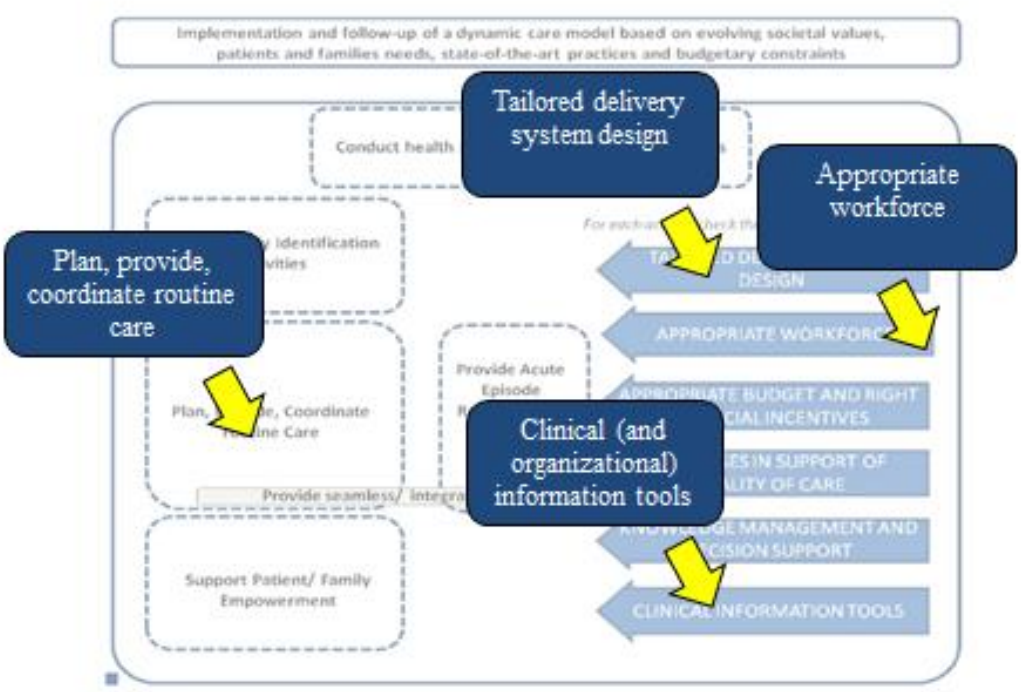
Key component of projects identified through case studies were used to analyse other similar projects. They were seen from a normative point of view. This means that we described how the projects expected their services to improve older people's outcomes Therefore, we looked into the objectives set by the projects, which activities they planned to perform to achieve these objectives and if, according to their statements, they actually did these activities.

Each researcher identified the components explaining the success of the project individually for one group of projects (through case study analysis, yearly questionnaire analysis and literature review). Each list of components, with its list of relevance criteria was reviewed by another researcher who had participated in the case study analysis of the same group of projects. These components were displayed along with the domains of the Chronic Care adapted to Belgian context (see figure 4).
Data were discussed amongst all researchers of the qualitative team during regular working sessions. This led to a comprehensive set of items (e.g. 25 for case management projects), which made them very complicated to test. After discussion amongst the members of the research team, a smaller set was selected, which were thought (1) to have the most weight in the success of the project, according to the actors of the projects' point of view and (2) of which the data were the most reliable (after triangulation).
A next step was to score projects in order to be able to compare them meaningfully. Two researchers independently rated the components of each project from 0 to 3, according to the list of criteria. The results were then compared and a consensus found whenever needed.

We finally focused on 3 requirements that appeared particularly relevant: characteristics of workforce; characteristics of clinical (and organizational) information tools; tailored delivery system design.

This analysis appeared particularly relevant for projects of case management. For these we summarized description of the requirements through a reduced number of criteria. For appropriateness of workforce, we looked at turnover of providers (or not); ratio of FOP per CM (≤ 40); training of professionals and presence of intervision. For characteristics of clinical (and organizational) information tools we looked at the use of BelRAI for care plan design ; the use of register for follow-up of frail older person; and the presence of agreed, evidence-based interdisciplinary protocols. For the tailored delivery system design, we looked at the provision of feed-back of the FOP to the GP; and the partnership with coordination service (SISD/SEL/GDT or CCSSD).

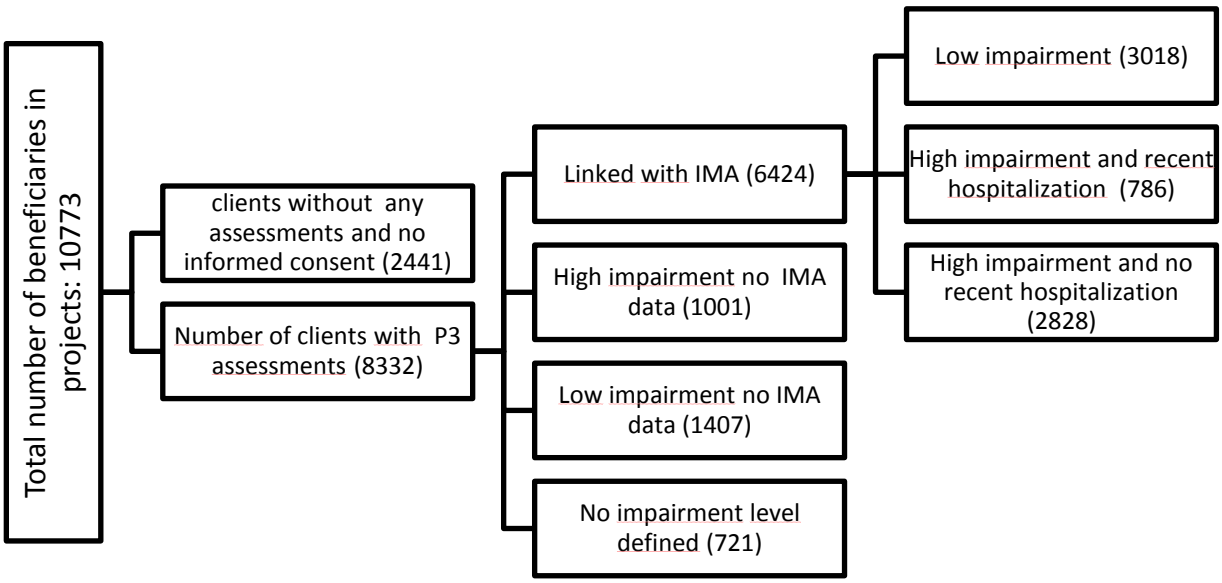
Figure 9 : extracted from Paulus D, Van den Heede K, Mertens R. Position paper: organisation of care for chronic patients in Belgium . Health Services Research (HSR). Brussels: Belgian. Health Care Knowledge Centre (KCE). 2012. KCE Reports 190Cs. D/2012/10.273/84



5.1 Description of the overall population benefitting from alternative forms of projects

Over 10773 beneficiaries that were included in the P3 projects; data from BelRAI is available for 8332 beneficiaries[33] and data from the IMA-AIM for 6424 beneficiaries. Data from BelRAI were mostly analysed by dividing the beneficiaries in 2 groups: those with low impairment (ADL<3 and CPS<3) and those with high impairment (ADL≥3 or CPS≥3). Data from IMA-AIM allowed a further subdivision of the highly impaired group in two subgroups: those with high functional impairment (ADL≥3) and recent hospitalization (in the previous 2 months), and those with high impairment (ADL≥3 or CPS≥3) without recent episode of hospitalization. Numbers of beneficiaries are reported on figure 8.

Figure 10. Decscription of data sets for anaylsis of the P3 projects.



Comparative characteristics of each group are presented on table 7. Among other things, there is an overall high proportion of the sample with high impairment for instrumental activities of daily life a (IADL≥24 for more than ¾ of the sample), and with ICG suffering from burden (ZBI-12≥10 for more than half of the sample). Half of the respondents live alone, though more than 80% have an informal caregiver identified. There are also more people living alone, without informal caregiver in the low impaired group.

Absolute risk of institutionalization and of death is higher than the population of 60+ in the IMA – AIM permanent sample (Table 8). This indicates that even “low impaired” population is more in need of services than general population of the same age.

[33] Projects were allowed to include a maximum of 25% of their population in their project, of which they were not obliged to fill out the BelRAI. These were often patients of which they could not have an informed consent. Data from the case studies suggest that this population did not differ from included patients.

Table 7 : Description of the beneficiary sample at 1st assessment (n= 8332) – BelRAI database

	Low impaired	High impaired without recent hospitalization	High impaired with recent hospitalization	Overall P3 sample with impair level calculated	Overall P3 sample
Median Age (P25-P75)	81 (75-85) n=3018	82 (76-86) n=3829	81 (76 – 86) n=786	81 (76-86) n=7633	81 (76-86) N= 8325
Proportion DRS ≥3	24.2% [22.7 ; 25.8] n = 2941	32.8% [31.3 ; 34.3] n = 3695	31.9% [28.5 ; 35.2] n = 753	29.3% [28.3 ; 30.3] n = 7389	30.2% [29.1 ; 31.2] N=7735
Proportion ADL ≥3	0%	79.5% [78.3 ; 80.8] n = 3829	100%	50.2 [49.1 ; 51.3] n= 7633	49.8% [48.7 ; 50.9] N = 7685
IADL≥24	56.9% [55 ; 58.7] n = 2705	90.7% [89.7 ; 91.7] n = 3238	95.9% [94.4 ; 97.4] n = 662	77.4% [76.4; 78.4] n= 6605	77.2% [76.2 ; 78.2] N = 6769
CPS ≥3	0%	54.5% [52.9 ; 56.1] n = 3767	33.4% [30.1 ; 36.8] n = 766	30.6% [29.6; 31.6] n= 7551	30.6% [29.6 ; 31.7] N = 7667
Median WHO-QoL (P25-P75)	29 (25-35) n=2671	31 (26-36) n=2478	30 (26-35) n=537	30 (25-35) n=5686	30 (25-35- N=6060
ZBI-12 ≥10	50.5% [48.3 ; 52.8] n = 1886	64% [62.3 ; 65.7] n=2828	62.3% [58.4 ; 66.2] n = 595	59.0% [57.7; 60.4] n=5309	59.5% [58.2 ; 60.8] N = 5611
Ratio male / Female	0.28 [0.26-0.30] n=3018	0.35 [0.33-0.36] n=3828	0.36 [0.33-0.39] n=786	0.32 [0.31 – 0.33] n =7633	0.32 [0.31 – 0.33] N=8332
Proportion living alone [IC95%]	65.9% [64.2% - 67.6%] n=2979	44.7% [43.2- 46.3] n=3791	47.6% [44.0 - 51.1] n=778	53,4% [52,2 - 54,4] n =7548	53,1% [52.0 - 54,2] N =8015
Proportion with informal caregiver [IC95%]	75.1% [73.5% - 76.7%] n=2949	88.2% [87.2%- 89.2%] n=3747	88.6% [86.3 %- 90.8%] n=760	83.1% [82.2 – 3.9] n=7456	82,9% [82,1 - 83,8] N =7792

Table 8 : Description in comparison with the permanent sample (overall PS)

	Low impaired	High impaired with recent hospitalization	High impaired without recent hospitalization	Beneficiaries P3	Permanent sample
Absolute risk of definitive institutionalization (6 months)	3.43% [2.6 ; 4.3] n =1778	9.7% [7.4 ; 12] n =630	8.1% [7 ; 9.2] n =2259	6.62% [1.57 ; 7.61] n = 5071	1.7% [1.63 – 1.78] n =114225
Absolute risk of death (6 months)	4% [3 ; 4.9] n =1778	13.8% [11.1 ; 16.5] n =630	7.5% [6.4 ; 8.6] n = 2259	7% [6.3 ; 7.7] n = 5071	1.6% [1.57 ; 1.71] n =114225

In order to interpret later relative risk results, we calculate the relative risk related to characteristics of beneficiaries. The two variables that represent the higher risk of institutionalization for FOP are the cognitive status (RR o of 2.18 for CPS≥3) and problems with instrumental activities of daily life (RR of 5.05 for IADLp≥24) (table 9)

Table 9 : characteristics of beneficiaries and risk of institutionnalization

Variable	RR (bivariate)
DRS≥3	1.26 [1.01 ; 1.58]
ADL≥3	1.8 [1.43 ; 2.27]
IADLp≥24	5.05 [3.02 ; 8.45]
CPS≥3	2.18 [1.75 ; 2.71]
ZBI-12≥10	

Furthermore, interpretation of results must be done in function of the missing data. We characterized the beneficiaries with and without missing data. Generally, the group with missing data has a worse health status (and as a consequence a higher risk of institutionalization) than the group with data completed (see table 10). There is, however, variation depending of the group of beneficiaries (see later).

Table 10 : comparison of characteristics of beneficiaries with and without missing value at second assessment of BelRAI[34] data

	Not missing		Missing		Diff stat sign
	Median at 1st assessment	N	Median at 2nd assessment	N	
ADL missing					
Age	81	*4813*	82	2395	***
Sadlh	2	*4601*	3	2026	***
Scps	1	*4587*	2	2019	***
Sdrs	0	*4591*	2	2097	***
Siadlp	33	*4128*	38	1713	***
ZBI-12	11	*3369*	13	1509	***
Who-QoL-8	29	*3848*	31	1393	***
CPS missing					
Age	81	*4809*	82	2399	***
Sadlh	2	*4582*	3	2045	***
Scps	1	*4594*	2	2012	***
Sdrs	0	*4592*	2	2096	***
Siadlp	33	*4125*	38	1716	***
ZBI-12	11	*3369*	13	1509	***
Who-QoL-8l	29	*3845*	31	1396	***
DRS missing					
Age	81	*4895*	82	*2313*	***
Sadlh	2	*4589*	3	*2038*	***
Scps	1	*4593*	2	*2013*	***
Sdrs	1	*4691*	2	*1997*	***
Siadlp	33	*4134*	38	*1707*	***
ZBI-12	11	*3417*	13	*1461*	***
Who-QoL-8	30	*3920*	31	*1321*	***

[34] In this table the n is less than on table 1 because we only have clients here that had a first evaluation by the beginning of March 2013 at the latest (to be able to count for a second evaluation).

5.2 Description of the comparison groups

Two comparison groups for low impaired and two comparison groups for high impaired were respectively defined. Indeed, in each of the subgroup, one comparison group was defined to analyse BelRAI data (i.e. the "BelRAI comparison group") and one to analyse IMA-AIM data (i.e. the "IMA-AIM" comparison group).

The low impaired BelRAI comparison group included beneficiaries from the 7 "cheapest" and "least effective" projects. These are projects of occupational therapy (3 project), case management delivered alone (2 projects), psychological support (2 projects). Characteristics of this group, compared to intervention group (the beneficiaries from other projects) are presented on the table 11.
Although there are no statistically significant differences between control and intervention group, values of the scale show an initial worse health status for intervention group than for control group (with the exception of DRS).

Table 11 : Scale for comparison group BelRAI low impairment

	Control group n=283	Intervention group n=2735
Age	80 (76-85) Mean 79.64 (7.15)	81 (75-85) Mean 79.93 (7.69)
Proportion ADL ≥3	0	0
Proportion CPS ≥3	0	0
Proportion DRS ≥3	26.5% [0.21, 0.32]	24.1% [0.22, 0.26]
Proportion IADL≥24	51.1% [0.45, 0.58]	57.4 [0.55, 0.59]
Proportion ZBI-12≥10	47.8% [0.37, 0.58]	50.7 [0.48, 0.53]
Who-QoL-8 score	29 (24-34)	29 (25 ; 35)

Absolute risk of institutionalization and death of both comparison group for low impaired population are presented on table 12. It shows a higher risk of institutionalization over 6 months for the comparison group IMA-AIM compared with BelRAI comparison group and intervention group. The difference between absolute risks of death is not statistically different between the 3 groups

Table 12 : absolute risk of institutionalization

	Control group BelRAI	Control group IMA-AIM	Intervention group
Absolute Risk (AR) of institutionalization at 6 months	2,2% [0,002 ; 0.47] n=134	8.2% [7 ; 9.5] n = 1857	3.6% [2.7 ; 4.5] n = 1613
Absolute Risk (AR)of institutionalization at 1 year	10.5% [3.5 ; 17.6] n=76	10.6% [9 ; 12.4] n= 1291	7.8% [6.3 ; 9.3] n = 1241

The high impaired BelRAI comparison group included beneficiaries from the 8 "cheapest" and "least effective" projects. These are projects of psychological support (3), occupational therapy (2), case management delivered alone, night care, case management and psy / occupational therapy . Characteristics of this group, compared to intervention group (the beneficiaries from other projects) are presented on the table 13. There is a statistically significant lower proportion of DRS≥3 and of ZBI-12≥10 in the intervention group than in the comparison group. Also, though not statistically significant, there is a higher proportion of ADL≥3, in the intervention group than in the comparison group.

Table 13 : Scale for control group BelRAI high impairment

	comparison group Median (P25-P75) n=377	Intervention group Median (P25-P75) n=4290
Age	81 (76-86) Mean 80.25 (7.58)	81 (76-86) Mean 80.68 (7.85)
Proportion ADL ≥3	77.9% [0.74, 0.82]	82.5% [0.81, 0.84]
Proportion CPS ≥3	62.6% [0.58, 0.68]	49.9% [0.48, 0.52]
Proportion DRS ≥3 *	40.3% [0.35, 0.46]	32.1% [0.31, .34]
Proportion IADL≥24	91.7% [0.89, 0.95]	91.1% [90.2, 92.0]
Proportion ZBI-12≥10 *	78.5% [0.74, 0.83]	62.4% [0.61, 0.64]
Who-QoL-8 score	34 (30-38)	30 (25 -36)

Absolute risk of institutionalization is higher though not statistically significant in the comparison group IMA-AIM compared to the 2 other groups. Risk of death is higher in control group BelRAI compared to the 2 other group, but this is not statistically significant (table 14).

Table 14 : absolute risk of institutionalization

	Comparison group BelRAI	Comparison group IMA-AIM	Intervention group
Absolute Risk (AR) of institutionalization at 6 months	8.0% [4.1 ; 12] n= 187	10.8% [9.3 ; 12.2] n = 2862	8.3% [7.3 ; 9.4] n = 2682
Absolute Risk (AR)of institutionalization at 1 year	24.8 [17.4 ; 32.2] n=133	17.54% [15.3 ; 19.7]	17.2% [15.6 ; 18.8] n=2198

5.3 Overall presentation of the projects interventions

Since the beginning of the evaluation process, the projects have been grouped into homogeneous strata, to allow for comparisons among projects. The classification was based on the key services that the project aimed at providing. There are summarized hereafter.

Projects with a component of **case management** are performing (a) individualized needs and preferences' assessment, (b) planning of services, according to the results of this assessment, (c) patient-centered care coordination and (d) re-evaluation and adjustment of the care coordination.
Among these, there are projects providing only services **at home** and projects combining a component **of case management with services outside the FOP's home**. Besides delivering case management, those six projects provide either revalidation services in a short term accommodation (2 projects targeting mainly people at the end of an acute episode of illness including post-acute hospital rehabilitation), respite in a short term accommodation (2 projects) or night care (2 projects). Moreover, three of those projects are delivering occupational therapy and one, nutritional support.

Projects with **occupational therapy** (and physiotherapy) components provide mainly home adaptation in order to: (1) make the patient's living environment more adapted to their current conditions, and (2) offer better work conditions to home caregivers. Three projects also offered rehabilitation services in addition to home adaptation. This type of activity is comparable to what an occupational therapist is used to perform in revalidation service in a hospital (e.g., patient education in case of hip prosthesis, strengthening of the upper and lower limbs, advice to prevent falls, rehabilitation in activities of daily living, etc.). Combined with a home modification, the rehabilitation might give better results in terms of independence, safety and home maintaining.

Projects with **psycho component** deliver psychological, psychosocial support or psychotherapy at home by a trained psychologist or psychotherapist. These projects share the aim to maintain frail elderly people in their homes by providing psychological support to the elderly and their informal caregivers. The way they concretize psychological support often differs between projects.

Projects with **night care at home** components represent a category of projects whose interventions occur at night, between 10 pm to 5 am. They mainly offer nursing care at night or surveillance for FOP with clinical or psychological needs during the night. They seem designed for FOP aged 60 years and above needing surveillance and/or care during the night (change of incontinence material, pressure ulcer prevention, surveillance and support of home dialysis, support for going to bed).

Projects with **night hostels** provided nursing care (i.e. pressure ulcer prevention, medication, etc.) or surveillance in night hostel. FOPs spend night there, periodically or in emergency and might be seen as a sort of respite care.

Projects providing services in **day care centers** described their services as customized care, customized assistance, differentiated care, etc. The emphasis was on the individual counselling of clients according to their individual needs and preferences. Activities were organized to improve the independence of the elderly. Older people often also got psychological support. In addition, group activities were organized in order to encourage social contact. Most projects also provided information and/or support to informal caregivers. Nevertheless, it was unclear how the individual daily program of an older person was determined and adapted.

The various types of projects are summarized in the table 9 here below, including their target population.

In the next sections we present the various classes of projects results. The intervention (i.e. the service provided to FOP and ICG), the characteristics of beneficiaries and results of the intervention (i.e. uptake, cost and outcome) are detailed for each type of projects. Additionally, conditions for implementation are described for three "requirements" of the "Belgian" chronic care model: Characteristics of workforce, characteristics of clinical (and organizational) information tools and tailored delivery system design (intra-organization and interaction with other components of the –local- system).

5.4 The projects with case management component

22 projects were attributed to this group. When looking at the services they provide and the professionals delivering these services, 4 of these 22 projects deliver case management alone (of which 2 were included in the comparison group).

The remaining 18 projects delivering case management along with other services, were regrouped into three subclasses: Case management (CM) with occupational therapy/physiotherapy, i.e. delivering also occupational therapy (OT) and sometimes physiotherapy, CM with residential care or night care and CM with psychological or psychosocial support and occupational therapy.

5.4.1 The intervention

The case managers should play a role as an advocate of the FOP's and their ICGs when they can't manage the situation themselves. They should take the necessary time to identify latent needs and to help in negotiations, if necessary with the health/social care system. The case manager should seek the best possible solution from the FOP/ICG perspective. In that sense institutionalisation might sometimes be the best outcome. This is especially the case when maintaining the FOP in her home is at her own (very high) expenses.

A typical sequence in activities for case management could include the following steps[35]:

- The Identification of a FOP is based on the referral of a professional or an ICG;
- After a first contact by phone, the case manager meets the FOP at home, where an Edmonton scale is used. If criteria are met (including an assessment that the case management would benefit the FOP and that the ICG could be involved adequately), inclusion is decided. A notification of the inclusion is then send to every healthcare provider involved;
- Full assessment is performed (through Global Geriatric Assessment tool such as BelRAI)
- A proposal of support plan is made with the FOP;
- If agreed, the case manager calls the available services (i.e. without waiting lists) or professional, in order to respond quickly to the needs;
- The case manager does the follow-up of the situation, by the means of home visits or, in some cases, by phone calls;
- A FOP remains in the project as long as he/she is not definitively institutionalised; deceased or when the case manager and the FOP/ICG decide that the project is not needed any more (e.g. when there are only two care providers and the situation is stable).

It is interesting to note that in this model of case management, although the beneficiary has been identified as 'frail', the specifics and nature of the interprofessional collaboration with the beneficiary's GP is not mentioned.

In the proper implementation of such an intervention, the following characteristics may be useful:

- The trustworthiness of the case manager towards FOP/ICG and care providers, i.e. the capacity to build trustful relationships with the FOP/ICGs and the other care providers, in order to reduce the uncertainty linked to the professional capacities of each professional;
- The training of the case manager (to be able to perform the different functions of a case manager, including the skills to promote inter professional collaboration, with a special mention to the beneficiary's GP);
- The 24hours a day availability of the case manager.
- Information tools for global assessment of FOP and capacity of the case manager to use it adequately to plan the care
- Coordination activities (meetings) and tools (ITC including shared tools);
- Access to evidence-based interprofessional protocols.

Four projects were included in the subcategory **case management delivered alone** (three in the Dutch speaking part and one in the German speaking part of Belgium).

Their objectives were rather diverse as, besides the "official" objective of the funding entity (NIHDI), which was to delay premature nursing home placement (one project), two projects targeted the autonomy of the FOP and/or his network, one of the latter adding the training of professional care providers and the last one specifically mentioned the use of the local resources by structural agreements and coordination after careful assessment and addressing needs.

Only one project used the wording of *case management* for the description of its services. This project was part of the case study. None of the professionals in these project delivered direct care to the FOPs whose case they managed.

Meetings among professionals showed to be very important to coordinate interventions, as it was the case for all case management projects. All projects mentioned that they organized multidisciplinary meetings (multidisciplinary meetings) and follow-up of the 'cases'. However, they

[35] Proposed in case study 1 CM provided alone

diverged in terms by means of frequency (monthly, every three months or 'ad hoc') and location (fixed location or at the FOP's home)

Two projects out of four reported a flexible frequency of home visits and this was related to the workload of the case managers. As to duration, all but one project declared that the FOPs remained in their projects as long as they were not definitively institutionalised. The exception is the project of the case study, stating that if during a planned assessment, it appears that both parties do not perceive any added value of the project, they discuss with the FOPs to stop the intervention (e.g. when the situation is viewed as stable and only two care providers intervene with this FOP).

One of the projects mentioned they did not use a care plan, as opposed to the others. This was also the only project which did not use the BelRAI for case management's purposes. The reason of this was because the case manager did not have access to the BelRAI application; because of legal reasons (was not a healthcare provider, nor social worker). This project also stopped in December 2012, and did also not reach its proposed caseload.

Seven projects provided **case management in combination with occupational and physiotherapy**, the intervention started with and was articulated around case management that contains de facto a coordination component. Moreover, the seven projects declared to systematically include the ICG during the meetings at home. This was verified further when analysing FOP data.

Out of the seven projects, six declare to use BelRAI results to identify the needs of the FOP (CAPs and results of scales) and all make up a care plan, which is evaluated at 'regular' intervals (at least every six months, which corresponds to the NIHDI requirements in the scope of the scientific evaluation).

Multidisciplinary meetings hold an important place for coordination. The seven projects organize this type of meeting at the FOP's home, in presence of the frontline workers of primary care, GP included. Such a meeting is organized at least once yearly. The projects meet more frequently (i.e. in between) in case of complex situations, in absence of the FOP or her/his ICG. In that case, multidisciplinary meetings are hold at the umbrella organisation or, for one of the projects, at the region's level, in an ever changing place.

The information flow about a single FOP occurs mostly through informal channels, such as phone and email, and the notebook at the FOP's home.

Four out of the seven projects declare spontaneously that they miss a shared FOP record, common to all healthcare and care providers around a FOP.

Among those seven projects, the intensity of the case management and other services provided varied strongly, from 21 hours/year to 187hours/year (median = 53 hours/year). One project declared to deliver a care trajectory, without specification of the number of hours spent in care. The projects state that they adapted the intensity of case management and other services to the needs of the FOPs, for instance, in transitional or crisis situations, they felt that their intervention should be more frequent and in stable situations, they could intervene less often, or through phone calls.

Additionally to case management, those seven projects provide occupational therapy (adaptation of the home, falls prevention, help with mobility) by occupational therapists. The intensity of the services varies from 'irregular' to 'once a week'. Besides delivering case management AND occupational therapy, four projects deliver also physiotherapy and this service is provided by a physiotherapist (kiné), paid by the project. This physiotherapy is delivered on an irregular basis or once month, in every case at the FOP's home. The main aim is to support the FOP's autonomy. Three projects in this category also offer speech therapy and the speech therapists are paid by the projects.

Those speech therapy sessions can be provided in addition to case management and occupational therapy and, for one project, with physiotherapy. The content of the therapy aims at supporting meal times (swallowing disorders) and delivered at home, on an irregular basis (2 projects) or monthly (1 project).

Six projects provide **case management in combination with residential or night care**. They have in common that they provide healthcare services in a setting outside the FOP's home; either revalidation services in a short term accommodation (2 projects), respite in a short term accommodation (2 projects) or night care (2 projects). Moreover, three of those projects are delivering occupational therapy and one, nutritional support.

As opposed to the category of projects delivering case management and occupational therapy/physiotherapy, case management is explicitly provided only by four of those six projects.

Nevertheless, the reason why these two projects were allocated to the category of case management projects is that they are conducting multidisciplinary assessments of needs, proposing a care plan in collaboration with the FOP, coordinating this healthcare and, eventually, evaluate this coordination. This case management service is provided at home for four projects and in another setting, for two projects. For the latter, case management is provided in a revalidation service.

The intervention is provided through different modalities from project to project and can last from two weeks to a permanent duration (i.e. the case management intervention lasts as long as the FOP is in the project).

Three projects declare adapting the intensity of the intervention of the project following the needs of the FOP. For the project declaring providing case management every day in a residential, the FOP remains, on average, 26 days in the project.

Additional services provided, along with case management include among the six projects, healthcare services in a residential setting, except one project, delivering night care at home. Those services are delivered by a team, except for two projects. In the latter projects, one project delivers night care by the means of volunteers, the other delivers night surveillance by the means of nursing assistants. In-depth study of the night care projects provided information about the fact that, for these projects, the night care accommodation was relatively poorly used and served the purpose of 'crisis accommodation'. Overall, the FOPs seem to prefer to remain at home during the night, if possible, as reported by the project members.

Three projects can be considered as a subgroup within the group of projects providing case management with night/or residential care, as they specifically target FOP recently discharged from a hospital and with a intervention duration less than one month.

Along with the delivery of case management and residential and/or night care, three projects also deliver occupational therapy as well and, in that case, the occupational therapy is delivered by an occupational therapist, which is paid by the project. Out of these three projects, two deliver this occupational therapy at home, while occupational therapy is provided outside the home for one project. This raises some questions about the possible adaptation of the home, which is one of the main purposes of the service.

One project delivers psychological support. This service targets FOP which underwent chemotherapy or, for a limited period, FOP in crisis situation. This service is provided by a psychologist, paid by the project.

Three of those projects also deliver physiotherapy, either in group sessions in a residential centre, or through individual sessions, for falls prevention. Those three projects have a strong rehabilitation focus, as they exclusively recruit FOP from hospitals, have a short duration (max 31 days and a very low case manager to FOP ratio), as will be described below

One project hired a dietician (0.25 FTE) to deliver nutritional support to FOP being at risk of malnutrition or malnourished.

Four projects offer **case management, together with psychological or psychosocial support**, sometimes combined with occupational therapy and, in one case, with nutritional support.

Two projects focus on the support to frontline care providers caring for FOPs. One provides psychological support, including counselling, coordination meetings, diagnosis and trainings for frontline workers. The other is situated at the level of the frontline network support, by means of a multidisciplinary cell, and its intervention is done 'where the request comes from'. The project defines its intervention as a way of '*coordinating the network by coordination meetings*'. The other project coordinates the global offer of services for an individual (her/his network), with a special focus on communication between the healthcare providers, by means of a care plan or adapted support, which is regularly evaluated and adapted, if needed.

Two projects provide light form of case management (one is unsure that it actually provides it). These projects organize meetings for coordination. They concern the organisation of interventions around an individual FOP. They may include the FOP, her/his ICG, case manager and other care providers. These meetings are mainly organized at the FOP's home and are different than visits at home for usual care.

One project changed in the type of service delivered. They decided to add activities to support the socialization process of the FOP (by the means of a community nurse).

5.4.2 The beneficiaries

Table 15 and 16 below show the scores of the beneficiaries, at inclusion, per subtype of case management projects. Proportions are presented with confidence interval; median with percentile 25 and 75 intervals.

For low impaired group, proportion with DRS≥3 is very low for beneficiaries of project with case management and residential services post-hospitalisation. It is however high for beneficiaries from project with case management and psychological services. Logically, the beneficiaries of these projects have also a worse perceived quality of life. Finally the beneficiaries from these projects have the lowest proportion having an informal caregiver. When they have an ICG, a high proportion of them have a ZBI-12≥10.

Proportion with IADL≥24 is high for beneficiaries from CM OT for visually impaired FOPs, and even more for CM with residential services post hospitalization.

For high impaired group, the beneficiaries from projects with case management and residential services post-hospitalisation are relatively different from the others. They have lower proportion of DRS≥3, ZBI-12≥10, CPS≥3 but higher proportion of ADL≥3 and IADL≥24. A high proportion of them live alone at home. Beneficiaries from project with case management provided without other services have a low proportion of ADL≥3 and IADL≥24. They have a bad quality of life and a high proportion of them living alone, eventually with ICG. When there are ICG, a very high proportion of them suffer from burden (ZBI-12≥10).

Among beneficiaries from CM OT for visually impaired FOPs, there is a low proportion of them with CPS≥3 and a low proportion of ICG with burden. Amongst, people benefiting from project of CM with OT and Psychosocial support there is a higher proportion with DRS scale more or equal to 3, with a CPS scale more or equal to 3. Finally, people benefiting from project of CM with psychosocial support have the worse perceived quality of life at admission. A high proportion of their ICG have a ZBI-12 more than 10.

Table 15 : characteristics of low impaired beneficiaries of different class of case management

	Low impaired CM OT for visually impaired	Low impaired CM& OT only all	Low impaired CM OT & physio all	CM resident posthosp	All CM & psycho	Comparison low impaired group BelRAI
Median Age (P25-P75)	80 (76-85) n=117	81 (76-86) n=302	83 (78-86) n=126	81 (76-85) n=832	78.2 (72-84) n=249	80 (76-85) n=283
Proportion DRS ≥3 [CI95%]	32.17% [0.23 ; 0.41] n=115	33.56% [0.28 ; 0.39] n =295	32.23% [0.24 ; 0.41] n = 121	2.8% [0.02 ; 0.04] n=825	50.6% [0.44 ; 0.57] N = 239	26.5% [21.1 ; 31.9] n = 260
Proportion ADL ≥3 [CI95%]	0	0	0	0	0	0
IADL≥24 [CI95%]	66.37% [0.57; 0.75] n = 113	58.3% [0.52 ; 0.64] N = 259	45.6% [0.36 ; 0.55] n = 114	76.4% [0.73 ; 0.79] n = 823	35.57% [0.29 ; 0.42] N = 194	51.1% [44.5 ; 57.7] N=227
CPS ≥3 [CI95%]	0	0	0	0	0	0
Median WHO-QoL (P25-P75)	32 (27-36) n=115	28 (24-34) n=285	29 (24-33) n=107	28 (25-33) n=778	35 (29-41) n=224	24 (29-34) n=202
Proportion of ZBI-12 ≥10 [CI95%]	43.04% [0.32 ; 0.55] n = 79	37.5% [0.31 ; 0.44] n =208	41.8% [0.31 ; 0.52] N = 86	56.14% [0.52 ; 0.60] N = 627	75.00 [0.66 ; 0.84] N=96	47.8% [37.4 ; 58.2] n = 92
Ratio male / Female	28.2% [19.9; 36.5] n=117	34.8% [29.4; 40.2] n=302	36.6% [27.9; 45.2] n=123	24.2% [21.2; 27.1] n=832	30.5% [24.8; 36.3] n=249	26.5% [21.3, 31.7] n=283
Proportion living alone [CI 95%]	60.0% [50.9; 69.1] n=115	59.3% [53.7; 64.9] n=295	45.9% [36.9; 54.9] n=122	74.6% [71.6; 77.5] n=830	54.9% [48.6; 61.3] n=242	66.7% [61.1, 72.2] n= 279
Proportion with informal caregiver [CI95%]	73.9% [65.8; 82.1] n=115	75.1% [70.1; 80.1] n=293	85.8% [79.5; 92.2] n=120	78.6% [75.8; 81.4] n=828	64.2% [58.1; 70.3] n=240	74.5% [69.4, 79.7] n= 275

Table 16 : : characteristics of low impaired beneficiaries of different class of case management

	Case management solo	High impaired CM& OT only all	High impaired CM OT & physio all	CM resident posthosp	CM residential	All CM & psycho	Comparison high impaired group BelRAI
Median Age (P25-P75)	80 (75-86) n=95	83 (78-87) n=426	82 (77-86) n=256	81 (77-86) n=464	82 (77-87) n=450	78.6 (73-84) n=187	81 (76-86) n=322
Proportion DRS ≥3 [CI95%]	32.6% [22.8; 42.3] n=92	36.38% [0.32 ; 0.41] n = 415	37.45% [0 .31 ; 0.43] N = 251	5.63% [0.03 ; 0.08] n = 462	33.41% [0.29 ; 0.38] n = 437	66.30% [0.59 ; 0.73] N = 184	41.1% [35.5 ; 46.6] n = 302
Proportion ADL ≥3 [CI95%]	56.8% [46.7; 67.0] n=95	83.8% [0.80 ; 0.87] n=426	78.51% [0.73 ; 0.83] N = 256	94.61% [0.93 ; 0.97] n = 464	85.1% [0.82 ; 0.88] n = 450	48.12% [0.41 ; 0.55] n=187	74.3% [69.5 ; 79.1] n = 323
IADL≥24 [CI95%]	61.4% [50.8; 72.1] n=83	92.2% [0.89 ; 0.95] N = 297	83.94 [0.79 ; 0.88] N = 249	94.27% [0.92 ; 0.96] n = 454	91% [0.88 ; 0.94] n=322	77.63% [0.71 ; 0.84] n = 152	91% [87.6 ; 94.4] n = 278
CPS ≥3 [CI95%]	63.5% [53.1; 74.0] n=85	50.71% [0.46 ; 0.55] n = 422	62.95% [0.57 ; 0.69] N = 251	14.35% [0.11 ; 0.18] n = 460	55.7% [0.51 ; 0.60] n = 438	77.27 [0.71 ; 0.84] n = 176	65.9% [60.6 ; 71.2] n = 314
Median WHO-QoL (P25-P75)	35.5 (32-41) n=76	28 (24-34) n=318	29.5 (24-35) n=166	29 (26-33) n=424	29 (26-33) n=290	35 (30-40) n=141	34 (30-38) n=149
Proportion of ZBI-12 ≥10 [CI95%]	90.5% [81.2; 99.7] n=42	47.2 [41.6; 52.7] n=318	61.6% [54.8; 68.4] n=198	52.16% [0.47 ; 0.57] n = 347	62.54% [0.57 ; 0.68] n = 331	77.42% [69.9; 84.9] n=124	80.7% [75.7 ; 85.7] N=238
Ratio male / Female	38.9% [29.0; 48.9] n=95	31.0% [26.6; 35.4] n=426	33.2% [27.4; 39.0] n=256	24.6% (20.6; 28.5] n=464	32.9% [28.5; 37.2] n=450	35.8 [28.9; 42.8] n=187	40.4% [34.9, 45.8] n=377
Proportion living alone [CI 95%]	64.2% [54.4; 74.0] n= 90	45.9% [41.1; 50.6] n= 423	40.2% [34.2; 46.3] n=256	63.3% [58.9; 67.7] n=463	47.9% [43.2; 52.5] n=443	36.9% [29.9; 43.9] n=184	35.4% [30.1, 40.7] n=316
Proportion with informal caregiver [CI95%]	63.3% [53.2; 73.5] n=90	85.6% [82.2; 89.0] n= 417	93.8% [90.8; 96.7] n=256	79.2% [75.5; 82.9] n=461	91.5% [88.9; 94.1] n=445	83.5% [78.1; 88.9] n=182	88.1% [84.4, 91.7] n=310

5.4.3 The condition for implementation

5.4.3.1 Characteristics of workforce

In the projects with **case management delivered alone**, the profile and the training of professionals varied across them and tended to be more social worker-sided (so a non-medical approach), as opposed to nursing case management. Only one project included specifically a nurse case manager.

Specific training for case management was seen as crucial in order to carry out the various functions of a case manager (assessing, planning, coordinating, monitoring and evaluating). While there is no specific case management training in Belgium, one project managed to train their collaborators abroad (in Germany, where the function is well-implemented in the healthcare system).

The case manager to FOP ratio varied from 1:11 to 1:63 in this subcategory. The project having a higher CM to FOP ratio is described in a case study. According to the professionals of the project, the internal organisation is highly structured around homemade software, that allows fluent information flow about FOP's data and services and care needed, but also provides reminders and information about local resources.

Intervisions between professionals were present in the projects and seen as highly important to the ongoing training of case managers. In all but one project, this intervision was supervised by a professional external to the project (mostly physicians);

Case managers were trained in all projects and in two projects, this training was given by teachers outside the project

Except for one project, all projects experienced a turnover of their case managers. Further analysis should eventually explore if this dimension is also crucial for case management providing also other services, as these other (direct) healthcare services might enable to build trusting relationships between FOPs and ICGs, but also with other professionals.

In the project providing **Case management in combination with occupational and physiotherapy** case management is carried out by nurses (two projects); a team of nurses and occupational therapists (one project); nurses and social workers (three projects) or social workers and occupational therapist (one project). Only one project did not include nurses for case management

All projects preferred to recruit experienced nurses. This experience may be related to the work with frail older persons and/or cared for at home, or with case management. As project coordinators were eager to recruit professionals who were more likely to support successful case management, some projects delayed the start of their intervention.

The intensity of the intervention is systematically adapted to the needs of the situation; there is no such thing as "one size fits all" activities of case management. We have some hunches that the intensity was also lowered when the workload was too high, as during interviews, the members of the projects switched from systematic home visits to phone calls to monitor the situation.

The case manager to FOP ratio varied from 1:9,6 to 1:67. The project having a case manager to FOP ratio of 1:67 (the first project of the case study) estimates that this number is too high and that they are not able to perform case management in optimal conditions. Indeed, to be able to face the high workload that is a consequence of too many cases per case manager, this project reduced the

number of contacts with FOP, in order to allow them to be maintained in the project, even at a suboptimal level.

Three out of the seven project organized internal training sessions in case management, focusing on the use of the results of the global individualized assessment in a patient-centred care plan during intervision sessions held at the provincial level. The other project organized intervisions, but not specifically aimed at improving case management skills. One project that did not organize such training recruited since the start, and purposefully, an experienced, highly skilled geriatric nurse. As she had formerly a leading role in the internal geriatric liaison team in a teaching hospital, she experienced the implementation of the comprehensive geriatric assessment tool (BelRAI) before, which was highly valued by the project coordinator who recruited her.

Only two projects did not report any turnover of their case managers.

Occupational, speech and physiotherapy were delivered by the appropriate professionals.

For projects providing **case management in combination with residential or night care**, case management was delivered either by a nurse (two projects), or a team composed by a nurse + social worker (four projects).

Only one project declared having organised – and is still organising - a specific training for the use of the results of BelRAI (CAPs, scales and health profiles) for case management's purposes (together with two other Protocol3 projects). A more 'basic' training has also been provided for case managers, for this project, relating to the multidisciplinary use of the BelRAI. Moreover, intervisions, organized at provincial level are also found very useful in this aspect. This project is providing a continuous coaching of project collaborators, in order to streamline multidisciplinary practices.

In the three projects taking care of FOPs who were recently discharged from hospitals, the case manager to FOP ratio was significantly lower than in the other projects of this subcategory (1:2 versus 1:20), probably explained by the lower duration of the intervention (less than one month versus permanently included) and thus, a very high patient turnover rate.

For the five projects providing **case management in combination with psychological or psychosocial support**, two use a dyad of professionals, social worker/nursing assistant, social worker/ nurse for case management; three hired nurses.

The ratio FOP per full time equivalent varied highly, from one for 13 FOPs (the lowest) to one for 37 FOPs. The project with the highest CM to FOP ratio was the project with the lowest proportion of FOP with cognitive problems, as defined by the percentage of FOP with a CPS>3. The caseload per case manager was below 40 for all projects. This ratio might indicate an adequate workload and thus probably sufficient resources to provide high-intensity case management. All the projects of this category reported that they organised a specific training for the case managers by an external teacher.

An extra psychologist was recruited by one project, because the workload was so high with one psychologist that the waiting times for the FOPs were unacceptably long;

5.4.3.2 Characteristics of clinical (and organizational) information tools)

Among projects providing **case management delivered alone**, all used diverse data collection tools of FOP data, including FOP record on paper (n=2) or electronically; a notebook at home (n=1), etc. One

project developed specific software, in order to collect and share information about FOPs, whether they were included in the project or not[36].

In one project, special management software was designed. According to the professionals of the project, the internal organisation is highly structured around that software (see above). It allows fluent information flow about FOP's data and services and care needed, but also provides reminders and information about local resources. Moreover, this tool, which is constantly evolving as the project goes on, allows a careful monitoring of the functioning of the project. This came, of course, with a high cost (estimated at two days' working per month).

Those projects did not use the results of BelRAI for care planning's purposes. One project stood out as to the organisation of the information flow amongst professionals in the project, as it had coupled its electronic health record with a software for the project's' management.

Out of the seven projects providing **case management in combination with occupational and physiotherapy**, six declare to use BelRAI results to identify the needs of the FOP (CAPs and results of scales) and all make up a care plan, which is evaluated at 'regular' intervals (at least every six months, which corresponds to the NIHDI requirements in the scope of the scientific evaluation).
Two projects reported having a ICT tool to facilitate the information flow about the coordination management of the care needed.
Among the project providing **case management in combination with residential or night care,** all six projects claim to use the results of BelRAI to identify FOP's needs (CAPs and results of scales) and all make care plans, that are 'regularly' monitored (at least every six months, except for one project, which claims to do it only yearly).

The information flow around an individual FOP occurs mainly by means of informal circuits, such as by telephone or email, along with the notebook at the FOP's home. Out of the six projects, three have an electronic patient record, allowing the sharing of information within the project. Three projects claim that they miss a shared patient record, among healthcare providers working with the FOP (across organisations).

For the project providing **case management in combination with psychological or psychosocial support**, the BelRAI is filled out by multiple professionals in four out of five projects and in one project by a single professional (nurse). In one this completion is even done across settings (i.e. by professionals outside the project, the project of the case study). None of the projects use the results of this comprehensive assessment to make the care plan and the rationale for not using the results of the BelRAI are very diverse/creative, according to the projects, going from the fact that BelRAI-HC is not suited for home care to the filling out in paper version and the CAPs not being available in real time for care planning.

5.4.3.3 Tailored delivery system design:

It can be expected that case management projects providing **case management delivered alone**, without additional services have more intense interactions with their local context in which they were embedded. In this aspect, two models were present; either the project was a new service of an umbrella organisation that already offered a set of services, or as a dedicated and new service.

Three out of the four projects had interactions with the local coordination centres and centres for public welfare. Interestingly, the project that had no formal contacts with those entities had to stop because it did not achieve this caseload.

[36] This project was part of the case study and the software will be described further in this chapter.

Collaboration with the GPs was very diverse, but in general poor. In two of the projects, the GP was systematically included in the case management process. In one other project, the GP was only sideways informed about the FOP being in the project. In the last project, the collaboration with the GP was described as 'difficult'. This project recognized that they really needed time to know the local (health) care resources, build trust and be known by the local providers and target population.

One project observed that the interaction with the local nurse organisation was not easy, because of overlapping coordination: when the FOPs already benefited from home nursing services, this came along with a certain level of coordination that was provided by the organisation to which this nursing service belonged. Therefore, the referral of this organisation was not so good as expected.

All seven projects providing **case management in combination with occupational and physiotherapy** seem to have some interactions with the local coordination centre (SISD/GDT) they are part of, except for one project, where the case managers attended coordination meetings initiated by the coordination centre. This project mentions technical interoperability issues between the BelRAI server and the software of the coordination centre. This was a barrier to information flow between the project and the coordination centre. Four other projects declare receiving the support of a coordinator of a sickness fund to help them in their case management care delivery.

At the level of coordination around a single FOP, the collaboration with the GPs was quite diverse. Two projects report that their collaboration with the GP was very low and two others, that it was satisfactory. For the latter, this can be verified by the systematic attending of multidisciplinary meetings by GPs at FOPs' home. One project seems to be tightly (exclusively ?) linked to the umbrella organisation and only mentions meetings with representatives of this organisation for coordination, while a project signals that they attend meetings, which are organized at the hospital, before discharge of the FOP.

Two projects merely interact with the Social Centre for Public Support and sickness funds, which might be seen as a proxy of a higher level of embeddedness in the local network. It is noteworthy that one of the projects, which declared a low level of embeddedness (and is part of the case study), declares also that its intervention is perceived as too intrusive by the other disciplines.

All six projects providing **case management in combination with residential or night care** have an important 'coordination' output. This might be explained by the fact that they offer a range of services, needing coordination between professionals within the project. Mostly, coordination of the healthcare around a given FOP starts during hospitalization for two of these projects; another project starts coordination in a residential setting. For the other projects, except one, the meetings conducted for the organisation and coordination of healthcare is done at the FOP's home. For the last project, no meeting around an individual patient was reported. The informal caregiver is involved in all these projects, when possible, during coordination meetings.

The five projects **providing case management in combination with psychological or psychosocial support** had an organisation for home nursing care or coordination centre as umbrella organisation. Except for one, all projects had structural relationships with a coordination centre and three projects had a structural link with a mental health centre, which was considered important for the psychologists of the project, because of the expertise provided in this area.

The agreements between partners had to be refined to include an expertise centre for dementia, in order to support the working of the steering committee of the project (one project). For another project, the services were not needed (e.g. cultural services offered by a nursing home were not acceptable for the FOPs)

In all but one project, intervisions were organised and included a supervisor and one project reported the presence of a geriatrician or physician during those intervisions.

Except for one project, all projects reported replacement of at least one case manager(s). The partnership with coordination services, supporting the continuity of care with other agencies organising home care, was also inconsistent, as only two projects had formal and operational partnerships with home (health) care agencies. The level of interaction with GPs also appears to be rather low for this subgroup of projects. This is also the project with the lowest reported turnover rate.

5.4.4 Results of the intervention (uptake, cost and outcome)

Two of the projects with **case management delivered as a stand-alone** (so without other services) were dropped from the statistical analysis because they were included in the comparison group (cheap and low effective project cost and low). The two others did not fill properly BelRAI instrument in such a way that statistical analysis cannot be done for this group. One of them has to stop because caseload was too low.

5.4.4.1 Uptake of beneficiaries

One of these projects with **case management delivered as a stand-alone** had to stop in December 2012, because it did not achieve the foreseen caseload. This project stated that there was no demand for the case management services they offered to the population and that they had overestimated the size of the target population.

The three other projects of this category had sufficient demands, two of them having even an excessive demand, in comparison with their resources. They had a very hard time to engage independent nurses and primary care physicians of the FOP to cooperate with the project and, as a consequence, had difficulty to reach its caseload. However, suddenly the referrals increased and the project could function as expected. The reason for this sudden 'success' was explained by the project because (1) the project needed time to get know by local care providers and that the referrals were only made after a while, but also (2) because they changed their inclusion criteria and included also FOP without a disability (FOPs with a recognized handicap was a first inclusion criteria before).

Only one of the 5 projects providing **case management in combination with psychological or psychosocial support** had problems to achieve their caseload and asked to change their convention accordingly (from 65 to 60 FOP). These projects adapted frequently their exclusion criteria, to be able to care and support FOPs who are most likely to benefit from their intervention (e.g. FOPs with severe psychiatric disorders or homeless FOPs) but also changing of inclusion criteria for the same reason (e.g. including FOPs who did not receive a nursing lump sum (because they did not needed nursing care) but however needed care of this type of project);
Strategies to reach their caseload in terms of number of FOPs with data in BelRAI included the adaptation of their discourse by making the information about the psychological support, provided along with case management, look less threatening and expanding of the catchment area, in order to be able to reach the caseload (one project);

5.4.4.2 Cost and outcome

For low impaired group there are no results for the projects with CM alone: 2 of them have been included in the control group and the others have too many missing values and therefore too few values available.

Results for beneficiaries with a low level of impairment included in case management projects are as follow. Beneficiaries from case management with occupational therapy for visually impaired FOPs have a reduced risk for depression (DRS) and a reduced risk to be institutionalised compared to control group. Beneficiaries from case management with occupational therapy have a reduced risk to be institutionalised compared to control group. Beneficiaries from case management with occupational therapy and physiotherapy have a reduced risk for depression compared to control group. Beneficiaries from case management with occupational therapy or with psychotherapy have a lot of missing values, which cannot be explained by deaths or institutionalisation. Beneficiaries from case management with residential care post-hospitalisation have a reduced risk for depression, a reduced risk for functional decline (ADL and IADL), and a reduced risk to be institutionalised compared to control group. Finally, beneficiaries from case management with psychological services have a reduced risk of depression and a reduced risk to institutionalized in comparison with control group.

For low impaired beneficiaries, the total cost of the healthcare support is almost equally divided between the cost of the projects and the cost of NPS. All project types have no significant impact on the cost after 6 month except for the project of case management post hospitalization with an increase compared to the control group. For this type of projects, population might differ from the control group as, in majority; beneficiaries are recruited at hospital discharge.
For low impaired beneficiaries, the time spent on care giving by the informal caregiver varies between 1.9 to 3.6 hours per day, in average, over a period of 6 months after entry date in projects. There is no significant variation of daily time between the first evaluation at entry date and the second one.

Results for beneficiaries with a high level of impairment included in case management projects are as follow. Beneficiaries from projects of case management in a residential care setting or with night care after a hospitalisation have a reduced risk of depression; a reduced risk of functional decline (ADL); and a reduced risk of institutionalisation compared to control group. Beneficiaries from projects of case management with services in a residential care setting or with night care have a reduced risk of depression and a reduced risk of institutionalization compared to control group. Beneficiaries from case management with occupational and physiotherapy have an increased risk of functional decline (ADL) compared to control group.

Total cost of the healthcare support is high for CM with residential services. It is relatively lower for CM resident post-hospitalization and CM OT and psycho.

For high impaired beneficiaries, the most important cost is the daily of cost for NPS, varying between 14,1 to 21,9 euro. Projects targeting patients at hospital discharge, CM resident post-hospitalization, have the lowest cost of NPS as patients may experience more acute health problem than chronic impairment (OR for ADL≥3 = 0.30 and is statistically significant). Nevertheless, the positive variation of the NPS cost for CM with residential care post-hospitalisation is still significant as the increase is probably due to hospitalisation.
For the projects CM OT and psycho, the increase of the NPS cost cannot be explained by an increase of ADL or IADL difficulties (OR not significant). Two other explanations are possible:

- Beneficiaries of these projects may experience particular changes of the health status not considered in the modelling which could explain an increase of NPS costs.
- Projects may better identified the health care needs for nursing and thus induce an increase of nursing care, all things being equal.

The projects of CM OT and physio are interesting because the significant increase of the cost of NPS is consistent with the significant increase of beneficiaries with important problems with ADL (ADL>=3).

Despite the significant increase, the averages daily of NPS for these projects with a significant increase still remain lower (between 14,6 to 18,2)to other projects which experience any change (19.5; 21.9 euro).

The average daily time of informal care varies between 3 hours (CM resident posthosp) to 12 hours (CM psycho & OT). The 3 hour for CM resident posthosp is an outlier value as the means of other projects types is above 5.5 hours despite the high proportion of beneficiaries with severe functional problems (more than 90% with ADL>=3 and/or IADL>=24). The relative low level of daily time estimated for these projects is consistent with the functional improvement (OR ADL≥3 at the 2nd measurement 0.1) whilst there is no significant improvement in the other project types.
For the project of CM psycho & OT, the high mean daily time of ICG is mostly explained by the high proportion of beneficiaries with severe cognitive problems which is also associated with a high burden of ICG.

There is no significant variation of daily time between the first evaluation at entry date and the second one.

Table 17: results for DRS, ADL and IADL after 6 months for low impaired beneficiaries from case management projects

	CM alone	Low impaired CM OT for visually impaired	Low impaired CM& OT only all	Low impaired CM OT & physio all	CM resident posthosp	CM psy all	Comparison low impaired group BelRAI
OR DRS≥3 at 2nd measurement[37]	No results	0.39* [0.15 ; 0.99] N=135	0.54 [0.27 ; 1.09] N = 208	0.25* [0.08 ; 0.80] N=130	0.38* [0.16 ; 0.89] N = 162	0.36* [0.14 ; 0.91]	1
Missing total	*50%*	*16%*	*26%*	*22%*	*1%*	*44%*	*32%*
Missing not known	*50%*	*11.4%*	*18.2%*	*15.4%*	*1%*	*37.4%*	*30.65%*
OR ADL≥3 at 2nd measurement[38]	No results	0.65 [0.09 ; 4.4] N = 76	NS	2.13 [0.7 ; 6.48]	0.1* [0.03 ; 0.27]	0.96 [0.3 ; 3.06]	1
Missing total	*50%*	*15%*	*26%*	*22%*	*2%*	*45%*	*29%*
Missing not known	*50%*	*10.5%*	*18.2%*	*16.72%*	*2%*	*38.25*	*28.71%*
OR IADL≥24 at 2nd measurement[39]	No results	2.9 [0.76 ; 10.9] N = 121	NS	0.63 [0.19 ; 2.08] N = 115	0.22* [0.12 ; 0.38]	0.46 [0.15 ; 1.33]	1

Table 18: results for RR of institutionalization after 6 months for low impaired beneficiaries from case management projects

	Case management solo	Low impaired CM OT for visually impaired	Low impaired CM& OT only all	Low impaired CM OT & physio all	CM resident posthosp	All CM psy together	Comparison low impaired group IMA-AIM
RR of definitive institutionalization at 6 months	No results	0.06* [0.01 ; 0.45]	0.22* [0.06 ; 0.74]	0.15 [0.02 ; 1.16]	0.37* [0.18 ; 0.73]	0.09* [0.01 ; 0.71]	1
RR of death at home at 6 months	No results	0,73 [0,23; 2,25]	0,89 [0,45; 1,74]	0,65 [0,21; 2,01]	1,24 [0,88; 1,75]	0 .58 [0.22 ; 1.59]	1

[37] With DRS1
[38] With ADL OR siadlp1 kept
[39] With IADL kept

Table 19: results for cost over 6 months for low impaired beneficiaries from case management projects

Per beneficiary		Case management solo	Low impaired CM OT for blind	Low impaired CM& OT only all	Low impaired CM OT & physio all	Low impaired CM Psy	CM resident posthosp	Comparison low impaired group EPS
Daily cost of the projects*			7,6	7,1	5,2	5.9	6,3	0
Daily** mean cost for the nursing , physio and speech therapy at home[40] after intervention over 6 months	NIHDI	9.3 (few values)	3,5 (NS)	6,7 (NS)	5,8 (NS)	5.8 (Sign+)	7,1 (Sign+)	2.6
	Patient		0,12 (NS)	0,28 (NS)	0,21 (NS)	0.32 (NS)	0,45 (Sign+)	0,26
Total daily mean cost of the healthcare support			11.1	13.8	11	12	13.4	11.1
Daily mean cost for hospitalization (no confounding variables)	NIHDI	17.6 (few values)	3,9 (NS)	7,1 (NS)	7,7 (NS)	8.45	13,6 (NS)	6,0
	Patient		0,34 (NS)	0,95 (NS)	1,11 (NS)	1.3	1,7 (NS)	0,78
Time of informal care at follow up (hours/day) Mean Median (p25 – p75)		2.34 (NS) 1.43 (0.29 – 3.00)	3.61 1.43 (NS) (0.57-4)	2.53 1 (NS) (0.5-2)	2.24 1 (NS) (0.5-2)	1 (NS) (0.43-3.42)	1.89 (NS) 0.86 (0.57-1.43)	3.44*** 1.07 (0.57 – 2.79)

*N.B. The cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).

**at home

*** Comparison with the BelRAI control group

[40] Nursing lump sum A, B and death in the 6 month after intervention as significant confounding

Table 20 : results for DRS, ADL and IADL after 6 months for high impaired beneficiaries from case management projects

	Case management solo	High impaired CM& OT only all	High impaired CM OT & physio all	CM resident posthosp	CM residential	All CM & psycho	Comparison high impaired group BelRAI
OR DRS≥3 at 2nd measurement[41]		0.72 [0.44 ; 1.19]	0.83 [0.48 ; 1.44]	0.25* [0.12 ; 0.51]	0.59* [0.35 ; 0.99]	1.06 [0.58 ; 1.94]	1
Missing total	*50%*	*35%*	*26%*	*5%*	*38%*	*43%*	*49%*
Missing not known	*14,50%*	*24.85%*	*18.46%*	*1.45%*	*27%*	*32.25%*	*34.79%*
OR ADL≥3 at 2nd measurement[42]		1.38 [0.71 ; 2.68]	2.33* [1.21 ; 4.46]	0.30* [0.19 ; 0.51]	3.39 [1.59 ; 7.23]	0.55 [0.28 ; 1.08]	1
Missing total	*50%*	*35%*	*27%*	*5%*	*38%*	*44%*	*47%*
Missing not known	*14,50%*	*24.15%*	*19.17%*	*1.45%*	*27%*	*33%*	*32.43%*
OR IADL≥24 at 2nd measurement[43]		0.56 [0.15 ; 2.12] N =302	1.48 [035 ; 6.2] N = 239	0.51 [0.16 ; 1.6]	0.36 [0.10 ; 1.23]	0.52 [0.15 ; 1.83]	1

Table 21 : results for RR of institutionalization after 6 months for high impaired beneficiaries from case management projects

		High impaired CM& OT only all	High impaired CM OT & physio all	CM resident posthosp	CM residential	All CM & psycho	Comparison high impaired group BelRAI
RR of definitive institutionalization at 6 months[44]		0.94 [0.5 ; 1.76]	0.86 [0.41 ; 1.83]	0.31* [0.18 ; 0.55]	0.66* [0.43 ; 0.99]	1.1 [0.5 ; 2,44]	1
RR of death at home at 6 months		0.99 [0.65 ; 1.50]	0.68 [0.38 ; 1.23]	0.92 [0.49 ; 1.74]	0.79 [0.50 ; 1.23]	0.29 [0.14 ; 0.61]	1

[41] With DRS1
[42] With ADL siadlp1 kept + scps for CMOT and psy
[43] With IADL kept + Zarit for CMOT & phys
[44] With forfA dementia out of forfB, C and costNKL

Table 22: results for cost over 6 months for high impaired beneficiaries from case management projects

Per beneficiary		High impaired CM& OT only all	High impaired CM OT & physio all	CM resident posthosp	CM residential	High impaired CM psycho	Comparison high impaired group IMA-AIM
Daily mean cost of the projects *		7,2	6,4	6,4	13,2	4,6	0
Daily** mean cost for the nursing , physio and speech therapy at home[45] after intervention over 6 months	NIHDI	21,9 (NS)	18,2 (Sign+)	13,5 (Sign+)	19,5 (NS)	14,6[46] (Sign+)	11,7 (-1,3)
	Patient	0,57 (Sign+)	0,35 (NS)	0,6 (Sign+)	0,37 (NS)	0,38 (NS)	0,29
Total daily mean cost of the healthcare support		29.7	25	21.1	34		
Daily mean cost for hospitalization [47] after intervention over 6 months (no confounding variables)	NIHDI	10,8 (NS)	9 (NS)	16,6 (NS)	8,9 (NS)	12,1 (NS)	5
	Patient	1,1 (NS)	1,24 (NS)	1,8 (NS)	1,27 (NS)	2.1 (NS)	0,74
Time of informal care at follow up (hours/day) Mean Median (p25 – p75)		6.43 2 (0.71-6)	7.06 2 (1-10.3)	3.03 1.14 (0.57 – 2.86)	5.49 2 (0.86-6)	12.30 10 (2-24)	6.15 3,44*** (1.14 – 8)

*N.B. Cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).

** At home

*** Comparison with the BelRAI control group

[45] Nursing lump sum A, B and sometimes the cost of hospitalization over 6 months before entry date in projects as significant confounding

[46] No confounding variable

[47] Confounding variables tested are not significant for modelling the cost variation of hospitalisations before and after

5.5 The projects providing psychological services

5.5.1 The intervention

The projects delivering psychological, psychosocial support or psychotherapy at home by a trained psychologist or psychotherapist share the same aim: to maintain frail older people in their homes by providing psychological support to the older people and their informal caregivers. These projects have as care objectives**:** to sensitise and prevent crisis situations by early interventions, fill in the gaps in the existing healthcare system, ensure continuity of care, lower the threshold to psychological services and provide support and psychological expertise to other first line healthcare workers.

All projects offer **individual psychological interventions** to the FOP (and/or their informal caregiver) in their homes. The content of these interventions vary from real psychological support like psychological consultations, psychotherapy, writing life review and psycho-education to sometimes more psychosocial or just social support like giving information about existing healthcare and social services and practical advice. Two projects report to stimulate the FOP to have more social contacts. Only one project organises **psycho-education for groups** to facilitate the FOP to exchange experiences with peers. When advisable and with permission of the FOP, others like ICG's or family members can be invited to the individual psychological consultations. For example to resolve a conflict or strengthen the family ties. All but one project support the ICG directly or indirectly. Three projects mention to **support directly the informal caregiver** by offering consultations to them and this, despite the fact that NIHDI did not allow the projects to exclusively target informal caregivers. This seems an interesting move because, especially projects targeting FOP with dementia will be more likely to have success if they do target the ICG directly. Four projects only invite the ICG to join a session together with the FOP if it is relevant for the FOP's therapy; for example to resolve a conflict between the FOP and the ICG. The other 4 projects offer the opportunity to the ICG to have sessions on their own. These sessions can be standardized therapeutic interventions or just non-standardized support or advice. Decreasing stress or burden in the ICG will have an indirect effect on the FOP.

Most projects organize mono- or multidisciplinary team meetings, both internally with the project staff, as well as with external professionals or organizations. During these meetings, individual clients are discussed and the existing care and necessary care is coordinated. One project indicates that, although it is a large time investment, this type of meeting is very useful and necessary for proper functioning of the project. The frequency of client meetings is very variable between projects. In most of them, meetings where individual clients are discussed happen monthly or more frequently. Meetings about one individual client take mainly place at the project office or at the client's home.

Most projects did not plan a limited duration of the intervention. FOPs stay in the project as long as necessary. Three projects have set a limit of 6 months. The three case studies adapted all their planned number of sessions per client based on their experiences. Basically they observed that the duration and the frequency of the intervention needed to be adapted to each beneficiary.

Clients that need more psychological support after the maximum of sessions or have too acute or severe psychological needs are being referred to a mental health centre in all 3 case studies.

Some projects planned to support the ICG as well but noticed that the percentage of FOP with an ICG is lower than expected.

5.5.2 The beneficiaries

There is a link between the proposed intervention and the type of population that is targeted by the projects. Three projects stated in their inclusion criteria that the FOP had to be able (cognitively and verbally) to have a (therapeutic) conversation with the psychologist or other professional. In these three projects the percentage of FOP with a high CPS score is the lowest. The 2 projects that have the highest proportion of 'high-CPS'-FOP are the projects that target especially FOP with dementia and their ICG. The intervention in these 2 projects is more targeted towards supporting the ICG.
These psychological projects target FOP who are 60+ and suffering from non-complex psychosocial problems and their ICG. The most common complaints are early stage of dementia, depression, mourning, loneliness and fear. FOPs are frail in terms of psychosocial factors but they need to have some good level of independence and in some projects be verbally and cognitively able to have a conversation with the therapist. It is important that the FOP is motivated, that he has a positive attitude towards psychosocial support and that he has disease awareness. Many FOPs in these projects have a very small or no social network.
Two projects of psychological support have been included in the control group for low impaired population. Three projects have been included for the highly impaired control group
In the lower impaired group, the population benefiting from psycho project have a higher proportion of people with depression, lower proportion of people with IADLp problems. There is also a higher proportion of ICG suffer from burden, though a relatively low proportion of beneficiaries have an ICG.
The same is observed for beneficiaries from highly impaired group except that more of these beneficiaries have an ICG

Table 23 : characteristics of beneficiaries from low impaired group

	psycho all	Comparison low impaired group BelRAI
Median Age (P25-P75)	77 (72-82) n=186	80 (76-85) n=283
Proportion DRS ≥3	62.6% [0.55 ; 0.7] N=182	26.5% [21.1 ; 31.9] n = 260
Proportion ADL ≥3	0	0
IADL≥24	31.64% [0.24 ; 0.4] N= 158	51.1% [44.5 ; 57.7] N=227
CPS ≥3	0	0
Median WHO-QoL (P25-P75)	37 (30-43) N=169	24 (29-34) n=202
Proportion of ZBI-12 ≥10	61.54% [0.50 ; 0.72] N=78	47.8% [37.4 ; 58.2] n = 92
Ratio male / Female	25.8% [19.5; 32.2] n=186	26.5% [21.3, 31.7] n=283
Proportion living alone [IC95%]	65.3% [58.2; 72.4] N= 176	66.7% [61.1, 72.2] n= 279
Proportion with informal caregiver [IC95%]	53.8% [46.3; 61.3] N=173	74.5% [69.4, 79.7] n= 275

Table 24 : characteristics of beneficiaries for high impaired group

	psycho all	Comparison high impaired group BelRAI
Median Age (P25-P75)	80 (75-84) n=122	81 (76-86) n=322
Proportion DRS ≥3	58.03% [0.49 ; 0.67] N = 112	41.1% [35.5 ; 46.6] n = 302
Proportion ADL ≥3	54.91% [0.46 ; 0.64] N=122	74.3% [69.5 ; 79.1] n = 323
IADL≥24	85.85% [0.79 ; 0.93] N=99	91% [87.6 ; 94.4] n = 278
CPS ≥3	68.52% [0.6 ; 0.77] N=108	65.9% [60.6 ; 71.2] n = 314
Median WHO-QoL (P25-P75)	32 (24-39.5) N=96	34 (30-38) n=149
Proportion of ZBI-12 ≥10	64.44% [0.54 ; 0.74] N=90	80.7% [75.7 ; 85.7] N=238
Ratio male / Female	30.3% [22.1; 38.6] N=122	40.4% [34.9, 45.8] n=377
Proportion living alone [IC95%]	38.13% [29.2;47.0] N=118	35.4% [30.1, 40.7] n=316
Proportion with informal caregiver [IC95%]	86.7% [80.4; 93.8] N=113	88.1% [84.4, 91.7] n=310

5.5.3 The condition for implementation

5.5.3.1 Characteristics of workforce

In most projects, the intervention itself, "psychological support" is done by one or more psychologists. One project works with a duo of professionals including a bachelor in applied psychology and a pastoral worker. Another project works with three psychologists and two masters of orthopedagogy that were trained as psychotherapists. This project emphasized during an interview that for them it is more important to have psychotherapists with some practice experience in the project than hiring a master in psychology who never did any field work. One project works with a bachelor in rehabilitation sciences and a master in orthopedagogy. They call themselves “levensverhaalschrijvers” (biography writers).

Five projects work exclusively with (clinical) psychologists or licensed psychotherapists. These are the projects that offer more standardized psychological therapies (cognitive-behavioural therapy, psychotherapy). In the other three projects, which offer non-standardized interventions like psychosocial and emotional support or reminiscence therapy, also social workers (and other

professionals) are employed. Pre-existing clinical expertise about FOP and an interest in working with older people is necessary. This target population demands a different approach than people under 60 years old. Projects that employ adequate and experienced staff are more likely to be successful.

Turnover of therapists had a negative effect on the success of the project. People do not like to tell their psychological problems to a stranger. It takes time to build a relationship of trust between the FOP and the therapist. Continuity is very important; a FOP should be having only 1 therapist during the entire period of treatment. Four projects experienced turnover of a therapist due to pregnancy leave. In two of these projects it had a clear impact on reaching the estimated caseload.

5.5.3.2 Characteristics of clinical (and organizational) information tools:

Almost all projects indicate that they most frequently use telephone calls, e-mail and reports of meetings as a tool to share information and coordinate the care for the clients on an individual basis. Remarkably, only 3 projects indicate to use a patient record (on paper) as a central tool in the coordination. One project uses a shared ICT tool (SharePoint) to share information between staff members. Only 2 projects mention BelRAI as a coordination tool and only one project reports to use the BelRAI results but not in a multidisciplinary way.

One project implemented an ICT tool for coordination of the work between all therapists in the project (a SharePoint application). Although not yet implemented, four projects mention that multidisciplinary electronic patient files for communication and coordination of care could be very useful in the future.

5.5.3.3 Tailored delivery system design:

In most projects the project coordination is done by different people, often by a manager of a nursing home. In two projects no one has an explicit administrative function. These are the two projects in this category that have the lowest total FTE. In each of these 2 projects, only a part-time psychologist (60% and 50%) and a manager (2% and 5%) are employed.

In four of the 8 projects the umbrella organisation is a nursing home. Two projects have a GDT/SISD as an umbrella organisation; the other two projects are projects from a SSD of the CPAS and from a home nursing organisation.

All but one project have a coordination service as a partner of the project. Four projects have a mental health centre as a partner. One other project has a psychiatric hospital as a partner. Three projects do not mention a mental health service, psychiatric hospital, psychiatrist or psychologist as a partner. All projects have partners that can refer FOP to the projects.

Most of 'psychological' projects have little structural interaction with the environment because of the fact that many FOPs in these projects do not yet have a lot of healthcare providers. In most cases just the GP.

All projects mention having problems to communicate with other healthcare providers. For projects providing psychological interventions the most important other healthcare provider to communicate with is the GP (treatment with antidepressants, general health status). Often it is even the only other healthcare provider in the FOP's network because the projects mention that their population does not yet need the support of other care providers.

5.5.4 Results of the intervention (uptake, cost and outcome)

5.5.4.1 Uptake of beneficiaries

A project delivering psychological interventions has to be accessible to FOP/ICG financially, geographically and culturally. There still rests a taboo on all that is 'psycho' in society. All or most projects were aware of this possible threshold. All projects offer interventions at home. Four projects offer their intervention for free, the others ask for a contribution that varies from 45 euro/year to 400 euro/year. The proportion of immigrant FOP in the projects is very low compared to their proportion in the environment of the projects. This is something projects should be aware of and try to find a way to reach this specific population.

Three projects did not reach their estimated caseload. One other project encountered some problems to achieve the estimated caseload due to staff problems, but overcame those problems. Four projects had no problems reaching their caseload; in fact three of them exceeded their estimated caseload.

One project has expanded its work area to be able to reach more FOPs. Another project initially struggled with a work area that was too large. The psychologists had to travel long distances to do the home visits. They didn't reduced or split the area, but they allocated new clients to a psychologist who is close by.

5.5.4.2 Cost and outcome

For low impaired group, there are no association between benefiting of a project with psychological support alone and DRS, ADL or IADLp. Proportion of missing values is relatively similar than for the control group.

No person has been institutionalized in this group. This is probably associated to the characteristics of the population (and therefore an overestimation of a potential effect of projects)

For high impaired group there is no association between project with psychological support and different scales. There is also no difference statistically significant for the risk of institutionalization at 6 months .

In both groups, total cost of the healthcare support is lower than other type of project (CM and others)

There is no variation of costs observed in the psychological support projects for low and high impaired beneficiaries. The difference of cost healthcare support between the two levels of impairment is mostly explained by the cost of NPS (3,3 for low impaired and 10,1 for high impaired beneficiaries).

The mean daily time spent on informal caregiving is 2,8 hours for the group of the low impaired beneficiaries. This level is comparable to other types of projects for same population. Nevertheless, proportion of informal caregiver experiencing a high burden is high (61%), and the majority of the beneficiaries have significant depressive symptom (62%).
For the high impaired beneficiaries, the severe depressive symptoms and cognitive problems may explain the high mean daily time (7.1 hours). There is no significant variation of daily time between the first evaluation at entry date and the second one.

Table 25 : results for DRS, ADL and IADL for beneficiaries from low impaired group

	psycho all	Comparison low impaired group BelRAI
OR DRS≥3 at 2nd measurement[48]	0.82 [0.2 ; 3.4]	1
Missing total	*21%*	*32%*
Missing not known	*21%*	*30.65%*
OR ADL≥3 at 2nd measurement[49]	3.17 [0.31 ; 32.95]	1
Missing total	*22%*	*29%*
Missing not known	*22%*	*28.71%*
OR IADL≥24 at 2nd measurement[50]	0.85 [0.36 ; 1.96]	1
Missing total	*17%*	
Missing not known	*17%*	

Table 26 : results for RR of institutionalization after 6 months for low impaired beneficiaries

	psycho all	Comparison low impaired group IMA-AIM
RR of definitive institutionalization at 6 months	0 person institutionalized	1
RR of death at home at 6 months	0,18 [0,02; 1,26]	1
RR of death at 6 months		

Table 27: results for DRS, ADL and IADL for beneficiaries from high impaired group

	psycho all	Comparison high impaired group BelRAI
OR DRS≥3 at 2nd measurement[51]	0.77 [0.39 ; 1.48]	1
Missing total	*19%*	*49%*
Missing not known	*13.11%*	*34.79%*
OR ADL≥3 at 2nd measurement[52]	1.21 [0.57 ; 2.57]	1
Missing total	*28%*	*47%*
Missing not known	*21.84%*	*32.43%*
OR IADL≥24 at 2nd measurement[53]	0.46 [0.1 ; 2.23]	1

[48] With DRSADL, ZBI-12
[49] With ADL , DRS, CPS, ZBI-12 kept
[50] With IADL kept
[51] With DRS1
[52] With ADL kept
[53] With IADL and ADL kept

Table 28 : results for RR of institutionalization after 6 months for high impaired group

	psycho all	Comparison high impaired group IMA-AIM
RR of definitive institutionalization at 6 months	0.26 [0.06 ; 1.02]	1
RR of death at home at 6 months	0.63 [0.24 ; 1.67]	1
RR of death at 6 months		

Table 29: results for cost over 6 months for low impaired beneficiaries

Per beneficiary		psycho all	Comparison low impaired group IMA-AIM
Daily mean cost of the project*		4,8	
Daily** mean cost for the nursing , physio and speech therapy at home after intervention over 6 months [54]	NIHDI	3,3 (NS)	2,6
	Patient	0,11 (NS)	0,26
Total daily mean cost of the healthcare support		**8,2**	
Daily mean cost for hospitalization after intervention over 6 months (no confounding variable)	NIHDI	5,4 (NS)	6
	Patient	0,65 (NS)	1,72
Time spent in care by the informal caregiver at follow up (hours/day) Mean Median (p25 - p75)		2.85 (NS° 1 (0.57-2.9)	3.44*** 1.07 (0.57 – 2.79)

*N.B. The cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).
** At home
*** Comparison with the BelRAI control group

[54] Nursing lump sum (A and B) , death in the 6 months after the entry date in projects and the daily cost of hospitalisation over 6 months before the entry date in projects as confounding variables

Table 30: results for cost over 6 months for low impaired beneficiaries

Per beneficiary		psycho all	Comparison high impaired group IMA-AIM
Daily mean cost of the projects *		5,9	
Daily** mean cost for the nursing , physio and speech therapy at home (no confounding variable)	NIHDI	10,1 (NS)	11,6
	Patient	0,27 (NS)	0,29
Total daily mean cost of the healthcare support		**16,3**	
Daily mean cost for hospitalization after intervention over 6 months (no confounding variable)	NIHDI	7,1 (NS)	5,1
	Patient	0,62 (NS)	0,54
Time of informal care at follow up (hours/day) Mean Median (p25 – p75)		7.67 (NS) 3 (1-12)	6.15 3 (1.14 – 8)

*N.B. The cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).
**At home
*** Comparison with the BelRAI control group

5.6 The projects providing occupational therapy

5.6.1 The intervention

Within the whole set of 63 projects, 7 (11%) have been classified under the category of « occupational therapy at home » because their main intervention was occupational therapy. Among these, three have been more in-depth investigated through a case study.
All the projects from this category declare that their main intervention consists of home adaptation in order to (1) Make the patient's living environment more adapted to their current conditions; (2) Offer better work conditions to home professional caregivers.

Home modifications are adaptations to the living environment intended to increase ease of use, safety, security, and independence. Home modifications overlap considerably with assistive devices (e.g., bath benches, walkers) which tend to be more mobile in nature and not attached to the structure of the house. In addition, home modifications are often accompanied by repairs (e.g., fixing worn-out stairs) to insure their usefulness.

Two projects also offer another type of intervention that could be more developed in the future that is rehabilitation. This type of activity is comparable to what an occupational therapist is used to perform in revalidation service in a hospital (e.g., patient education in case of hip prosthesis, strengthening of the upper and lower limbs, advice to prevent falls, rehabilitation in activities of daily living, etc.). Combined with a home modification, the rehabilitation might give better results in terms of independence, safety and home maintaining.

Still among what projects declare to offer, the ADL assessment of FOP seems to be important (4 out of 7 projects declare doing it). Another point as important as ADL assessment is the follow-up that is also probably under-reported (3 out of 7) because this is the final step that show how adaptations answer to FOP's difficulties and improve functional status.

Based on what they declared the five projects providing OT without rehabilitation show consistency in respecting some elements that could be defined as crucial for the well-functioning of this type of

project that is: shared decision, planned follow-up and education component. Two projects do not collaborate with a distributor of home care devices[55] as partner. That could explain their difficulty to reach the caseload. However, it's probably minimal because even if costs of home modifications may be a barrier to this intervention they are some non-cost options like environmental management. In term of procedures the five projects show consistency in respecting some elements that could be defined as crucial for the well-functioning of this type of project that is: shared decision, planned follow-up and education component.

For the sub-group providing OT with rehabilitation activities, the worst item is also the presence of a distributor of home care devices as partner which is followed by the 'collaboration and coordination with other care providers'. The project that has the worst notation for these two items is also the one that had the biggest difficulty to reach his caseload. The two projects proposed rehabilitation activities as ADL-training. However this kind of activities takes more time than home modifications and needs much more sessions and more closed than what they proposed to do (in addition to home modifications): one project spends on average 8 hours per patient without indication on their repartition by day while the other offers a six session intervention distributed over 4 weeks. That's why 'revalidation activities' as these two projects propose them are probably performed after home modifications in using the new 'material' which is of course a right way to show to FOP benefits he can retire from new helps as the other OT projects also do but maybe without saying it.

5.6.2 The beneficiaries

3 projects in the low impaired group and 2 in the high impaired group are part of the respective control groups.

Low and high impaired group have characteristics relatively similar to the control group. The only exception is for high impaired group having a lower proportion of people with DRS≥3.

Table 31 : characteristics of beneficiaries from low impaired group

	OT all	Comparison low impaired group BelRAI
Median Age (P25-P75)	79 (74-84) N=187	80 (76-85) n=283
Proportion DRS ≥3	21.6% [16 ; 28] N = 185	26.5% [21.1 ; 31.9] n = 260
Proportion ADL ≥3	0	0
IADL≥24	42.22% [35 ; 49] N=180	51.1% [44.5 ; 57.7] N=227
CPS ≥3	0	0
Median WHO-QoL (P25-P75)	30 (25.5-34) N=176	29 (24-34) n=202
Proportion of ZBI-12 ≥10	51.38% [42 ; 61] N=109	47.8% [37.4 ; 58.2] n = 92

[55] Having a distributor of home care devices as a partner seems to be relevant in terms of financial accessibility. A project that works with one or two distributors of home care devices, that have so a near monopoly, benefits from prices reductions that increase the accessibility of these devices for the FOPs.

Ratio male / Female	25.1% [18.9; 31.4] N=187	26.5% [21.3, 31.7] n=283
Proportion living alone [IC95%]	63.6% [56.7; 70.6] N=185	66.7% [61.1, 72.2] n= 279
Proportion with informal caregiver [IC95%]	68.6% [61.9; 75.4] N= 185	74.5% [69.4, 79.7] n= 275

Table 32 : characteristics of beneficiaries for high impaired group

	OT all	Comparison high impaired group BelRAI
Median Age (P25-P75)	80 (76-84) N=220	81 (76-86) n=322
Proportion DRS ≥3	21.56% [16 ; 27] N = 218	41.1% [35.5 ; 46.6] n = 302
Proportion ADL ≥3	72.73% [67 ; 79] N = 220	74.3% [69.5 ; 79.1] n = 323
IADL≥24	82.87% [77.8 ; 87.9] N=216	91% [87.6 ; 94.4] n = 278
CPS ≥3	44.91% [38.2 ; 51.6] N=216	65.9% [60.6 ; 71.2] n = 314
Median WHO-QoL (P25-P75)	34 (29-37) N=178	34 (30-38) n=149
Proportion of ZBI-12 ≥10	58.5% [50.6 ; 66.5] N=152	80.7% [75.7 ; 85.7] N=238
Ratio male / Female	33.2% [26.9; 39.5] N=220	40.4% [34.9, 45.8] n=377
Proportion living alone [IC95%]	36.9% [30.4; 43.3] N=217	35.4% [30.1, 40.7] n=316
Proportion with informal caregiver [IC95%]	79.4% [73.9; 84.8] N=218	88.1% [84.4, 91.7] n=310

5.6.3 The condition for implementation

5.6.3.1 Characteristics of workforce (needed Vs implemented)

The occupational therapist is really the kingpin of these projects. No occupational therapist has a specific experience directly linked with home care that reflects the novelty of this professional and his intervention **at home**.

5.6.3.2 Characteristics of clinical (and organizational) information tools (needed versus implemented):

Four projects collect information in a specific patient file with the same objective of information sharing. Other tools mainly used are phone calls, emails or communication papers.

Generally, occupational therapy projects do not use a comprehensive evaluation tools with the exception of one which declare doing a special OT screening and two others declare using BelRAI as a CGA.

5.6.3.3 Tailored delivery system design:

Most of the occupational therapists, especially for French speaking projects, work under coordination centre authority which is implemented in the local area for years. Two projects, from the north of the country, declare having a cross-sectorial collaboration with the local coordination centre. Of course, if an occupational therapy project is organised by a home care services coordination centre, interactions between this one and the occupational therapist occur.
For 3 projects, GP are well involved. Two others have a poor collaboration with GP despite the financing provided. For the others, GP are not involved at all.
Except for one project, all the other ones declare exchanging some information with other professionals working around the FOP what is a good element to be well embedded. The only project that does not exchange information is the one that has a little effective caseload in comparison to the number of FTE. GP and other professionals with which this project has poor or no collaboration are some potentials client providers, important thing for a new project that has to make itself know.

5.6.4 Results of the intervention (uptake, cost and outcome)

5.6.4.1 Uptake of beneficiaries

Five out of seven projects had difficulties to reach the caseload. Reasons are: (1) lack of FOP's knowledge about what an occupational therapist is and (2) FOP's resistance to change. There is no straight reason that could explain that for a project with 1 FTE a caseload of 40 persons per year cannot be reached but a hypothesis might be the relative poverty of the population where the project works.

Two have modified their caseload in decreasing it while 2 others have changed their FTE number (increase for one and decrease for the other). The fifth one has expanded its target population in order to reach easier its caseload. We can notice that one project has really overestimated its caseload to the extent that even in reducing it this still too high to reach in comparison to the other projects. Two projects stopped.

5.6.4.2 Cost and outcome

There is no association between OT project and DRS, ADL or IADL in both high and low impaired groups. Furthermore, there is a high proportion of missing values for the second measurement of the different scales in the low impaired group.
For both low and high impaired beneficiaries, the cost of NPS is significantly higher over 6 months after intervention while the proportion of beneficiaries with important ADL problems did not significantly increase compared to the control group. Therefore, 2 explanations are possible:

- Beneficiaries of these projects may experience particular changes of the health status motivating the intake in OT projects.

- Projects may better identified the health care needs for nursing and thus induce an increase of nursing care, all things being equal (e.g. possible inter professional collaboration through a coordination center authority). Despite a focus on IADL problems, OT projects may also assess ADL problems.
  The risk of institutionalisation is significantly lower in the OT group than in the control group for the low impaired beneficiaries. There is no significant variation of the cost of hospitalisation.

  The mean daily time spent on informal caregiving is relatively high compared to other project types with 4 hours for the low impaired beneficiaries. The relation between the time and the type of impairment is not obvious for the low impaired beneficiaries of OT (42% with important IADL problems, no beneficiaries with important ADL, 21% with severe depressive symptoms).
  for the high impaired FOP the relatively high mean time, 9.5 hours is explained with the high proportion of beneficiaries with important functional problems at the entry date (72% with severe ADL problems and 82% with IADL problems).
  There is no significant variation of daily time between the first evaluation at entry date and the second one for low and high impaired beneficiaries.

Table 33 : results for DRS, ADL and IADL for beneficiaries from low impaired group

	OT	Comparison low impaired group BelRAI
OR DRS≥3 at 2nd measurement[56]	0.43 [0.16 ; 1.1]	1
Missing total	*48%*	*32%*
Missing not known	*41.76%*	*30.65%*
OR ADL≥3 at 2nd measurement[57]	1.14 [0.33 ; 3.98]	1
Missing total	*47%*	*29%*
Missing not known	*40.2%*	*28.71%*
OR IADL≥24 at 2nd measurement[58]	1.02 [0.43 ; 2.42]	1

Table 34 : results for RR of institutionalization after 6 months for low impaired beneficiaries

	OT	Comparison low impaired group IMA-AIM
RR of definitive institutionalization at 6 months	0,67* [0,13 ; 0,94]	1
RR of death at home at 6 months	1,08 [0,51; 2,27]	1
RR of death at 6 months		

[56] With DRS1
[57] With ADL kept
[58] With IADL and ADL kept

Table 35 : results for DRS, ADL and IADL for beneficiaries from high impaired group

	OT	Comparison high impaired group BelRAI
OR DRS≥3 at 2nd measurement[59]	0 .51 [0.26 ; 1.01]	1
Missing total	*27%*	*49%*
Missing not known	*24.3%*	*34.79%*
OR ADL≥3 at 2nd measurement[60]	1.19 [0.56 ; 2.51]	1
Missing total	*27%*	*47%*
Missing not known	*24.3%*	*32.43%*
		1

Table 36 : results for RR of institutionalization after 6 months for high impaired group

	OT all	Comparison high impaired group IMA-AIM
RR of definitive institutionalization at 6 months	0.19* [0.06 ; 0.59]	1
RR of death at home at 6 months	0.47 [0.21 ; 1.04]	1
RR of death at 6 months		

Table 37: results for cost over 6 months for low impaired beneficiaries

Per beneficiary		OT	Comparison low impaired group EPS
Daily cost of the project per beneficiary*		2,7	
Daily** mean cost for the nursing , physio and speech therapy at home [61] after intervention over 6 months	NIHDI	7,2 (Sign+)	2,6
	Patient	0,33 (Sign+)	0,26
Total cost of the healthcare support for the NIHDI		**10,2**	
Daily mean cost for hospitalization after intervention over 6 months (no confounding variables)	NIHDI	10,7 (NS)	6
	Patient	1,45 (NS)	0,72
Time of informal care at follow up (hours/day) Mean Median (p25 – p75)		3.98 (NS° 2 (1-4)	3.44 *** 1.07 (0.57 – 2.79)

*N.B. The cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).
**At home
*** Comparison with the BelRAI control group

[59] With DRS1
[60] With ADL kept
[61] Death in the 6 months following the entry date in projects and the mean daily cost of hospitalisation over 6 months before the entry date in projects as confounding variables

Table 38: results for cost over 6 months for low impaired beneficiaries

Per beneficiary		OT	Comparison high impaired group IMA-AIM
Daily mean cost of the projects*		2,7	
Daily** mean cost for the nursing , physio and speech therapy at home after intervention over 6 months (no confounding variables)	NIHDI	17,2 (Sign+)	11,6
	Patient	0,5 [62] (Sign+)	0,29
Total daily mean cost of the healthcare support for NIHDI		**20,4**	
Daily mean cost for hospitalization after intervention over 6 months (no confounding variables)	NIHDI	12,5 (NS)	5,1
	Patient	1,41 (NS)	0,54
Time spent in care by the informal caregiver at follow up (hours/day) Mean Median (p25 - p75)		9.44 (NS° 5 (2-21.43)	6.15** 3 (1.14 – 8)

*N.B. The cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).
** At home
*** Comparison with the BelRAI control group

5.7 The night care projects

5.7.1 The intervention

By definition, the 'night care projects' represent a category of projects whose interventions occur at night, between 10 pm and 5 am. They mainly offer nursing care at night or surveillance for FOP with clinical or psychological needs during the night.

Projects providing 'night care' generally offer night observation, psychological support during the night, coordination of services and respite care between 10 pm and 5 am.

The majority of night care projects implement a collaboration link with organizations that provide healthcare to patients during the day. According to projects, the level of dependence for this category of FOPs is already very high at the inclusion.
No project is free for the patient. The patients always pay for night care interventions and in two cases it goes over 100€ a month, which adds up to the existing costs for other healthcare services.
The intervention can take place at home or in a 'night hostel', which are some beds made available in nursing homes. The intensity of night interventions offered by projects varies from daily visits to interventions in case of need. Night care can be planned (from one to seven nights a week) or provided in case of emergency. The main wishes for the beneficiaries included in the projects that propose night care at home are in fact to provide care that is usually given in hospital but in the home setting.

[62] Nursing lump sum as confounding variable

The eleven projects from this category are divided in three sub-types according to the intervention delivered: 'night care with one professional visiting several beneficiaries at night at home', 'night hostel only' and 'night care with one caregiver spending the whole night with one FOP', or a mix of the two first types of night care.
In the first group of night care projects, nurse and/or nurse assistant visit patients at home during the night. These projects are tailored according a same pattern. They do have collaboration with organizations and professionals to ensure the continuity of care. They have a good geographical accessibility but patients do pay for the intervention.

In the second group of night care projects, night hostel interventions, they do have collaborations with other day professionals or organizations. The beneficiary is going to a nursing home to spend one or several nights a week. None of night hostel projects is free and one is considered as cheap.
The third form of night care project, provide whole night assistance to one FOP by one caregiver (volunteer or nursing aid).
Except for one night care at home project, the collaboration with other organizations or day professionals is not implemented. Patients do benefit from great accessibility to the projects. This type of projects is mainly adequate to the needs of their target population. One project is considered as very cheap in comparison with the other projects.

5.7.2 The beneficiaries

The night care projects seem to be designed for FOP aged 60 years and above needing surveillance and/or care during the night (change of incontinence material, support for going to bed). These projects target an impaired population in loss of autonomy and/or a cognitive decline.

Beneficiaries of projects with visits of several beneficiaries by a professional and night hostels have a low proportion of depression and cognitive problems compared to control group. These same groups have a high proportion of ADL problems.
The beneficiaries of projects with visits of several beneficiaries by a professional have also a low proportion of ICG with burden.

Table 39 : characteristics of beneficiaries from high impaired group

	Night several at home	Night one FOP at home	Night hostels	Comparison high impaired group BelRAI
Median Age (P25-P75)	83 (78-88- N=228	85 (79-89) N=473	80 (77.5-88.5) N=64	81 (76-86) n=322
Proportion DRS ≥3	22.48% [16.9 ; 28.1] N=218	41.58 [36 ; 46.1] N=455	28.1% [16.8 ; 39.4] N=64	41.1% [35.5 ; 46.6] n = 302
Proportion ADL ≥3	92.5% [89.1 ; 95] N=228	83.5% [80.1 ; 86.8] N=473	95.3 [90 ; 100] N=64	74.3% [69.5 ; 79.1] n = 323
IADL≥24	95.92% [93.1 ; 98.7] N=196	99.2% [98.3 ; 100] N=378	90.6% [83.3% ; 97.9%] N=64	91% [87.6 ; 94.4] n = 278
CPS ≥3	43% [36.5 ; 49.6] N=223	62.4% [57.9 ; 66.9] N=452	52.4% [39.7 ; 65.1] N=63	65.9% [60.6 ; 71.2] n = 314
Median WHO-QoL (P25-P75)	29 (24-33) N=156	33 (28-36) N=156	27 (23-34) N=45	34 (30-38) n=149

Proportion of ZBI-12 ≥10	35.5% [28.2 ; 42.9] N=166	77.1% [73 ; 81.2] N=410	77% [66.2 ; 87.9] N=61	80.7% [75.7 ; 85.7] N=238
Ratio male / Female	31.6% [25.5; 37.6] N=228	41.9% [37.4; 46.3] N=473	45.3% (32.8; 57.8) N=64	40.4% [34.9, 45.8] n=377
Proportion living alone [IC95%]	57.8% [51.3; 64.4] N=223	42.4% [37.9; 46.8] N=472	38.7% [26.2; 51.2] N=62	35.4% [30.1, 40.7] n=316
Proportion with informal caregiver [IC95%]	86.4% [81.9; 91.0] N=221	96.8% [95.2; 98.4] N=471	100% N=64	88.1% [84.4, 91.7] n=310

5.7.3 The condition of implementation

5.7.3.1 Characteristics of workforce

People engaged by the project to be involved in care are nurses and nurse assistants. Three projects with similar designs have no care professional paid by Protocol 3. For these three projects delivering night care during the whole night at home, these are volunteers or nursing aids, supported by nurses or psychologist.

One project asked for changes to raise salary rates.

5.7.3.2 Characteristics of clinical (and organizational) information tools (needed versus implemented):

Three of the eleven night care projects declare using BelRAI as a tool for therapeutic decisions and also declare using it as a tool for care coordination. One is using BelRAI only as a tool for care coordination. Other tools used are meetings, patient's files, phone calls or emails

5.7.3.3 Tailored delivery system design:

In order to maintain the continuity of care, night care projects need to have links with day care structures, especially because the level of dependence is already high.

The projects from this category are exclusively associated with a day care centre or a home care coordination centre. This observation is understandable because these two types of umbrella organisation can were able to offer either a package of care in the homes or a bed for the night hostel. When a home care service proposes a night hostel intervention, there is a need of one or several nursing home(s) as partners and when a nursing home provides care at home, there is need of either a home care service or independent care professionals or both as partners

Seven of the night care projects state that they have good interactions with general practitioners.

Two projects had to adapt their partnership. Nursing homes beds were provided for projects organizing night hostels and an organisation of family care service in another project provides nursing assistants for night care and is active in the accompanying committee.

5.7.4 Results of the intervention (uptake, cost and outcome)

5.7.4.1 Uptake of beneficiaries

Projects had to adapt their criteria for admission or their services because of unexpectedly low or high workload. One project extended its inclusion criteria to FOP pertaining to A Katz's category. Another project reduced the emergency interventions distance to maximum 10 km from the nursing home, limits the intervention to two visits a night maximum (for the same client). Finally, a project halved the number of nursing assistants because of an overestimation of the demand.

Two projects providing night care by nurses at home stopped in November 2013 because they did not meet the NIHDI requirements regarding (1) the achievement of their caseload and (2) for one project, filling out the BelRAI data.

5.7.4.2 Cost and outcome

The only association identified for night projects is an OR>1 for ADL≥3 for beneficiaries of projects with visits of several beneficiaries by a professional. For the three types of night care, there are a lot of missing values, mainly associated with institutionalization or death. Projects reported difficulties to collect data when the professionals delivering the care were only in contact with the beneficiaries during the night.

The beneficiaries of projects with visits of several beneficiaries by a professional have an almost statistically significant lower risk of institutionalization, compared to the control group. The beneficiaries from the two other forms of night care projects have a higher risk of institutionalization. Finally the beneficiaries of night care by one professional for one person per night have a higher risk of death at home.

Total cost of the healthcare support is rather high for both forms of night care at home compare to night hostels. This is particularly the case for one professional providing night care for one beneficiary by night.

Table 40: results for DRS, ADL and IADL for beneficiaries from high impaired group

	Night several at home	Night one FOP at home	Night hostels	Comparison high impaired group BelRAI
OR DRS≥3 at 2nd measurement[63]	0.97 [0.47 ; 2.03]	0.89 [0.51 ; 1.54]	0.50 [0.17 ; 1.48]	1
Missing total	*34%*	*47%*	*49%*	*49%*
Missing not known	*22.1%*	*18.33%*	*17.15%*	*34.79%*
OR ADL≥3 at 2nd measurement[64]	5* [1.86 ; 13.46]	1.19 [0.62 ; 2.27]	3.5 [0.76 ; 16.1]	1
Missing total	*31%*	*46%*	*48%*	*47%*
Missing not known	*19.84%*	*17.94%*	*16.8%*	*32.43%*
OR IADL≥24 at 2nd measurement[65]	0.44 [0.05 ; 3.72]	0.26 [0.03 ;2.2]	0.28 [0.03 ; 2.73]	1

[63] With DRS1

[64] With ADL and (sometimes) IADL OR SCPS kept

Table 41 : results for RR of institutionalization after 6 months for high impaired group

	Night several at home	Night one FOP at home	Night hostels	Comparison high impaired group IMA-AIM
RR of definitive institutionalization at 6 months	0.51 [0.24 ; 1.05]	1.41* [1.01 ; 1.96]	4.01* [2.70 ; 5.94]	1
RR of death at home at 6 months	0.71 [0.36 ; 1.42]	2.03* [1.48 ; 2.77]	0 death	1

The total cost of the healthcare support for night care is globally high, 25,1 and 37,1 euro (too few values for night hostels and the total cost of accommodation is not included for night hostel). Despite a significant increase of ADL problem for beneficiaries of night several at home, the daily mean cost of NPS did not significantly change. One possible explanation is that the type of care provided by night several at home may be a substitute to the nursing care during the day.
For the beneficiaries of night one FOP at home, the NPS cost has significantly increased. This may be due to the worsening of the health status, independently of the ADL problem. Indeed, the RR of death at 6 months is significantly higher than in the control group. Nevertheless, hospitalisation cost did not change for this type of project as for night several at home.
The mean daily time of informal care is relatively low in two projects, Night several at home and Night hostel (3,5 and 4 hours). For these beneficiaries, despite a high level of impairment, their health status may be stable and they may already receive the formal care needed. The high daily mean time of informal care for Night one FOP at home may be explained by a need of important supervision due to instable health status (the RR of death at home 2.03).For the three subtypes of projects, there is no significant variation of time of informal care between the first evaluation and the second one.

Table 42: results for cost over 6 months for low impaired beneficiaries

Per beneficiary		Night several at home	Night one FOP at home	Night hostels	Comparison high impaired group EPS
Daily mean cost of the projects *		6,1	16,3	10,8	
Daily** mean cost for the nursing , physio and speech therapy at home after intervention over 6 months (No confounding variables)	NIHDI	18,5 (NS)	20,3 (Sign+)	8,7 (NS few val)	11,6
	Patient	0,47 (NS)	0,45 (NS)	0,29 (NS few val)	0,29
Total daily mean cost of the healthcare support		25.1	37.1	19.8	
Daily mean cost for hospitalization after intervention over 6 months (No confounding variables)	NIHDI	9,4 (NS)	6,94 (NS)	6,6 (NS)	5,1
	Patient	1,42 (NS)	1,27 (NS)	2,04 (NS)	0,54
Time of informal care at follow up (hours/day) Mean Median (p25 – p75)		3.95 (NS) 1 (0.43-4)	9.99 (NS) 7 (3-15)	3.54 (NS) 3 (1.29-5.71)	6.15 3 (1.14 – 8)

*N.B. The cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).
**At home

[65] With IADL kept

5.8 The day care projects

5.8.1 The intervention

Among all Protocol 3 projects, nine projects can be grouped into the category 'day care projects', of which the majority (eight) are situated in Flanders, the remaining being in Wallonia. Since the change in the regulation of the insurance on the day care centres, patients with profile A dementia were eligible for funding within the F package[66] from 1st January 2012 on. Furthermore, Article 3 of the Royal Decree of 2 July 2009 prohibits Protocol3 funding when NIHDI structurally financing exists. As a consequence, the scientific evaluation stopped for five projects at this date. Nevertheless, the data collected till then were included in the scientific evaluation.

They aim to maintain the frail elderly at home by offering varied services during the day (outside the home of the FOP). By doing so, most of the projects also wanted to provide some respite to the informal caregivers. Other objectives that most projects covered included: improvement of autonomy and quality of life, by the means of maintaining or improving the cognitive skills, reactivation and social reintegration, providing psychosocial support, supervision of medication delivery and hence, improve FOPs' adherence to treatments. Most of the project also aimed at providing specific guidance of eating habits (preparation and meals), in order to improve the nutritional status but also as an opportunity for socialising. Group activities were organized in order to encourage social contact. Nevertheless, it was unclear how the individual daily program of an older person was determined and adapted.

Some day care projects had more specific aims. One day care project including patients with a psychiatric profile aimed to improve the self-image of their patients, who frequently suffer from a low self-esteem and image because of self-neglect during the frequent hospitalisations. They wished to enhance this self-esteem by the means of providing activities of stimulation of self-care (hygiene, shaving, make-up, etc.) but also by the means of offering meaningful activities, two means that also could lead to better socialisation and hence, less isolation and time for negative thoughts.

Two day care projects started a comprehensive geriatric assessment (BelRAI) and provided the results to the regular home and healthcare agencies, already in place for the FOPs.

The majority of the projects provided goal-oriented care, as they described in the yearly questionnaire that the services they provided were carefully tailored to meet the goals, negotiated with the beneficiary and his/her informal caregiver.

5.8.2 The beneficiaries

Beneficiaries from day care projects have a low proportion of depressive but a rather high proportion of people with cognitive problem, compared to control group.

[66] Since 1st January 2012 a centre for daycare can ask NIHDI reimbursment (F-forfait) for beneficiaries with dementia. See also http://www.riziv.be/care/nl/residential-care/pdf/residentialcare013.pdf

Table 43 : characteristics of beneficiaries for high impaired group

	Day care	Comparison high impaired group BelRAI
Median Age (P25-P75)	78 (71-83) N=232	81 (76-86) n=322
Proportion DRS ≥3	22% [16.6 ; 27.5] N = 227	41.1% [35.5 ; 46.6] n = 302
Proportion ADL ≥3	72.73% [67 ; 79] N = 220	74.3% [69.5 ; 79.1] n = 323
IADL≥24	93.5 [90.2 ; 96.8] N=215	91% [87.6 ; 94.4] n = 278
CPS ≥3	75.7% [70.2 ; 81.3] N=231	65.9% [60.6 ; 71.2] n = 314
Median WHO-QoL (P25-P75)	28 (24-33) N=151	34 (30-38) n=149
Proportion of ZBI-12 ≥10	70.4% [63.6 ; 77.3] N=176	80.7% [75.7 ; 85.7] N=238
Ratio male / Female	44.8% [38.4; 51.3] N=232	40.4% [34.9, 45.8] n=377
Proportion living alone [IC95%]	35.8 [29.6; 42.1] N=229	35.4% [30.1, 40.7] n=316
Proportion with informal caregiver [IC95%]	93.9% [91.0; 97.0] N= 229	88.1% [84.4, 91.7] n=310

5.8.3 The condition for implementation

5.8.3.1 Characteristics of workforce

The intervention itself was usually done by nurses, nursing assistants and occupational therapists. Two projects had to cope with a large turnover of nurses. Another project had a turnover of coordinators. One project's location was changed and this was, according to the project, the reason for the difficulty to achieve its caseload. Two projects have a social worker employed for the interventions. Other professions (physiotherapist, speech therapist, educator and psychologist) were less common.

5.8.3.2 Characteristics of clinical (and organizational) information tools (needed versus implemented):

One project experienced difficulties in filling out the electronic version of the BelRAI and asked for one person to encode the data, while the others provided paper versions of their assessment. This can be seen as a drawback in comparison to the expected use of the BelRAI.

Only one project in this subcategory used the results of the BelRAI in a shared electronic patient record.

5.8.3.3 Tailored delivery system design:

Nursing homes were the umbrella organisations of all the day care projects. The results show that seven of those day care projects had formal agreements and/or regular, planned meetings with services that provided or coordinated healthcare at home. Amongst those, four had also the same level of collaboration with community organisations (OCMW/CPAS). Of special interest for this group of projects is the interaction with expertise centres having a specific knowledge in mental health, reported for five projects. These are the same projects providing day care for frail older persons with dementia.

Four projects reported that the GPs came in the day care centre on a regular basis to care for their patients and that informal, face-to-face contact enabled fluent information flow. Those same projects reported also providing feedback to other primary care providers on a regular basis. Two projects reported that they only had interaction with the FOPs' GPs in case of problem, one project only interacted with the GP of the patient in case of medication problems and one project did not answer to this question.

The level of collaboration with coordination services was lower in this subgroup than in the subgroup targeting FOPs with dementia but the provision of feedback about the FOPs was, on average, better than in the projects targeting FOPs with dementia.
Only one project (of the projects targeting FOP with dementia) did not have formal agreements with partners likely to provide nursing care or other care at home for their population.

5.8.4 Results of the intervention (uptake, cost and outcome)

5.8.4.1 Uptake of beneficiaries

The caseload per project varied between eight and 70 (median = 15). It was easily achieved for seven projects; two reported difficulties achieving their caseload, one of them reported the reason for this was the changing of the project's location.

One project refined their objective, because they felt having an impact on the stability of the situation of psychiatric patients, who experienced less 'up and downs'.
One project requested to decrease the inclusion age, because they had several demands. After the new regulation about the structural day care projects for patients with A dementia, the projects who wanted to continue and had a mixed target population excluded this population. One project added persistent aggressive behaviour from the beneficiary as an extra exclusion criteria.

Every project in this subgroup had problems in managing their caseload, as two projects exceeded their caseload and two did not reach it. When the caseload was exceeded, some beneficiaries had to be put on a waiting list. When the caseload was not achieved, the professionals were not paid and, thus threatening the availability of staff in these projects.

Crucial for the accessibility of the day care center for this target population was the organization of the transport of the frail older person to the day care center. This was organized by all but two projects. The cost of this transportation was fixed in all but one project and varied between 2,5 € and 9 € per day (return cost).

5.8.4.2 Cost and outcome

Benefiting from day care project is not associated to any outcomes except that risk of death is lower for this group compared to control. This is probably because beneficiaries are physically healthier. The daily cost of the healthcare support is 26.8 euro, equally distributed between the cost of projects and the cost of NPS. The beneficiaries of day-care have a significant increase of the daily cost of NPS compared to the control group after 6 months of intervention. A possible explanation is that the intake in day-care projects is decided after a significant worsening of the health status,, in spite of a risk of death staying lower than in the control group. Another explanation is that the cost of day-care services are partly included in the NPS cost through the nursing lump sum F in day care centre.
The evolution of the cost of hospitalisation is not different from the control group.
The average daily time of informal care is 5,4 hours. The population has both severe and cognitive impairment with a high proportion of ICG with burden. There is no significant variation between entry date and the second evaluation.

Table 44 : results for DRS, ADL and IADL for beneficiaries from high impaired group

	Day care	Comparison high impaired group BelRAI
OR DRS≥3 at 2nd measurement[67]	0.69 [0.38 ; 1.28]	1
Missing total	*29%*	*49%*
Missing not known	*20.3%*	*34.79%*
OR ADL≥3 at 2nd measurement[68]	1.23 [0.63 ; 2.39]	1
Missing total	*28%*	*47%*
Missing not known	*19.04%*	*32.43%*
OR IADL≥24 at 2nd measurement[69]	0.91 [0.2 ; 4.18]	1

Table 45 : results for RR of institutionalization after 6 months for high impaired beneficiaries

	Day care	Comparison high impaired group IMA-AIM
RR of definitive institutionalization at 6 months	0.72 [0.43 ; 1.22]	1
RR of death at home at 6 months	0 .32* [0.13 ; 0.77]	1
RR of death at 6 months		

[67] With DRS1
[68] With ADL and IADL kept
[69] With IADL and ADL kept

Table 46: results for cost over 6 months for high impaired beneficiaries

Per beneficiary		Day care	Comparison high impaired group IMA-AIM
Daily mean cost of the projects *		13,3	
Daily** mean cost for the nursing, physio and speech therapy at home after intervention over 6 months (no confounding variable)	For NIHDI	13,1 (Sign+)	11,6
	For the patient	0.36 (Sign+)	0,39
Total daily cost of the healthcare support		26,8	
Daily mean cost for hospitalization after intervention over 6 months (no confounding variable)	For NIHDI	11,42 (NS)	5,1
	For the patient	1.6 (NS)	0,54
Time of informal care at follow up (hours/day) Mean Median (p25 – p75)		5.41 (NS) 3 (1 – 8)	6.15*** 3 (1.14 – 8)

*N.B. The cost of the project is determined for all beneficiaries (mean daily cost per project weighted by the number of beneficiaries in the BelRAI database matching with the IMA-AIM database).
**At home
*** Comparison with the BelRAI control group

6 Overview of all results

We analysed the relation between cost and definitive institutionalization by combining different type of costs with definitive institutionalization in four figures: proportion of avoided institutionalization combined (1) with the cost for beneficiaries (including informal caregiver time spend in care) (figure5); (2) with the daily cost for NIHDI and beneficiaries (including out of pocket expenses for nursing, physiotherapy and speech therapy) to keep frail older person at home (including cost of nursing, physiotherapy and speech therapist care; and cost of the project) (figure 6); (3) with the daily cost of the project only (figure 7); (4) with the total cost combining the cost for NIHDI, beneficiaries and their main informal caregivers (figure 8).

In each of the figures, in green are projects with a good ratio ($instit.\searrow$)/$cost$) & low cost; in blue, projects with a good ratio ($instit.\searrow$)/$cost$) & high cost; in orange projects with a medium ratio ($instit.\searrow$)/$cost$); in red projects with a higher proportion of institutionalization than control group

Some projects such as case management with revalidation services post-hospitalization, case management for visually impaired older person are associated with good outcomes because targeting a particular type of population. Others, such as night care projects are associated with a bad outcome because targeting people in severe functional decline and for whom a definitive institutionalization might be a good outcome. Other projects have variable results.

Low impaired

- And with high proportion of IADL≥24 ■
- And with high proportion of DRS≥3 or ZBI≥10 □
- And recent (past 2 month) episode of hospitalisation ▣

Highly impaired

- And with high proportion of IADL≥24 ▲
- And with high proportion of DRS≥3 or CPS≥3 or ZBI≥10 △
- And recent (past 2 month) episode of hospitalisation △

Type of projects

- CM & rehab. : case management and rehabilitation post hospitalisation
- CM OT: case management with occupational therapy
- CM OT & physio: case management with occupational therapy and physiotherapy
- CM vis. Imp.: case management and occupational therapy for visual impaired
- CM psy: case management and psychological services
- CM & resid: case management and residential services
- OT : occupational therapy alone
- Psy alone: psychological services alone
- Day care: day care centres
- Night care one/prov: night care services by one provider visiting several beneficiaries during the night
- Night care sev/provider: night care services by one provider visiting one beneficiary per night

Figure 11: cost for beneficiaries and informal caregivers over avoided institutionalization

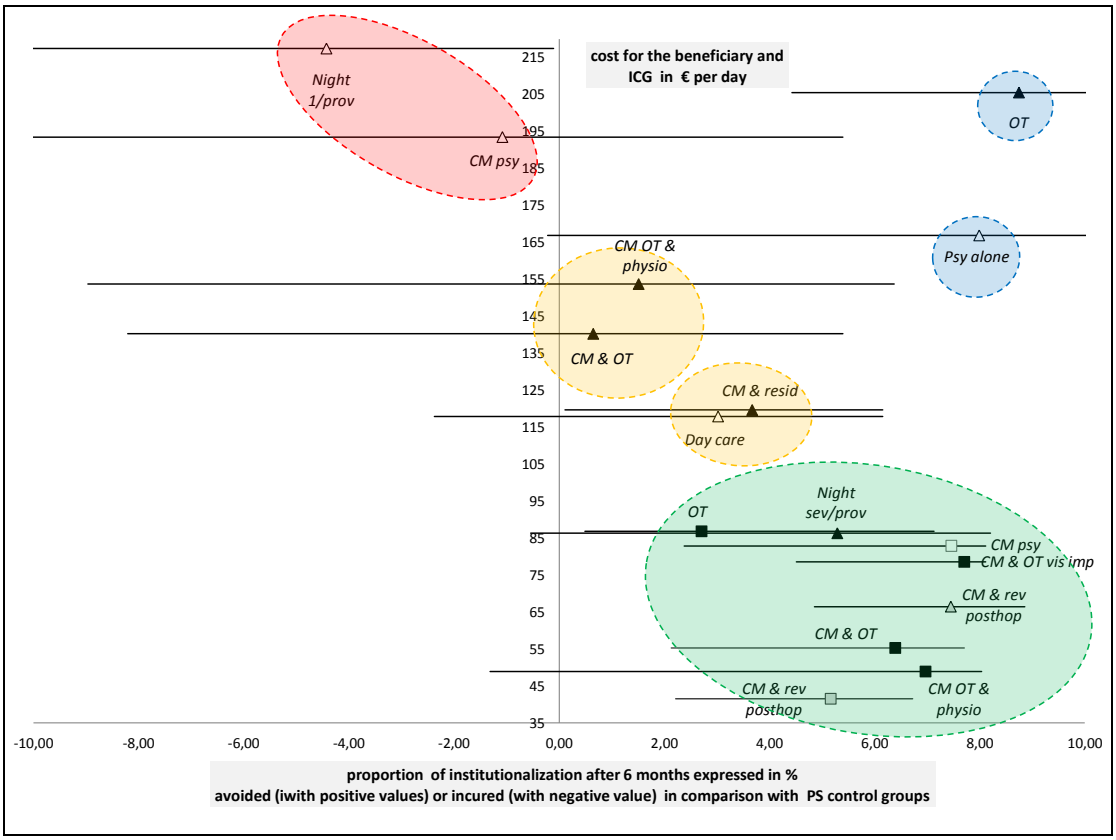


Figure 12: project, nursing care, physiotherapy and speech therapy at home costs over avoided institutionalization

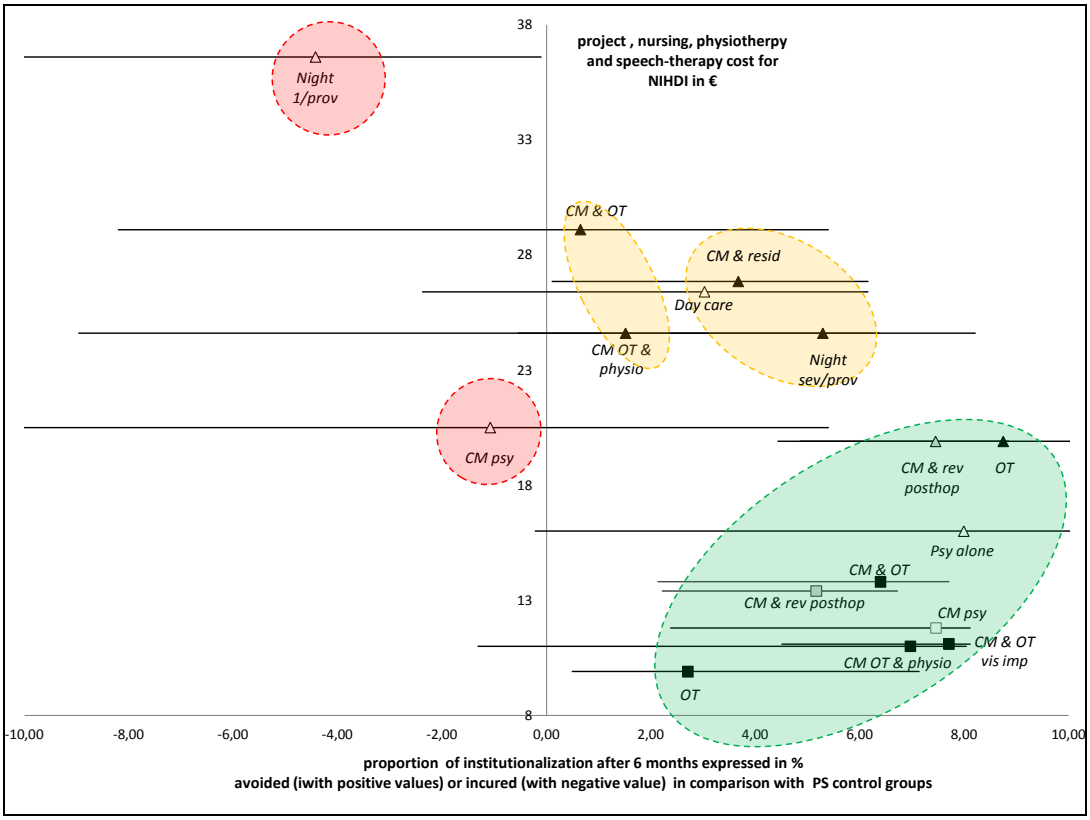


Figure 13: project cost over avoided institutionalization

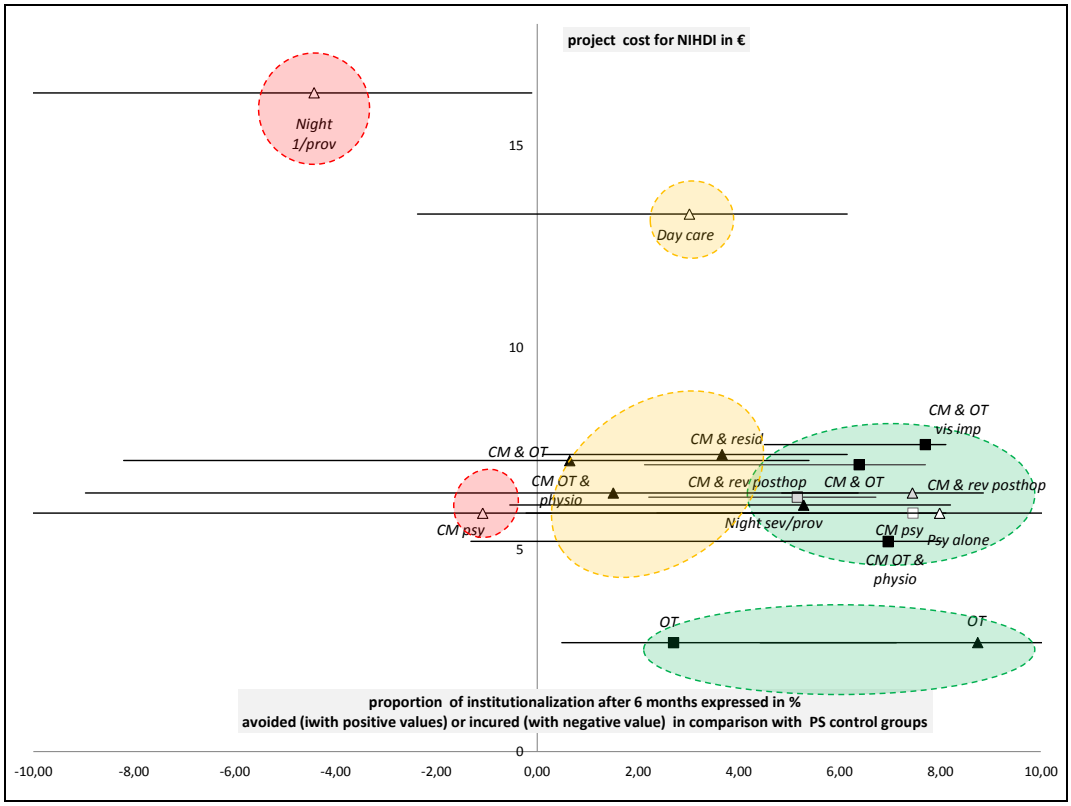
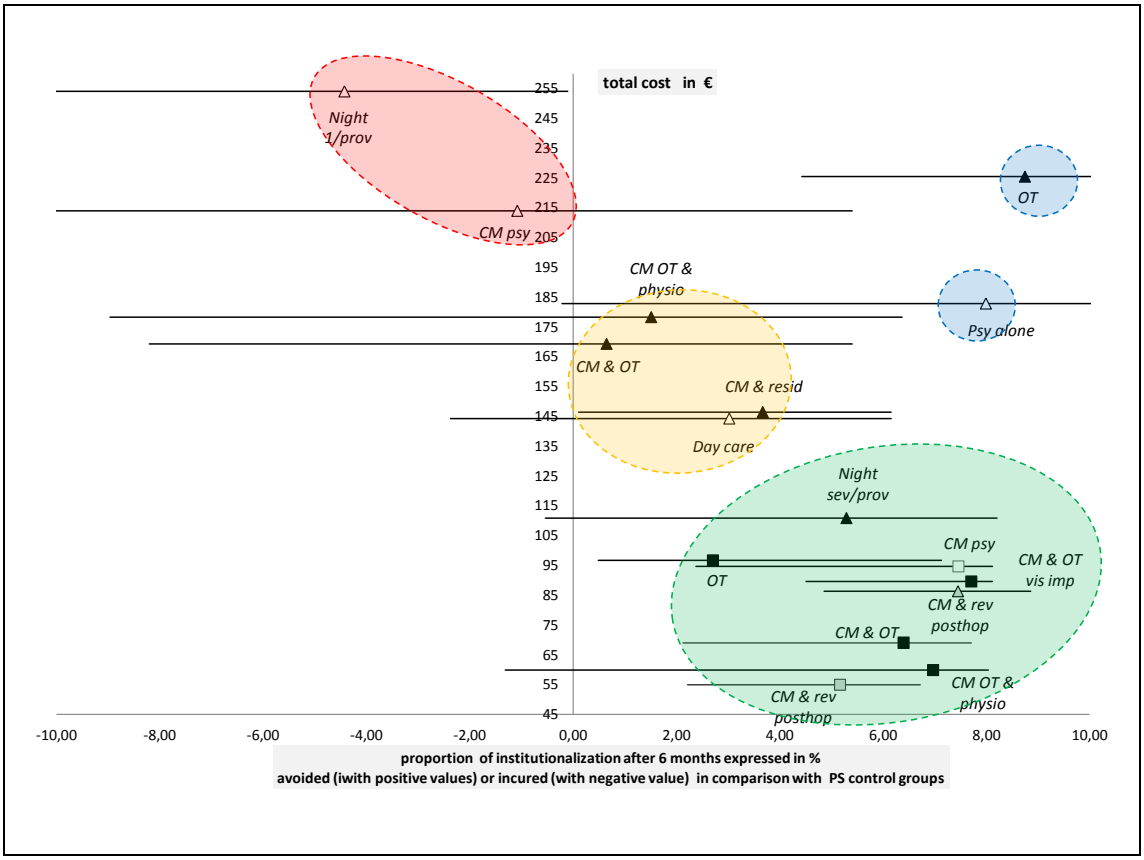


Figure 14: total cost over avoided institutionalization



The following key results can be mentioned by looking at the 4 figures:

1) Case management projects give mixed results. This may be related to the suboptimal implementation of such a project and to different effects on different types of case management.

To illustrate that issue, we summarize here the analysis done for the different type of case management for three key requirements: characteristics of workforce; characteristics of clinical (and organizational) information tools; tailored delivery system design. Thus us summarized on table 4 (workforce), 5 (information) and 6 (system design).

Globally, as illustrated by colors (red for low proportion of project meeting the criteria, and green for high proportion of projects meeting the criteria), most of the type of case management projects are implemented in a sub-optimal way. This has different consequences on results of the projects as summarized in the recommendations done below.

Table 47: number of projects fulfilling requirement per criteria on workforce

	Turnover of case managers	Training of professionals (excl. BelRAI)	Number of FOP per CM (≤40 FOP/CM)	Presence of intervisions/planned supervisions and MD group meetings to enhance the knowledge of case managers
CM & rehab.	0/3	0/3	3/3	1/3
CM OT	1/3	2/3	3/3	½
CM vis. Imp	0/1	0/1	1/1	1/1
CM OT & physio	1/3	1/3	2/3	1/3
CM psy	1/5	5/5	3/3	4/5
CM & resid	2/3	1/3	2/3	0/3
CM alone	¼	¼	¼	¾

Table 48: number of projects fulfilling requirement per criteria on clinical and managerial information

	Care plans use (established collaboratively and include the results of the BelRAI)	Registry (list of beneficiaries of the projects) -	Presence of agreed, evidence-based interdisciplinary protocols
CM & rehab.	2/3	1/3	0/3
CM OT	3/3	1/3	0/3
CM vis. Imp	1/1	1/1	0/1
CM OT & physio	3/3	0/3	0/3
CM psy	1/5	2/5	0/5
CM & resid	3/3	1/3	1/3
CMS	0/4	¼	¼

Table 49: number of projects fulfilling requirement per criteria on system design (mainly embeddedness)

Project	Provision of feed-back of the FOP to the GP (feed-back provided about the results of the intervention or of the BelRAI)	Partnership with coordination service (SISD/SEL/GDT or CCSSD) are reported through planned project meetings
CM & rehab.	2/3	1/3
CM OT	3/3	3/3
CM vis. Imp	0/1	0/1
CM OT & physio	2/3	3/3
CM psy	0/5	2/5
CM & resid	3/3	0/3
CMS	0/4	2/4

For, long-term case management the lack of fulfilling the requirements on workforce, use of clinical and managerial information and system requirements (embeddedness) may impede proper effectiveness (this is the case for projects of case management and psychological services and case management with occupational therapy);

For, two types of case management, key requirement (workforce, information and system) appear to influence less the results:

(3) Short-term case management for frail older person (FOPs coming out of the hospital appears to be an efficient intervention to delay institutionalization.
(4) Case management with institutional services may be less sensitive to poor level of requirements in comparison with other projects.

Case management projects give mixed results. This may be related to the suboptimal implementation of such a project and to different effects on different types of case management.

2) Psychological services and occupational therapy provided alone

Firstly, Psychological and Occupational therapy services provided as a stand-alone bring a better ratio of project cost for the NHIDI over reduced institutionalization than case management for low impaired frail older people. This may be at the expense of financial accessibility as some projects ask a payment.

Secondly, these projects bring about good results for highly impaired frail older person, provided that informal caregiver invests a substantial amount of time to the care to FOPs.

3) Night care and day care projects

Firstly, these projects target severely impaired older people.

Secondly, night care services encompassing one provider per FOP per night and night hostels result in more institutionalizations than the control group. These projects might be a good intervention to prepare the dyad of FOP and ICG for institutionalization

7 Publications

Articles in peer-reviewed journals

Article ready to be submitted to The Gerontologist:

De Almeida Mello, Macq, J., Van Durme, T., Cès, S., Van Audenhove, C., Declercq, A. The determinants of informal caregivers' perceived burden in the home care for frail older persons. Differences according to stratification of beneficiaries' impairment profile.

De Almeida Mello, Johanna ; Van Durme, Thérèse ; Macq, Jean ; Declercq, Anja. Interventions to delay institutionalization of frail older persons: design of a longitudinal study in the home care setting. In: BMC Public Health, Vol. 12, no. 12, p. 615 [1-6] (2012).

Van Durme, Thérèse ; Macq, Jean ; Jeanmart, Caroline ; Gobert, Micheline. Tools for measuring the impact of informal caregiving of the elderly: a literature review. In: International Journal of Nursing Studies, Vol. 49, no. 4, p. 490-504 (2012).

IMa (Meeting abstracts, presented at international scientific conferences and symposia, published or not published in proceedings or journals)

Oral presentations

De Almeida Mello, J., Van Durme, T., Macq, J., Cès, S., Declercq, A. (2014). Can case management be an asset to home care interventions in order to delay institutionalization of frail older persons? A Belgian longitudinal study. International Conference on Integrated Care. Brussels, 2-4 April 2014.

Van Durme Thérèse, Cès Sophie, Karam Marlène, Macq Jean, Strategies used by case managers supporting frail, community-dwelling older persons, to engage primary care physicians in interprofessional collaboration, RCN 2014 Annual International Nursing Research Conference 02 - 04 April 2014, Glasgow, Scotland, UK

De Almeida Mello, J., Macq, J., Cès, S., Van Durme, T., Declercq, A. (2013). The determinants of informal caregivers' perceived burden in the home care setting: relevant information for the care for older people. Oral presentation at British Society of Gerontology Annual Conference 2013. Global Ageing: Implications for Individuals and Society, 11-13 September 2013. Oxford, 12 September 2013.

Cès, Sophie, Evaluation économique de l'aide informelle, une activité complexe à mesurer Communication à la journée d'étude «Les enjeux économiques, sociologiques et politiques du vieillissement », CLERSE, Université Lille 22, 23 novembre 2012

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Van Durme, Thérèse ; Macq, Jean ; Gobert, Micheline. Validation de l'échelle de Zarit auprès d'aidants informels de personnes âgées non démentes. 1er Symposium international sur la recherche en interventions en sciences infirmières (Montréal, Canada, du 06/04/2011 au 08/04/2011).

De Almeida Mello, J., Declercq, A., Spruytte, N. (2010). The use of comprehensive geriatric assessments for clients using home care services: a Flemish study. Journal of Clinical Nursing: vol. 19 (Suppl. 1). Fourth European Nursing Congress Older Persons: the Future of Care. Rotterdam, 4-7 October 2010, 126.

Cès, Sophie ; Van Durme, Thérèse ; Jeanmart, Caroline ; Gobert, Micheline ; D'Hoore, William ; Macq, Jean. Evaluating innovative projects of care & support to community-dwelling frail elderly. séminaire interdisciplinaire de recherche sur le vieillissement du CRIV (Bruxelles, du 23/09/2010 au 23/09/2010).

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Van Durme Thérèse, Cès Sophie, Schmitz Olivier, Macq Jean, Case management's effectiveness to yield positive outcomes for frail older persons living at home: a realist review, 14th International Conference on Integrated Care, Brussels, April 2-4 2014

Lopez Hartmann Maja, Van Durme Thérèse, Maggi Patrick, Delye Sam, Schmitz Olivier, De Almeida Mello Johanna, Cès Sophie, Verhoeven Veronique, Gosset Christiane, Declercq Anja, Macq Jean, Wens Johan, Remmen Roy, Informal caregiver involvement in innovative home care projects in Belgium ; 13th International Conference on Integrated Care, April 11-12 2013, Berlin, Germany Thursday, April 11, 2013 to Friday, April 12, 2013

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Maggi Patrick, de Almeida Mello Johanna, Delye Sam, Van Durme Thérèse, Cès Sophie, Macq Jean, Declercq Anja, Gosset Christiane, An occupational therapist as a new professional at home: which profiles of clients are reached ? . Wintermeeting Belgische Vereniging voor Geriatrie en Gerontologie (Oostende, Belgium, du 22/02/2013 au 23/02/2013).

Van Durme, Thérèse ; Macq, Jean ; Lopez Hartmann, Maja ; Maggi, Patrick ; Delye, Sam ; Gosset, Christiane ; Schmitz, Olivier. Case management projects enabling frail older people to stay in their own home -building quality indicators for the evaluation of Protocol 3 projects. Wintermeeting Belgische Vereniging voor Geriatrie en Gerontologie (Oostende, Belgium, du 22/02/2013 au 23/02/2013).

De Almeida Mello, J., Lopez Hartmann, M., Cès, S., Van Durme, T., Remmen, R., Macq, J., Declercq, A. (2013). The effect of innovative home care projects on the perceived burden of informal caregivers: a

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Van Durme, Thérèse ; Cès, Sophie ; Ribesse, Nathalie ; D'Hoore, William ; Gobert, Micheline ; Jeanmart, Caroline ; Swine, Christian ; Remmen, Roy ; Declercq, Anja ; Macq, Jean. Designing a protocol for innovative projects of care and support targeting community dwelling frail elderly. 4th European nursing congress; Older persons: the future of care (Rotterdam, du 04/10/2010 au 07/10/2010). In: Journal of Clinical Nursing, Vol. 19, no. 1, p. 15 (2010).

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