Emilie BANSE

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SACRED DUTY, SILENT SUFFERING ?

A MULTIMETHOD INVESTIGATION OF MEDICAL CULTURE AND PHYSICIAN BURNOUT



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Abstract

Medicine is a profoundly meaningful profession in which physicians dedicate their knowledge and skills to alleviate suffering and care for others. Yet in recent decades, this vocation has come under increasing strain, marked by a persistent crisis of physician burnout. While extensive research has examined individual and organizational contributors, an essential dimension remains insufficiently addressed: the role of medical culture in shaping physicians' vulnerability to and experience of burnout. This thesis fills this gap by exploring how specific cultural assumptions influence burnout and related health outcomes. Four research questions guide our work across four empirical chapters: (1) can harmful cultural norms be identified, modelled, and operationalized? (2) to what extent are these norms associated with burnout and other health-related outcomes? (3) do physicians endorse these norms uniformly, or do patterns vary across subgroups? and (4) how do physicians themselves articulate and make sense of these cultural expectations? Findings suggest that medical culture is a macrosystemic influence of physician well-being, and that training and socialization play a central role in the transmission of harmful cultural norms. These results are discussed in light of their theoretical, research and practical implications. Overall, this thesis underscores the need to address and change specific cultural norms in medicine to prevent physician burnout.

Résumé

La médecine est une profession profondément porteuse de sens, dans laquelle les médecins mobilisent leurs connaissances et leurs compétences au service des autres. Pourtant, ces dernières décennies, cette vocation est soumise à des tensions croissantes, marquées par une crise persistante de burnout. Si de nombreuses recherches ont examiné les facteurs individuels et organisationnels qui y contribuent, une dimension essentielle demeure insuffisamment étudiée : le rôle de la culture médicale dans la vulnérabilité des médecins au burnout et dans la manière dont ils en font l'expérience. Cette thèse explore comment certains présupposés culturels influencent le burnout et d'autres issues de santé chez les médecins. Quatre questions de recherche guident notre travail à travers quatre chapitres empiriques : (1) peut-on identifier, modéliser et opérationnaliser des normes culturelles potentiellement délétères ? (2) dans quelle mesure ces normes sont-elles associées au burnout et à d'autres issues de santé ? (3) les médecins y adhèrent-ils de manière uniforme ou observe-t-on des variations selon les sous-groupes ? et (4) comment les médecins eux-mêmes décrivent-ils et comprennent-ils ces attentes culturelles ? Les résultats suggèrent que la culture médicale constitue une influence macrosystémique du bien-être des médecins, et que la formation et la socialisation jouent un rôle central dans la transmission de normes culturelles potentiellement délétères. Ces résultats sont discutés à la lumière de leurs implications théoriques, cliniques et pratiques. Dans l'ensemble, cette thèse souligne la nécessité d'aborder et de changer certaines normes culturelles en médecine pour prévenir le burnout des médecins.

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I will not have another opportunity to write such a heartfelt ‘thank you’ to the many people who have shaped this doctoral journey, which I was I want to take the time to do so here.

In my research environment, I was fortunate to be surrounded by many people whose support shaped both my work and research journey.

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A heartfelt thank you as well to Hélène Givron, for your genuine kindness and for opening the door to the wonderful people at UNamur. It was a joy to exchange with you about our shared research interests and about our experiences of the academic world. I admire you both as a researcher and as a person, and I really hope our paths will continue to cross.

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participated in what constitutes the main study of this thesis. Research cannot exist without your willingness to share your time and experiences, and I am very grateful that you made time for this in your already demanding (professional) lives. Thank you as well to the many organisations that relayed my survey and helped make this work possible. I am also grateful to everyone who offered me opportunities to present, explain, and bring my research to life through talks, trainings, podcasts, symposiums, and conferences. These moments of connection and exchange were honestly my favourite part of this PhD. To the physicians who attended my presentations and shared thoughtful comments - thank you too. Your insights helped me understand the realities of the field more fully. And to all those who enriched my thinking along the way (among many others; Philippe Rouard, Pascale Senny, Martin Desseilles, Dominique Henrion and Laura Demarthe), thank you for the conversations, the encouragement, and the perspectives you offered.

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Clara, Killian, Loïc, Pauline, Roxane, Louis, Charlie; but also my dear girl friends Emilie, Donia, Philou, and Marie-Laure); but you were always there, both in the difficult moments and to celebrate the successes. I won't list all the names and describe how each of you supported me along the way, but please know that your presence, in your own unique way, meant more to me than I can put into words. I hope you recognize yourselves. I am so lucky to have you! A special thank you as well to Hannah for creating the beautiful watercolor illustration that brings my thesis cover to life.

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General Introduction

General Introduction

Medicine is often described as a calling, a profoundly meaningful profession in which physicians dedicate their knowledge and skills to alleviate suffering and improve the lives of others. Yet in recent decades, this vocation has come under increasing strain. Physician burnout has grown into a public health crisis: its prevalence continues to rise worldwide, and its consequences extend far beyond individual physicians, affecting patients, colleagues, and healthcare systems as a whole.

The persistence of physician burnout may suggest that some of its deeper drivers have been overlooked. One such driver is medical culture, understood here as the set of shared beliefs, values, and norms that define the medical profession, shape behavioural expectations, and play a central role in the formation of physicians' professional identity. Deeply embedded yet rarely made explicit, medical culture is often invoked in commentaries and testimonies in relation to physician burnout, but has until now received little empirical investigation.

This thesis addresses that gap. Through a multi-method approach using both quantitative and qualitative methods, it explores how specific dimensions of the medical culture are associated with physician burnout and related health outcomes, and how these cultural dynamics are transmitted and experienced within the profession. In doing so, it aims to contribute both to scientific understanding of and to the development of more effective approaches for the prevention of burnout in medicine.

Before further detailing the framework, object and goals of the thesis, as well as outlining the structure thereof, it seemed important to share a brief account of its origins and of the insights that gave rise to its central questions.

The best research you can do is talk to people.

- Sir Terry Pratchett

The statement of Sir Terry Pratchett carries particular weight in psychology, a scientific discipline that is dedicated to understanding human thought, behaviour, and experience. Like most research journeys, mine began with the literature. I immersed myself in the extensive body of work on physician burnout and was struck by how much had already been written about its prevalence, risk factors, and consequences. As I read through empirical studies, systematic reviews, meta-analyses, qualitative research, editorials, and books written by physicians who had themselves experienced burnout in the profession, an intuition gradually began to take shape about the directions my own research might follow. It was an intuition that could not only offer an academic and practical contribution, but would also sustain the passion required for a doctoral project.

In parallel, it became clear to me that reading alone would not be enough. If I was to truly understand physician burnout, I needed to start by hearing from physicians themselves, to listen to their words and subjective experience, and to confront my reflections to lived reality. Early in my thesis, I therefore sought out encounters with resident and attending physicians from different specialties, who courageously shared their experiences of burnout in the medical profession.

Their words were striking. The following excerpts[1] are representative of what many physicians expressed in different ways:

« […] that's part of burnout, you know, [in medicine] you're trained to... to wreck yourself. When you're on duty, you're all alone. So, you better figure it out on your own, it's in our physician DNA. We've been brought up like that. »

« Both in terms of training, where you can't really take breaks, or where you'd better be at the very top of the class ranking, you'd better already have a clear career path mapped out and be sure your place is secured, because if not, uh … it's not well regarded. And again, that 'not well regarded' is once more about rumours. But it's scary! These are unspoken

1 Original excerpts in French:
« […] ça fait partie du burnout hein, on t'a éduqué à … à te déglinguer tout seul. Quand t'es de garde, t'es tout seul. Donc t'as intérêt à te débrouiller tout seul, c'est dans notre ADN de médecin. On a été élevé là-dedans »
« Tant au niveau des études ou on peut pas prendre de pauses, t'as intérêt à être tout en haut du classement, t'as intérêt à avoir déjà un plan de carrière tout tracé et être sur que ta place est assurée parce que si non euh … tu te fais [jeter] parce que c'est pas bien vu, et alors de nouveau le "pas bien vu" c'est de nouveau des rumeurs tu vois, mais je sais pas ce que ça implique tu vois ? Mais ça fait peur ! Ce sont des non-dits. »
« […] c'est mal vu vraiment de prendre du temps pour soi quoi, parce que t'es censé être carriériste, ton métier avant tout etc. »

things. »

« It's really frowned upon to take time for yourself, because you're supposed to be career-driven, [you're supposed to put] your job before everything else, etc. »

Listening to these testimonies sharpened my intuition. There seemed to be something intangible at play - a shared sense that many physicians described but struggled to name. I encountered the same undercurrent in the literature and in my exchanges with physicians: an invisible weight present in training, daily work, and professional identity. Elusive yet powerful, this 'something' appeared to shape not only physicians' vulnerability to and experience of burnout, but also how they responded to it. Over time, it became clear to me that what I was circling around was *medical culture* – a concept that reflects the set of values, norms, and expectations that gives meaning to the medical profession, but that also can sometimes place heavy constraints on physicians' capacity to care for themselves.

At the time, some authors had already evoked this notion of medical culture - whether in editorials, books, or discussions of qualitative research - and it was also a term that physicians themselves sometimes used in their testimonies. Yet little empirical work had *directly* examined medical culture in relation to physician burnout and distress. I saw the need to take what many physicians and researchers had sensed, and to explore it through empirical research. It is from this starting point that the core theme of this thesis took shape.

In terms of structure**,** the present thesis is organized in 3 parts.

The first part (chapters 1 to 3) lays the theoretical groundwork underlying the present thesis. **Chapter 1** gives an overview of the state of art of the scientific literature on physician burnout, by detailing its definition, prevalence, correlates, wide-ranging consequences, and existing strategies to address physician burnout. **Chapter 2** explores the concept of medical culture by delineating its defining characteristics and analysing the mechanisms through which it is transmitted within the medical profession via medical education and training. **Chapter 3** brings these two strands together by reviewing existing theoretical and empirical evidence on the links between medical culture and physician burnout. This chapter will highlight the strengths, limitations and research gaps of prior work and specify the aims and framework of the present thesis.

The second part (chapters 4 to 7) presents four empirical studies, all grounded in a shared data collection but approached through complementary methods. **Chapter 4** defines and validates the construct of Harmful Dimensions of Medical Culture (HDMC) and demonstrates its association with physician burnout. **Chapter 5** broadens the scope to additional outcomes, including depression, help-seeking,

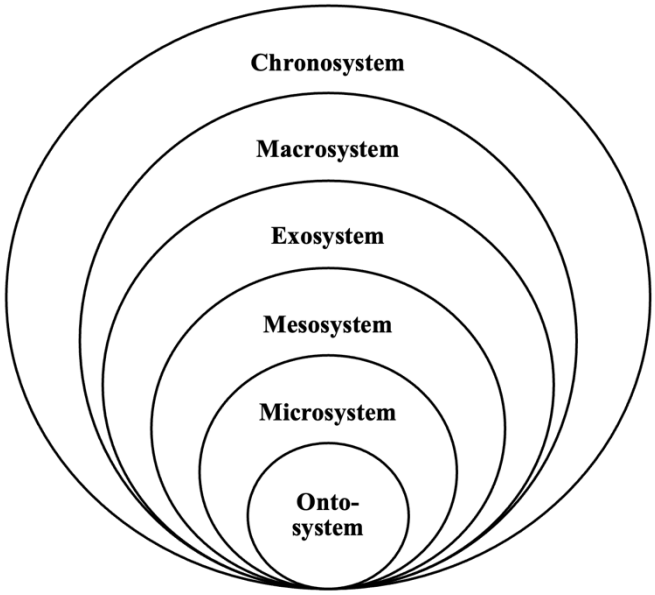
self-treatment, presenteeism, and psychoactive medication use. **Chapter 6** explores which physician groups are most exposed to harmful norms, identifying subgroup differences linked to age, gender, specialty, and workload, and testing whether HDMC mediates vulnerabilities to burnout. **Chapter 7** complements these findings with a qualitative analysis of physicians' accounts. The analysis suggests that cultural norms are internalized and reinforced throughout training and practice, while being situated within wider systemic and societal dynamics.

Finally, the thesis closes with a **General Discussion** that synthesizes the main findings, reflects on their theoretical, practical and research implications, considers transversal limitations and, finally, proposes concluding remarks to this thesis.

Before diving deeper into the topic of physician burnout, I would like to briefly introduce the disciplinary grounding of the present thesis. This thesis is situated in **health psychology**, a field concerned with how psychological, behavioural, and cultural factors influence health and illness. As we will see, physician burnout is a complex form of occupational distress that emerges from the interplay of individual vulnerabilities, workplace dynamics, and broader systemic forces. Moreover, this thesis focuses on one crucial but underexplored aspect of this phenomenon: how medical culture shapes physicians' vulnerability to and experience of burnout. Addressing this question necessarily requires an **interdisciplinary perspective**. To this end, this thesis adopts a socio-ecological perspective and draws on Bronfenbrenner's *Ecological Systems Theory* (1977, 1986) as its foundation.

Bronfenbrenner's theory emphasizes that individual development and behaviour can only be understood in relation to the multiple, interacting environments in which people are embedded. In its original formulation (1977), the model distinguishes several nested levels of influence: the **ontosystem** (the individual's own characteristics, such as personality traits, dispositions, or health status), the **microsystem** (settings with a direct influence on the individual, such as family, peers, or workplace), the **mesosystem** (interrelations between microsystems, such as the way work and family life influence one another), the **exosystem** (indirect environments that nonetheless affect the individual, such as a partner's workplace or organizational policies), and the **macrosystem** (the broader cultural or societal context that shapes norms and values). Importantly, Bronfenbrenner later added the **chronosystem** to his model (1986), which captures the influence of time (i.e. specific events, historical shifts, cultural socio-political changes over time). **Figure 1** illustrates this model in its commonly represented layered form.

Figure 1. *Visual representation of Bronfenbrenner's Ecological Systems Theory*



Note. Bronfenbrenner's theory is often represented through multiple layers.

Later, McLeroy and colleagues (1988) adapted Bronfenbrenner's ecological systems theory specifically to health psychology and public health, formulating *An Ecological Model For Health Promotion* that conceptualizes health and health behaviours as the product of multilevel interactions. While McLeroy and colleagues never used the term *Socio-Ecological Model* (henceforth SEM), this terminology became common in public health literature and practice (e.g. CDC, WHO) to denote such a multilevel perspective[2]. In this thesis, the socio-ecological perspective provides a unifying framework to situate medical culture a distinct layer of influence, one that will be conceptualized at the macrosystem level that intersects with other ecological forces to shape physicians' experience of burnout. By drawing on this perspective, the thesis remains rooted in health psychology while also integrating insights from organizational and social psychology, medical education, sociology and history. The socio-ecological perspective offers a coherent way to situate and interpret the empirical work that follows.

Building on these introductory reflections, the next chapters lay the theoretical foundations of the present thesis.

[2] Many authors in public health and health promotion cite McLeroy et al.'s (1988) work as the foundational reference for what is today referred to as the socio-ecological model (SEM).

I dedicate this work to all the physicians who work relentlessly to care for their patients.

It is my hope that the readers of this thesis will find the topic as engaging as I did while working on it.

Part 1. Theoretical Section

Chapter 1. Physician burnout

1. Definition, symptoms and prevalence

1.1 Defining job burnout

Job burnout is a work-related syndrome defined as **a prolonged response to chronic emotional and interpersonal stressors in the workplace** (Maslach et al., 2001). The first scientific use[3] of the term *burnout* appeared in Harold Bradley's work on community-based treatment for young adult offenders (1969). A few years later, Herbert Freudenberger popularized the concept by providing the first detailed description of the phenomenon. Freudenberger was a practicing psychologist and university professor who observed among helping professionals in an alternative healthcare agency a gradual depletion of emotional energy, loss of motivation, and declining commitment (Freudenberger, 1974). Around the same time, Christina Maslach, a social psychologist and academic researcher, documented similar patterns in professions such as nursing. She noted the emergence of cynism alongside exhaustion and diminished feelings of accomplishment. Building on these observations, Maslach developed and formalized the concept of burnout (Maslach, 1976; Maslach et al., 1993, 2001).

Since 2019, the World Health Organization has recognized burnout as an **occupational phenomenon**, though not as a medical condition (World Health Organization, 2019). The long-standing debate over whether burnout should be classified as a medical disorder continues (Nadon et al., 2022), but falls outside the scope of this thesis.

1.2 Symptoms and measurement

According to Maslach's conceptualization, burnout manifests through three core symptoms emerging in stages: **emotional exhaustion, depersonalization, and a sense of reduced personal accomplishment** (Maslach et al., 2001; Schaufeli et al., 2009). In the case of physician burnout (henceforth referred to as PB), burnout typically appears first as profound physical and emotional exhaustion, leaving physicians with a pervasive sense of depletion and little energy to face clinical duties. This is generally followed by depersonalization (also referred to as cynism or dehumanization), where physicians distance themselves from their patients -

[3] The earliest *literary* use of the term 'burnout' can be traced back to a novel (*A Burnt-Out Case)* written by Graham Greene in 1960.

sometimes referring to them by diagnosis or room number rather than by name - thus reducing them to objects rather than human beings. Third, physicians experience a sense of reduced professional accomplishment. They may lose confidence in their abilities in helping patients effectively and feel that their work is no longer meaningful or fulfilling (Maslach et al., 2001; C. P. West et al., 2018). The very term 'burnout' captures this progressive depletion, evoking the image of a flame that slowly dies out until it is extinguished (Schaufeli et al., 2009).

For long, the **Maslach Burnout Inventory (MBI)** has remained the most widely used instrument to assess burnout symptoms (Maslach et al., 1997). The version tailored for healthcare professionals (e.g. physicians), the MBI-Human Services Survey (MBI-HSS), consists of 22 items rated on self-reported frequency scales and assesses emotional exhaustion, depersonalization, and reduced personal accomplishment. Total scores can be computed, and cut-off values have been proposed to indicate high levels of burnout for each dimension (Maslach et al., 1997; C. P. West et al., 2018). Over time, shorter versions of the MBI have been developed to improve practicality in research and clinical settings (C. P. West, Dyrbye, et al., 2012; C. P. West et al., 2018). More recently, alternative measures to the MBI have been introduced to assess burnout. Among these, the **Burnout Assessment Tool (BAT)** (Schaufeli, Desart, et al., 2020) has attracted increasing attention, and it is the instrument adopted in this thesis. The BAT was designed to overcome several shortcomings of the MBI, including conceptual ambiguities in the definition of burnout, psychometric limitations, and restricted applicability for individual-level assessment (see Schaufeli, Desart, et al., 2020 for an in-depth discussion). The BAT conceptualizes burnout as comprising four core dimensions (exhaustion, mental distance, emotional impairment, and cognitive impairment) and three secondary dimensions (depressed mood, psychological distress, and psychosomatic complaints). It contains 33 items, with 23 measuring the core dimensions (BAT-C) and 10 the secondary ones (BAT-S), scored on self-reported frequency scales. By including symptoms such as cognitive and emotional impairment, the BAT captures aspects of distress commonly reported by physicians (Almarzouki, 2024; Jackson-Koku & Grime, 2019). Unlike the MBI, it produces a single overall score of burnout (Hadžibajramović et al., 2020; Schaufeli, Desart, et al., 2020) and evidence suggests that the BAT demonstrates stronger psychometric properties than the MBI (Schaufeli, Desart, et al., 2020; Villacura-Herrera et al., 2025). Note that in this thesis, the 12-item version of the BAT (BAT-12) was used (Schaufeli, Desart, et al., 2020; Schaufeli, De Witte, et al., 2020). This widely used short form focuses exclusively on the four core dimensions most consensually considered to reflect burnout. In doing so, the BAT-12 reduces overlap with constructs such as depression,

anxiety, and irritability, which, although related, are considered as conceptually distinct. Indeed, through latent and network analysis, De Amorim Macedo and colleagues (2023) found that the correlations between the BAT-12 subscales themselves were higher than their correlations with measures of depression, anxiety, or irritability among healthcare workers. This indicates that burnout domains measured with the BAT-12 are dissociable from other domains of negative affect. In the present work, we used the BAT-12 global continuous burnout score to capture overall burnout severity in a parsimonious and psychometrically robust way.

1.3 Prevalence of physician burnout

Today, PB is widely recognized as a **public health crisis**, characterized by high prevalence across specialties and experienced by both physicians in training and those in practice. Recent research indicates that PB has increased markedly in recent years (for reviews, see Panagioti et al., 2017; Rotenstein et al., 2018; Shanafelt, West, et al., 2022; Zhang et al., 2020) and that the problem is global in scope (C. P. West et al., 2018). Empirical studies further suggest that levels of PB exceed those observed in other professions, even after accounting for factors such as work hours (e.g. Shanafelt et al., 2012).

The most comprehensive assessment of PB prevalence to date remains the systematic review conducted by Rotenstein and colleagues (2018), published in *JAMA*. Synthesizing data from 182 studies conducted in 45 countries, the authors reported **striking variability in reported prevalence.** Overall burnout prevalence ranged from 0% to 80.5%, while the prevalence of its sub-dimensions ranged from 0% to 86.2% for emotional exhaustion, 0% to 89.9% for depersonalization, and 0% to 87.1% for reduced personal accomplishment. Rotenstein and colleagues primarily interpret this wide variability as a consequence of differences in burnout definitions (in their systematic review, the authors indicate that at least 142 unique definitions exist for meeting overall burnout or burnout subscale criterias in the PB literature), assessment methods, and study quality and design (2018). Importantly and to broaden this interpretation, it is likely that such differences also reflect variations in contextual and cultural factors on PB prevalence, including potential differences between countries (e.g. Barker et al., 2021; Lucchetti et al., 2018), institutions (e.g. Dinibutun, 2023; Edwards et al., 2018), or medical specialties (e.g. Ghaseminejad et al., 2024). This heterogeneity makes meta-analytic pooling and establishing reliable prevalence estimates challenging (Rotenstein et al., 2018).

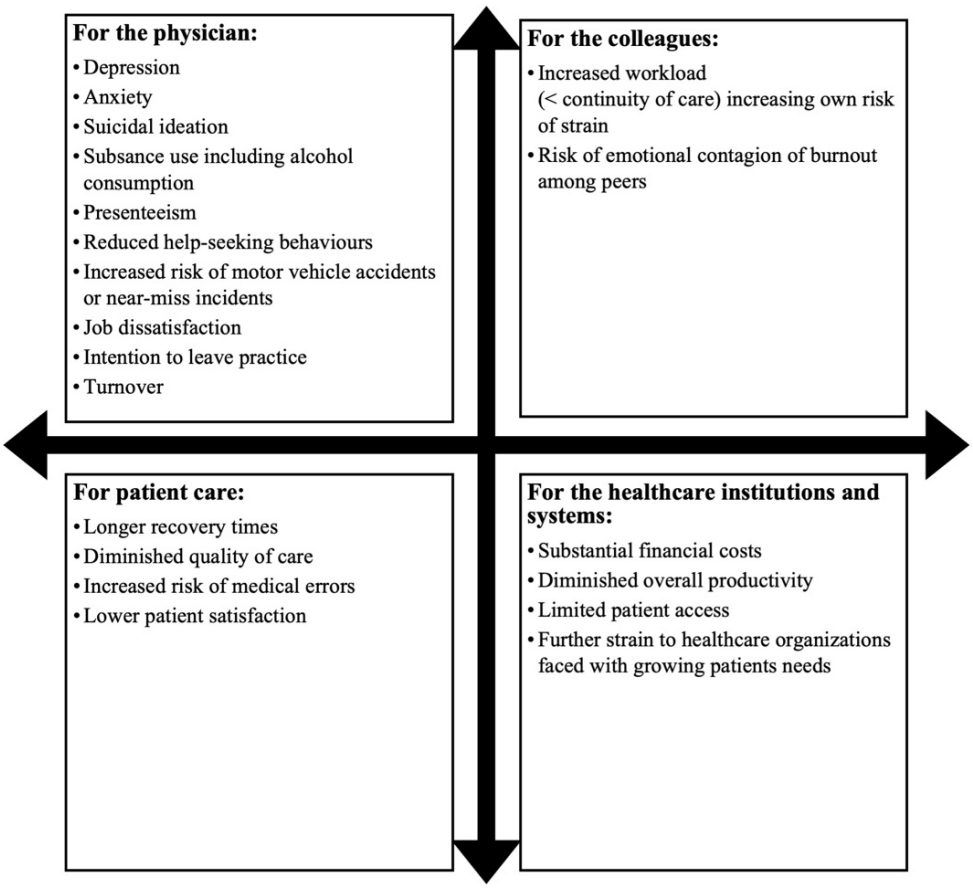
Yet, beyond the variability in numbers, a clear and consistent message emerges from both the literature and firsthand accounts in the profession: **the medical community is experiencing a widespread crisis of exhaustion and**

related distress. PB represents a pressing, global concern. Physicians are burning out, leaving the profession altogether, and medicine itself is losing its appeal as a vocation (CPME, 2025).

2. Consequences of physician burnout

PB matters not only because of its high prevalence but also because of its important and wide-ranging consequences (Patel et al., 2018; C. P. West et al., 2018). **Figure 1** provides an overview of these consequences. For readers interested in more detail and references, further information is provided in **Appendix A.**

Figure 1. *Multilevel consequences of PB*



As the figure illustrates, the impact of PB is multi-level, extending beyond individual physicians to affect patients, healthcare providers, and institutions.

3. Understanding the aetiology of physician burnout

3.1 Evolution of perspectives

In the broader literature on job burnout, the origins of burnout have long been debated, with early perspectives divided between individual and organizational explanations. Freudenberger (1974) emphasized individual dispositions, suggesting that highly motivated, dedicated, and idealistic individuals were most at risk. For him, burnout was a '**condition of the dedicated'**. Burnout reflected the disillusionment that arises when personal investment fails to achieve desired outcomes (e.g. a psychiatrist experiencing profound discouragement when a patient with alcoholism relapses, despite intensive psychotherapeutic care). On the other hand, Maslach (Maslach et al., 1993; Maslach & Leiter, 1997) highlighted the occupational dimension, showing that burnout was especially prevalent in caregiving professions such as healthcare, social work, or education. Here, burnout was initially framed as a '**condition of the caregiver**' emerging from the emotional strain of helping others (e.g. a palliative care physician becoming emotionally exhausted after repeated exposure to patient death, difficult decision-making, and family distress). The medical profession exemplifies this dual vulnerability, as physicians are typically both highly invested and mainly engaged in caring roles[4].

In the case of PB more specifically, scholars note that medicine has been particularly slow to acknowledge evidence from other fields showing that burnout is shaped not only by individual traits but also by workplace conditions (Shanafelt, 2021; Sinskey et al., 2022). Historical perspectives in journals such as *the New England Journal of Medicine* (Arnold-Forster et al., 2022) or *The Lancet* (Marchalik, 2019) illustrate how PB was long framed in medicine as a personal failing, reinforcing the misconception that it reflected a lack of resilience or adequacy (Oliver, 2017). More recent work highlights the important role of organizational and systemic factors in shaping PB as well (Marchalik, 2019; Montgomery, 2014; Sinskey et al., 2022)[5].

Today, evidence suggests that the perspectives outlined above are not mutually exclusive: burnout is now understood as a complex occupational

[4] This dual vulnerability is also observed in other groups at risk of burnout, such as nurses or parents.

[5] For instance, in his perspectives paper, Marchalik (2019) traces the evolution from earlier studies of the vulnerable 'physician personality' (Shortt, 1979) to more recent evidence. Although cross-sectional, this evidence suggests that burnout is driven more by training and the work environment than by personal dispositions. For instance, medical students begin with lower burnout and depression scores than their peers but surpass them after a year of training (Brazeau et al., 2014). Likewise, whereas higher education generally reduces burnout risk, a medical degree appears to increase it (Shanafelt et al., 2012).

phenomenon that emerges from the **interaction of individual, workplace, and societal influences**.

3.2 Theoretical frameworks to understand physician burnout

Across disciplines, a range of theoretical frameworks have been developed to explain the origins of burnout.

Following our review of the literature, we present in **Table 1** a selection of *six frameworks* that we believe are particularly relevant and complementary for understanding why and how burnout develops in physicians:

1. The Areas of Worklife model (Leiter & Maslach, 2003)
2. Burnout as a loss of existential meaning (Delroisse, 2020; Längle, 2003; Pines, 2002)
3. Burnout as a disease of civilization (Chabot, 2013, 2017)
4. Burnout according to the Self-Discrepancy theory (Higgins, 1987)
5. Burnout through a Socio-Ecological Perspective (McLeroy et al., 1988)
6. The Job-Demands Resources Model (Demerouti et al., 2001, 2021)

This overview is not exhaustive[6] but highlights models that offer useful perspectives from different disciplines. Some of these frameworks were developed specifically within burnout research, while others are broader theories of human behaviour that have since been applied to burnout. A more detailed description of each model with references is provided in **Appendix B.**

[6] While we acknowledge that many other models have been proposed to understand professional burnout (e.g. the Demand-Control Model, the Effort-Reward Imbalance Model), a comprehensive review lies outside the scope of this thesis. Here, we focus on a selection of frameworks that we consider particularly relevant for understanding PB.

Table 1. *Overview of theoretical frameworks to understand physician burnout*

Model	Discipline	Origin	Description	Application to job burnout	Application to PB specifically	Empirical validation ?	Unique contribution
Areas of Worklife model (Leiter & Maslach, 2003)	Occupational & organizational psychology	Developed within burnout research	Burnout arises from mismatches between person and job across six domains: workload, control, reward, community, fairness, values.	Empirically linked to higher exhaustion when mismatches occur, in multiple occupations (Leiter & Maslach, 2003)	Poor fit in workload, control, fairness, and values strongly predicts PB in surgeons and primary care physicians (Gregory & Menser, 2015; Verret et al., 2021)	Yes	Highlights *job-person fit* and the role of contextual mismatches in driving burnout.
Existential meaning (Längle, 2003; Pines, 2002)	Existential psychology	Broader existential theory applied to burnout	Burnout seen as a loss of meaning in work; an 'existential vacuum' when work no longer provides purpose in life.	Lack of existential meaning linked to feelings of emptiness and burnout across professions (e.g. Delroisse, 2020; Pines, 2002)	Physicians vulnerable due to vocational view of medicine; meaning protects against burnout in emergency physicians and residency directors (Ben-Itzhak et al., 2015; Hooker et al., 2020)	Partly (tested through measures of meaning)	Brings in *meaning and vocation* as protective/risk factors for burnout.
Disease of civilization (Chabot, 2013, 2017)	Philosophy	Conceptual philosophy applied to burnout	Burnout as a symptom of modern societies dominated by productivity and efficiency; professions of healing, educating, and governing are vulnerable.	Highlights burnout as a cultural and societal pathology, not only one of the individual (Chabot, 2013, 2017)	For physicians, clash between institutional productivity demands and relational ideals of patient care fuels PB (S. D. Agarwal et al., 2020).	No	Links burnout to *macro-cultural forces* and critiques the medical productivity culture.

Self-Discrepancy Theory (SDT) (Higgins, 1987)	Social psychology	Psychological theory applied to burnout	Negative emotions arise from gaps between actual, ideal, and ought selves.	Applied to teacher, counselor, parental burnout (D. Lee, 2018; Roskam et al., 2022; Tang, 2022). Discrepancies erode motivation and increase exhaustion.	PB associated with actual-ideal and actual-ought gaps; distress from discrepancies explains additional variance in PB (Aharon, 2024)	Yes	Brings in *identity and self-ideals*, showing how internalized expectations contribute to burnout.
Socio-Ecological Model (SEM) (McLeroy et al., 1988)	Public health and health psychology	General health framework applied to burnout	Multilevel model: intrapersonal, interpersonal, organizational, community, and policy factors interact to shape health behaviours.	Framework for burnout research and prevention; used to identify multilevel drivers of burnout (De Lisser et al., 2024; Habeger et al., 2022)	Highlights PB as multilevel phenomenon; medical culture potentially as a professional-level factor (Carmack, 2019)	Partly (mapping ; limited *direct* evidence possible)	Emphasizes the importance of *multilevel interactions*.
Job Demands-Resources (JD-R) Model (Demerouti et al., 2001, 2021)	Occupational health psychology	Developed within burnout research	Burnout develops when high job demands lead to exhaustion and insufficient resources lead to disengagement.	Strong empirical support. E.g. meta-analysis shows workload, role conflict ↑ burnout; control, autonomy ↓ burnout (Alarcon, 2011)	For physicians, stress, overload, and work-family conflict ↑ exhaustion; recognition and meaning ↓ depersonalization (Chênevert et al., 2021)	Yes	Provides a *parsimonious, empirically robust framework* linking demands, resources, and burnout.

Note. This table summarizes six theoretical frameworks with their application to physician burnout. 'Empirical validation' refers to whether the propositions of a framework have been empirically validated, i.e. supported through empirical studies, which may include both qualitative and quantitative studies.

3.3 Correlates of physician burnout

We now turn to the correlates of PB. Our goal is not to provide an exhaustive review of antecedents or to weigh their relative importance, as such assessments lie outside the scope of this thesis and would in any case be impossible given the sheer number of studies and the heterogeneity of their samples (e.g. trainees versus attending physicians), settings, and countries. Rather, we rely on Bronfenbrenner's *Ecological Systems Theory* (1977, 1986) to organize the main correlates of PB that have been most investigated in the literature. For a reminder, in this framework, six nested levels of influence are distinguished but interact with one another: the ontosystem (individual characteristics, such as personality traits, dispositions, or health status), the microsystem (direct experiences and interactions in family and work settings), the mesosystem (interrelations *between* microsystems, such as the way work and family life influence one another), the exosystem (organizational structures and processes that indirectly shape daily work life), the macrosystem (broader cultural and societal values), and the chronosystem (structural and historical changes over time).[7]

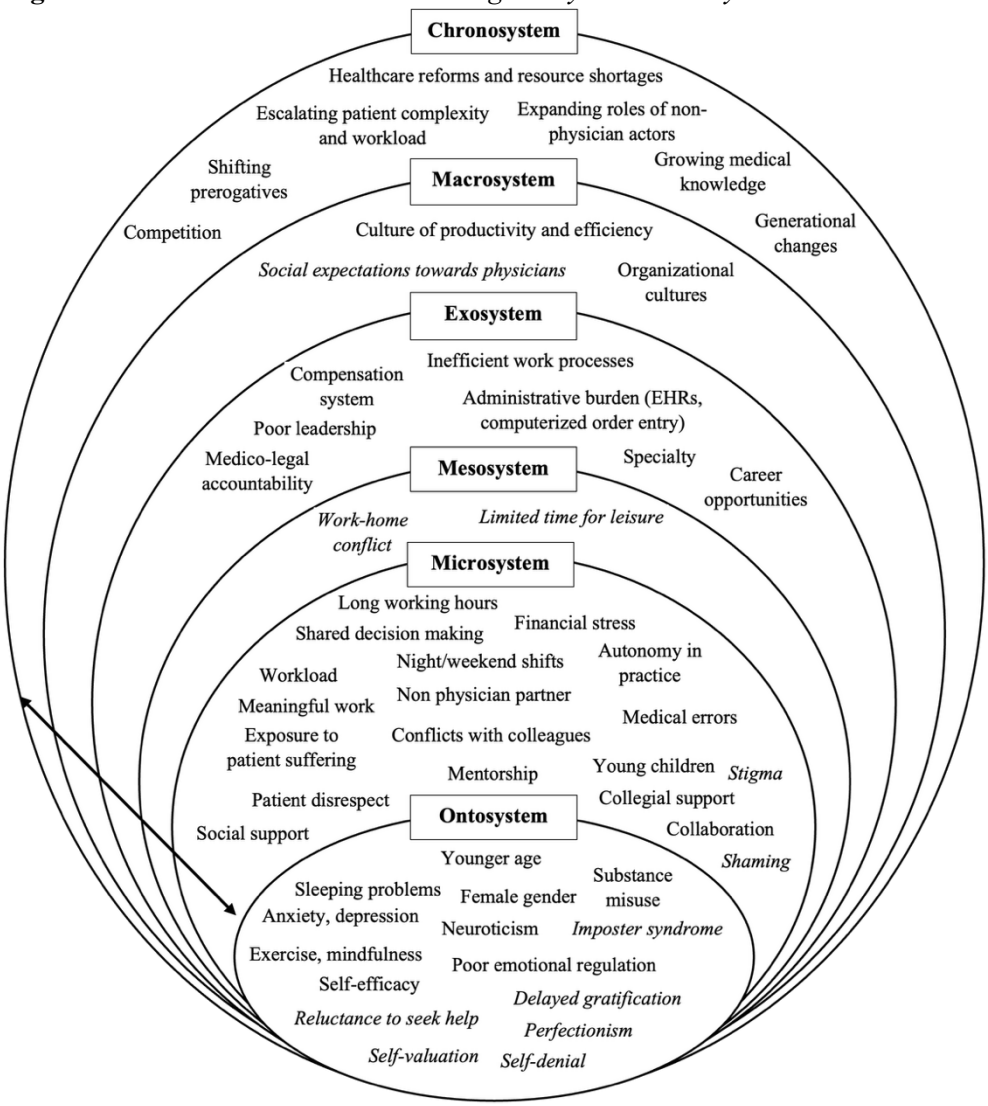
Figure 2 provides an overview of the correlates of PB organized across these levels. Note that we deliberately use the term *correlates* to describe factors associated with PB, as evidence for causality is often lacking (since most PB studies are cross-sectional)[8]. Further details with references are provided in **Appendix C**. The mapping proposed in the figure shows that PB does not stem from a single cause but from the **interplay of diverse influences at different levels** (including organizational, interpersonal and individual factors, e.g. Bayot et al., 2024). Importantly, these layers also reinforce one another: for example, a physician with perfectionist tendencies (ontosystem) may experience strained work-family interactions (mesosystem) or feel compelled to meet unrealistic productivity targets (exosystem), thereby heightening his or her vulnerability to burnout. For each physician, the experience of PB thus reflects a distinct and unique configuration of interacting influences.

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[7] While most correlates we have mapped have been empirically investigated, those situated at the macro- and chronosystem levels often reflect more conceptual or qualitative insights. Nonetheless, we consider it important to include them, as they are frequently invoked in the literature and help provide a more comprehensive picture of the factors related with PB.

[8] A recent PubMed scan illustrates the dominance of cross-sectional studies in PB research. Among 36 publications with 'physician burnout' in the title published over a *one-year period* (search date: September 2025), 14 (≈ 40%) used cross-sectional designs, 8 (≈ 22%) employed longitudinal, prospective, or experimental approaches, 13 (≈ 36%) were non-empirical (e.g., reviews, commentaries), and 1 (≈ 3%) was qualitative.

Figure 2. *PB correlates across the Ecological Systems Theory*



Note. This figure and its categorization of correlates were developed for the purpose of this thesis, as a way of organizing the PB literature through the lens of Ecological Systems Theory. The placement of some correlates can be debated. Moreover, boundaries between levels are necessarily artificial because 1) influences interact dynamically across layers, and 2) most studies rely on self-report measures, meaning that associations are always filtered through individual perception. The same correlate may act either as a risk or as a protective factor depending on its direction (e.g. neuroticism vs. emotional stability; poor vs. strong social support); for conciseness, only one pole of such factors is shown in the figure. Correlates can be work-related or non-work-related. The bidirectional arrows indicate that the different levels of influence are not isolated, but reinforce each other.

In **Figure 2**, several correlates appear in *italics*. While they could be attributed solely to the level in which we categorized them, the literature often discusses them

as interconnected manifestations of a broader professional culture in medicine (cf. Chapter 2 and 3). For instance, patterns such as perfectionism, delayed gratification, reluctance to seek help, low self-valuation, imposter feelings, or stigmatization of weakness may not be merely personal vulnerabilities or isolated relational dynamics[9]. They are also cultivated and reinforced through medical training and professional norms, and have been described as part of a **medical culture contributing to PB** (Gazelle et al., 2015; Grow et al., 2019; Shanafelt, Dyrbye, et al., 2022; Sibeoni et al., 2019; Trockel et al., 2021). As we will further see in the following chapters, although medical culture is frequently invoked as a key determinant of PB, it has rarely been treated as an explicit object of empirical study. At the macrosystem level, organizational cultures (such as those of hospitals or healthcare systems) have received some empirical attention, yet the professional culture of medicine itself remains understudied despite recurrent recognition of its importance. In this thesis, we will propose to conceptualize medical culture as a distinct level of influence situated at the level of the macrosystem, one that operates above and across organizational contexts, while also interacting with other systems in shaping physicians' vulnerability to PB (cf. Chapter 2 and 3).

4. Current strategies for preventing and addressing physician burnout

A number of strategies have been developed to address PB. We identified five major systematic reviews and meta-analyses on the thematic published over the last decade: (1) West et al., 2016, (2) Panagioti, Panagopoulou, Bower, et al., 2017 and (3) De Simone et al., 2021. More recently, (4) Haslam and colleagues proposed a systematic review and meta-analysis focusing on randomized trials testing interventions to reduce PB (Haslam et al., 2024), while (5) Kiratipaisarl and colleagues focused on interventions targeting resident physicians (Kiratipaisarl et al., 2024). In PB literature, strategies are not usually differentiated as preventive or interventional. Rather, proposed solutions to address PB broadly align with the drivers identified in the literature (C. P. West et al., 2018) and are grouped into two categories: those targeting the individual physician, and those targeting the organization.

Table 2 summarizes the goals and typical strategies proposed for each category.

[9] It should be noted that traits such as perfectionism are well-established psychological constructs at the *individual* level. What we are proposing here is that, in the context of medicine, they are *also* traits for which future physicians are often selected and which are further reinforced through training and professional norms, as will be further developed in the General Discussion of the present thesis.

Table 2. *Strategies to address physician burnout*

Type	Physician-directed	Organizational-directed
Goal	Strengthening emotional health, resilience, and coping with stress in physicians	Reshaping the working environment
Examples	▪ Cognitive-behavioural approaches (i.e. mindfulness-based stress reduction techniques and training programs) ▪ Educational interventions to enhance job competence ▪ Stress management and self-care trainings ▪ Communication and coping skills trainings ▪ Group interventions (e.g. facilitated Balint groups)	▪ Duty hour reforms ▪ Workflow redesign (e.g. ensuring rest days after shifts) ▪ Changing supervision practices ▪ Improvement in teamwork and evaluation processes ▪ Inclusion of physicians in decision-making processes ▪ Advocacy for peer support ▪ Systematic changes in the operations of healthcare organizations

Note. This table reflects how literature generally distinguishes strategies addressing PB.

Below**, Table 3** summarizes the available evidence on interventions to address PB, as reported in these five major systematic reviews and meta-analyses published between 2016 and 2024. Interventions targeting individual physicians consistently outnumber those addressing organizational or structural drivers of PB. The imbalance is particularly striking in the most recent RCT-only review, where among 38 randomized trials, only two tested organizational-level changes (both schedule modifications) (Haslam et al., 2024).

Two meta-analyses have found that organizational interventions (despite being fewer in number) had larger effect sizes than physician-directed strategies. Panagioti et al. (2017) and De Simone et al. (2021) reported medium effects for organizational interventions compared with small effects for physician-directed approaches. By contrast, in Kiratipaisarl et al. (2024) which focused on residents only, individual interventions showed small but significant benefits, whereas organizational interventions were *not* associated with significant improvements. The meta-analyses by Haslam et al. (2024) and West et al. (2016) did not provide direct comparisons of individual- versus organization-directed strategies. Haslam et al. (2024), which focused exclusively on randomized trials, found that although several interventions led to statistically significant reductions in burnout domains, the effects were small and unlikely to be clinically meaningful. Similarly, West et al. (2016) reported modest reductions in overall burnout prevalence, emotional exhaustion, and

depersonalization across both categories of interventions.

Table 3. *Evidence regarding PB interventions in meta-analyses*

Review	N of interventions		Reported effect sizes
	Physician directed	**Organization directed**	
West et al. (2016)	12 RCT; 20 cohorts	3 RCTs; 17 cohorts	Overall burnout ↓10% (from 54% to 44%); EE ↓14% (from 38% to 24%); DP ↓4% (from 38% to 34%)
Panagioti et al. (2017)	12	8	Individual: SMD -0.18 (95% CI -0.32 to -0.03); Org: SMD -0.45 (95% CI -0.62 to -0.28)
De Simone et al. (2021)	11	8	Individual: SMD = -0.18 (95% CI –0.32 to -0.04); Org: SMD -0.45 (95% CI -0.62 to -0.27)
Haslam et al. (2024)	36	2	MD for EE: -1.11 MBI points (95% CI -2.14 to -0.09); MD for DP: -0.32 (95% CI -0.63 to -0.01); PA: 1.11 (95% CI -0.21 to 2.43)
Kiratipaisarl et al. (2024)	25	8	Individual: EE d = -0.25 (95% CI -0.40 to -0.11); DP d = –0.17 (95% CI -0.32 to -0.03) (both significant, small); Org: no significant effects.

Note: SMD = standardized mean difference (a measure of effect size; 0.2 = small, 0.5 = medium, 0.8 = large). MD = mean difference. MBI = Maslach Burnout Inventory. EE = emotional exhaustion, DP = depersonalisation, PA = personal accomplishment. Org. = organizational. CI = confidence interval. d = Cohen's d. RCT = randomized controlled trial. Effect sizes are reported using the metrics provided in each review (SMD/Cohen's d or raw MBI point differences). Note that the effect sizes reported by Panagioti et al. (2017) and De Simone et al. (2021) are similar because the latter review includes a largely overlapping pool of studies and provides an updated synthesis of the former.

Overall, the available evidence thus indicates small improvements in PB across most interventions, with medium effects observed only in some organizational strategies. However, these organizational approaches are fewer in number and less frequently tested. This raises the issue of how to balance individual- and organization-directed interventions. A narrow focus on individual strategies (often framed as resilience or stress management training) risks backfiring if systemic contributors are left unaddressed, potentially reinforcing feelings of guilt, self-blame, or stigmatization among physicians (De Simone et al., 2021; LaDonna et al., 2022; Panagioti, Panagopoulou, Bower, et al., 2017). Yet disregarding individual vulnerabilities is equally problematic and could be viewed as a neglect of institutional responsibility to adequately support its staff members. Accordingly, and given the multidetermined aetiology of PB, **combined approaches integrating both**

individual- and organization-directed strategies are likely to hold the greatest promise, although they have not yet been rigorously evaluated (C. P. West et al., 2016, 2018).

5. What are we missing?

Despite decades of research, PB remains a critical concern for physicians, patients and healthcare systems (Shanafelt, 2021; Squiers et al., 2017). Prevalence rates remain alarmingly high, interventions often yield only modest effects, and many physicians disengage from solutions that feel misaligned with the realities of medical practice. Several factors can help explain this persistence. Methodological limitations in PB research remain a central obstacle as they undermine efforts to establish reliable prevalence estimates, identify causal pathways, or rigorously evaluate interventions. Another challenge lies in the prevailing emphasis of healthcare institutions on strategies aimed at enhancing individual physician resilience, often at the expense of organizational and systemic reform (Montgomery, 2014). While such approaches are often more straightforward to implement and may appear less demanding at the institutional level, they can produce unintended consequences (LaDonna et al., 2022; G. Walsh et al., 2019) and ultimately erode physicians' trust in the very institutions shaping their work environment.

A further possibility is that the proliferation of interventions to address PB has outpaced efforts to develop a deeper understanding of the *underlying* causes of PB and related distress in medicine (Bynum et al., 2021). From this perspective, **it may be time to pause and reconsider how we understand the roots of PB and, consequently, how we attempt to address it** (Squiers et al., 2017). In particular, the cultural context in which physicians are trained and practice has received too little attention. Indeed, **medical culture** - its norms, values, and implicit expectations - emerges in recent literature and in physicians' accounts as a crucial yet underexplored determinant of PB. Strikingly, while medical culture is often invoked as a contributing factor to physician distress, it has rarely been subjected to systematic empirical investigation. Its status sometimes resembles that of an 'elephant in the room': an influence that is widely sensed, occasionally mentioned, yet seldom confronted directly. This silence - or resistance - may itself reflect this very culture that cannot easily be questioned. Without fully examining how medical culture contributes to the development and persistence of burnout, existing strategies are likely to remain insufficient to address the crisis at hand (Shanafelt et al., 2019).

In Chapter 2, we turn to medical culture itself: what it is, how it is defined, and the ways in which it is transmitted in the profession.

Chapter 2. Medical culture

Foolish the doctor who despises the knowledge acquired by the ancients.

- Hippocrates

1. Definition

1.1 What is medical culture?

As social beings, humans rely on one another for survival (Baumeister & Leary, 1995). Culture provides the framework that makes this possible. Although many definitions of culture exist, most emphasize the shared values and norms of the members of a social group, i.e. 'the way we do things around here' (Danielsson et al., 2018). Values give rise to norms, which serve as informal rules that shape how members of a group are expected to behave (Hitlin et al., 2004 ; as cited in Danielsson et al., 2018; Schein & Schein, 2019a).

Physicians constitute one such social group, as medicine represents a distinct profession within healthcare. In this thesis, **medical culture is defined as the set of shared beliefs, norms, and values that characterize the medical profession**. **This medical culture shapes behavioural expectations in medicine and plays a central role in the formation of physicians' professional identity**[10] (Shanafelt et al., 2019). Put more simply, medical culture can be regarded as the profession's DNA.

Like all cultures, medical culture persists over time, is historically preserved and transmitted to new members because it serves an adaptive purpose that enabled the group to overcome professional challenges *in the past*[11] (Schein & Schein, 2019a; Shanafelt et al., 2019). The medical profession has its own very specific traditions, values, beliefs, symbols and language (Lenoir et al., 2021; Núñez, 2000). Understanding these elements helps members, including newcomers (i.e. medical students, interns, and residents) navigate and fit into the medical world (Shanafelt et

[10] A professional identity is a representation of one's professional self developed over time through socialization to the profession. For physicians, this encompasses how physicians see themselves within the medical field and their sense of belonging to the profession (Fitzgerald, 2020; Orsmond et al., 2022). For many, being a physician is a central component of their overall identity (Amano et al., 2024).

[11] We italicized 'in the past' deliberately to emphasize that while certain norms and values may once have served an adaptive function within the medical profession, this thesis will argue that some of these cultural elements may have become less adaptive in contemporary contexts.

al., 2019). Because it is deeply embedded, medical culture often becomes invisible or implicit to its members (Shanafelt et al., 2019). Its assumptions are so well-established that they are taken for granted and regarded as non-negotiable (Schein & Schein, 2019a). Physicians immersed in the medical culture are often unaware of its existence, as it is rarely explicitly articulated - something 'staring right at their face but that goes unrecognized' (Pearl, 2021). Nonetheless, even when members cannot easily articulate them, these cultural elements **drive daily professional behaviour** (Schein & Schein, 2019a). Given the high social status historically conferred on physicians (Arnold-Forster et al., 2022), medical culture is a strong and ingrained professional culture **directly associated to physicians' identity**.

1.2 Distinguishing professional from organizational cultures in medicine

Medical culture is a professional culture. This means that it is shared collectively by physicians as members of the medical profession. Importantly, the overarching culture of the profession should not be confounded with the cultures of the institutions and organizations in which physicians practice (such as hospitals, medical faculties, or healthcare systems) (Shanafelt et al., 2019). While professional and organizational cultures are distinct, they remain closely interrelated and likely influence one another (cf. Chapter 7) (Gerardi, 2005; Scott et al., 2018).

1.3 Subcultures in medicine

At the same time, it is important to recognize that beyond the overarching professional culture in medicine, **distinct subcultures** also exist. Such subcultures arise among colleagues who share similar educational backgrounds, interact frequently, work in specific environments, and perceive themselves as distinct from other groups (Danielsson et al., 2018; Mendelsohn, 2022).

In medicine, **specialties** illustrate this particularly well. Although all physicians share a common foundation in medical training, further specialization tends to accentuate differences over time, leading to distinct specialty subcultures. For instance, across specialties, medicine is marked by a strong hierarchy. Distinctions in prestige between specialties, though seldom expressed openly, are widely known both within and outside the profession (Lepiège et al., 2016; Pearl, 2021). At the top of this hierarchy lie specialties typically associated with the practice of urgent and life-saving interventions, such as surgery (Pearl, 2021). The cultures of such fields are often described as 'harder', exemplified by the bravado attributed to surgical culture (Balch & Shanafelt, 2011). By contrast, specialties typically regarded as less prestigious in the hierarchy, such as general medicine, are

more often characterized by a relational and supportive orientation (Gerada & Al-Naijar, 2020; Zaman et al., 2022)[12].

Medical culture also varies by the **type of practice setting** in which physicians work. Direct empirical evidence for distinct medical subcultures across practice settings is limited. Still, it is reasonable to assume that the structural, organizational, and functional differences between environments such as university hospitals, public hospitals, private hospitals, and private practices[13] shape specific norms and practices. These differences likely give rise to additional subcultures within medicine. Physicians in university hospitals, for instance, are immersed in a culture shaped by the tripartite mission of education, research, and specialized clinical care (Decramer, 2019). In Belgium, these institutions are directly affiliated with a university medical faculty, which entrusts them with training, research, and technological development (FPS Health, 2025). Academic medicine therefore cultivates its own subculture, that is likely distinct from that of public hospitals (managed by municipalities, intermunicipal associations, provinces, or regions) or from that of private hospitals (most of which in Belgium are non-profit and historically linked to religious congregations, mutual societies, or private associations) (FPS Health, 2025). By contrast, physicians in private practice operate in self-managed contexts that afford greater autonomy, while also placing direct responsibility on them for financial and administrative aspects of their work - responsibilities that, although also present in hospital settings, may take a more central and personal form in private practice (Palmer, 2020).

Thus, over and above the main medical culture, it is important to recognize and remember that distinct subcultures also exist in the medical profession. For the purposes of this thesis, however, the focus will remain on the overarching medical culture.

2. The duality of medical culture

Like all cultures, medical culture is characterized by a profound **duality** (Pearl, 2021). In this sense, the elements of medical culture can be seen as two sides of the same coin.

On the one hand, the robust culture of medicine includes numerous praiseworthy elements that are foundational to the profession. These positive values

[12] While many further variations could be traced across specialties, a detailed exploration of such subcultural differences lies beyond the scope of this thesis.

[13] This typology of practice settings reflects part of the organization of healthcare in Belgium. It is not meant to be exhaustive, as other practice settings could be described (e.g. polyclinics).

and norms are essential for the development of dedicated physicians (Pearl, 2021; Shanafelt et al., 2019). To illustrate this, we asked both attending and resident physicians about the values that guided their choice of medicine. **Table 1** summarizes some of them (personal communications, August 2025), and complements the literature that identifies these values as central elements of the medical culture.

Table 1. *Examples of positive values central to the medical culture*

Value	Description
Altruism and service	Many physicians enter medicine out of a deep desire to help and heal, often describing their choice as a vocation rooted in service to others (Heikkilä et al., 2015; Shanafelt et al., 2019; A. Woodward et al., 2017). Putting the patient's interests before their own is viewed as a defining responsibility of the profession.
Dedication and excellence	Medicine demands discipline and an unwavering commitment to high standards. Physicians emphasize the nobility of their role and the obligation to continually surpass themselves in order to provide the best care to others (Kuhn & Flanagan, 2017; Pearl, 2021; Shanafelt et al., 2019; Shanafelt, 2021; Ward & Outram, 2016).
Humanity and compassion	Central to the culture is the patient relationship: this includes values of compassion and empathy (Kuhn & Flanagan, 2017; LaDonna et al., 2022; Shanafelt et al., 2019), and ensuring that patients never face illness alone. Physicians sometimes describe their role as being the patient's ally and advocate.
Intellectual curiosity	Medicine attracts those seeking constant learning and intellectual challenge, combining science with human purpose.
Collaboration	Collaboration across disciplines (in and outside of medicine) is highly valued, because it fosters solidarity and shared responsibility in patient care (Pearl, 2021; Shanafelt et al., 2019; G. Walsh et al., 2019).

Note. Where no reference is cited, the content is based solely on personal communications (August 2025).

These values lie at the heart of medical culture and are often cited as the **ideals that sustain physicians** (across most specialties) throughout their careers. Cultivated in balance, they are vital to the profession and to the existential meaning that physicians derive from their profession (Shanafelt et al., 2019).

However, acknowledging these central positive values of medical culture does not imply that one can overlook the other side of the coin. As will be further argued in Chapter 3, medical culture also encompasses norms, assumptions, and expectations that are increasingly being questioned (Pearl, 2021). These can consist of values or norms that were initially 'positive' but that, when taken to an extreme

or pushed out of balance, can produce harmful consequences, including for physicians' health (Kuhn & Flanagan, 2017). Indeed, elements of the medical culture that once enabled the profession to adapt and thrive can, with time, become burdensome when held onto too rigidly in changing circumstances. Most, if not all, of these elements have been adaptive and functional in historical contexts. To cite only one example, the tendency within medical culture to work to the point of exhaustion may once have been necessary in a setting where a limited number of physicians were required to care for as many patients as possible. Under current conditions, however, such assumptions may no longer serve the best interests of physicians, patients, or healthcare delivery systems (Shanafelt et al., 2019; Trockel et al., 2019).

Although this thesis will primarily examine the potentially 'problematic' aspects of medical culture, it is essential to recognize this inherent duality and the **originally adaptive nature of a culture**. The same values that may have given physicians purpose and sustained their commitment can, when taken to extremes or thrown out of balance, contribute to distress (cf. Chapter 3, 4 and 5 of this thesis).

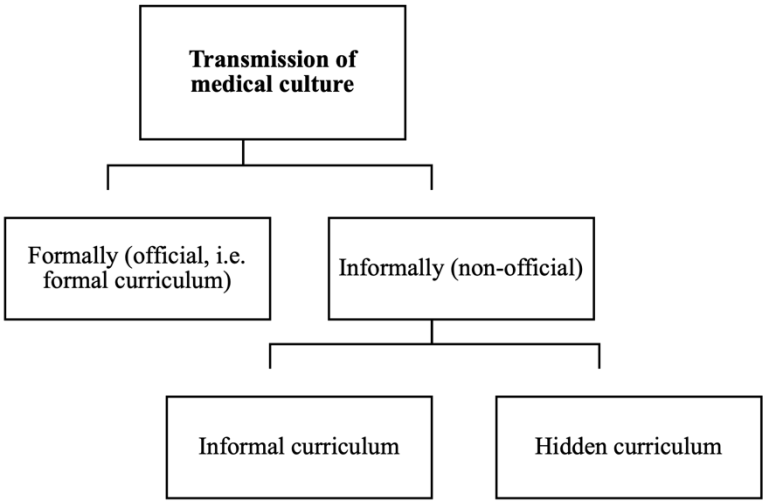
3. Transmission of medical culture

The persistence of medical culture over time depends on how it is transmitted to newcomers in the profession. This transmission occurs primarily through **medical education and training**, and unfolds as a process of socialization into the profession.

3.1 Formal, informal and hidden curriculum in medicine

As illustrated in **Figure 1**, the transmission of medical culture within medical education operates through the formal, informal, and hidden curricula (Detheux, 2024). Distinguishing between these three levels is essential, because it highlights the often-noted discrepancy between what students are explicitly *taught* and what they actually *learn* (Hafferty, 1998).

Figure 1. *Transmission of the medical culture via medical education and training*



Note. For clarity, the informal and hidden curriculum are comprised here under the 'informal transmission' of medical culture.

The **formal curriculum** refers to the official teaching mission of medical faculties, including program statements, course syllabi, materials, and objectives. Its purpose is to convey medical knowledge and skills, often framed around positive values such as altruism, respect, and integrity, with the patient placed at the center (Hafferty, 1998; Hafferty et al., 2015).

The **informal curriculum** encompasses unscripted, ad hoc learning that arises in everyday interactions - whether in corridors, cafeterias, or during exchanges with residents and faculty (Hafferty, 1998; Hafferty et al., 2015). These interactions transmit implicit messages that can either reinforce or contradict the formal curriculum. For instance, a professor may formally teach patient-centered care and respect for human dignity, but during ward rounds students may observe senior physicians interrupting patients, referring to them as 'the appendicitis in room 3', or not addressing them by name. Similarly, although the formal curriculum emphasizes the importance of self-care and balance, students often see residents and attendings consistently working long hours and discouraging breaks. Such field experiences leave strong impressions ('sticky knowledge') that can outweigh formal and explicit lessons (Hafferty, 1998; Hafferty et al., 2015; Mahood, 2011). Everyday communication that new members observe - in jokes, silences, or interactions with patients, families, or colleagues - likewise transmit values, whether intentionally or not (Karnieli-Miller et al., 2010).

Finally, the **hidden curriculum** functions at the institutional and cultural level. It transmits unspoken norms, values, and assumptions that shape how physicians come to think, act, and identify with the profession. The hidden curriculum is embedded in policies, evaluation systems, resource allocations, and even institutional slang. For instance, the relative emphasis (or neglect) of specific courses (e.g. through allocation of ECTS credits) tacitly communicates what is genuinely valued by the institution (Hafferty, 1998; Hafferty et al., 2015).

Taken together, **the professional culture in medicine is transmitted both formally** (through the formal curriculum) **and informally** (through the informal and hidden curriculum). Yet when contradictions arise (such as explicit calls to self-care versus implicit lessons that reward self-neglect), the latter often proves more powerful. **Implicit messages typically carry greater weight than explicit ones** (Hafferty, 1998; Lawrence et al., 2018; Mahood, 2011).

3.2 Enculturation to the profession

Enculturation into medicine is best understood as a **profound process of socialization**, situated primarily within the informal curriculum. Indeed, much of what it means to '*be* a doctor' is not learned in books or lecture halls, but through field training and, above all, role modeling (Cleland & Johnston, 2012). Medical students follow residents, who in turn follow attending physicians, creating a cascade in which learners internalize the behaviours, attitudes, and assumptions modeled by their superiors through informal pathways (Gérin-Lajoie et al., 2021). Through this process, learners observe and internalize the language of medicine, the symbols of the profession, the tacit rules that guide daily behaviour, what is said, and what is deliberately left unsaid (e.g. to patients or to colleagues) (Gofton & Regehr, 2006; Mahood, 2011). In their effort to gain acceptance within the group, new members adopt its codes, quickly learning what is valued and what is to be dismissed in their emerging professional identity (M. F. Shapiro, 1978). In this way, **newcomers internalize the culture of their future profession - often without awareness.** The desire to belong (cf. Social Identity Theory, Tajfel & Turner, 2004), and the threat of exclusion for those who do not conform or who challenge prevailing norms (Baumeister & Leary, 1995; LaDonna et al., 2025) is a powerful driver in this socialization process. However and importantly, it also contributes to the systemic reinforcement of existing norms, behaviours, and ways of being in the profession (Dyrbye et al., 2005; Schulte et al., 2024; Shapiro, 2003; as cited in Detheux, 2024).

By the end of their training, physicians acknowledge that they have both *passively absorbed* the norms, practices, and beliefs of medical culture - desirable as well as undesirable - and *actively engaged* in a deliberate process of assimilation.

This latter process involves making conscious choices about which norms to adopt or resist, and determining how closely they wish to align their own future practice with the profession's prevailing cultural expectations (Gordon et al., 2012).

4. The crucial importance of medical culture

Medical culture lies at the heart of the medical profession. It encompasses a deeply internalized set of shared values, norms, and assumptions that shape how physicians think, act, and see themselves. **Medical culture guides daily professional behaviour and forms the foundation of physicians' professional identity** (Danielsson et al., 2018; Shanafelt et al., 2019). It helps physicians adapt to the realities of their work while also fostering a sense of belonging to the group (Schein & Schein, 2019a; Shanafelt et al., 2019). **Culture matters** because it is powerful, largely tacit, and often unconscious. Over time, its elements become so ingrained that they are taken for granted and treated as non-negotiable (Pearl, 2021). Often, it is only when outsiders articulate what physicians themselves no longer notice that aspects of medical culture become visible (Shanafelt et al., 2019). The transmission of this culture through medical education, training, and professional socialization (Detheux, 2024) ensures its persistence across generations, giving medical culture its stability. Yet it is precisely because medical culture has such a strong implicit influence on both identity and behaviour that it deserves closer scrutiny. By shaping not only how physicians act, but also what they value and how they define their role, **medical culture provides a critical lens to understand persistent patterns of physician distress, including burnout** (Shanafelt et al., 2019). Indeed, the very cultural foundations that sustain the profession could also contribute to physicians' suffering.

However, despite the central role of medical culture in the profession, **surprisingly little work has attempted to formally identify or systematically study its dimensions** (including those that may prove harmful to physicians). To date, most contributions on medical culture remain anecdotal, conceptual, or qualitative. In so, they offer valuable insights but they do not yet constitute a well-established field of empirical research; especially in contrast to the extensively documented individual and organizational factors associated with PB and described in Chapter 1. This thesis begins to address this gap by laying the groundwork for a more systematic examination of medical culture and its defining elements.

Chapter 3 reviews how literature has begun to explore connections between medical culture and PB, outlining the contours of a field that has yet to be more formally established.

Chapter 3. The relationship between medical culture and physician burnout

1. Introductory remarks

In Chapter 1, we saw that PB represents a persistent crisis marked by high prevalence, serious consequences, and limited effectiveness of current interventions. Although its aetiology is multidetermined, some correlates appear to reflect broader professional norms rather than isolated factors. Chapter 2, in turn, showed how medicine is structured around a strong professional culture that shapes physicians' daily practices and identities, yet remains insufficiently examined in relation to physician well-being. Together, these chapters raise an important but underexplored question: (**how) does medical culture relate to PB?** As described in the General Introduction, early conversations with physicians suggested such a link. Residents and attending physicians alike recounted being trained to appear invulnerable, to work in isolation, to perform at the highest possible level, and to consistently place work before all else. These expectations seemed almost intrinsic to the profession and, according to physicians' accounts, necessarily contributed to their experience of burnout.

To prepare the ground for the empirical chapters that will follow, this chapter is organized in four parts. First, it reviews narrative and reflective writings on how cultural norms in medicine may foster burnout and distress. Then, it turns to one of the few theoretical frameworks that conceptualizes PB as a manifestation of deeper issues within the culture of medicine. Third, it reviews how emerging empirical contributions have begun to address these questions. Finally, it outlines how the present thesis seeks to extend this work and address existing gaps in the literature.

2. Narrative and theoretical perspectives

We first consider *non-scientific writings* that have linked medical culture and PB.

2.1 Narrative and reflective contributions

A wide range of narrative and reflective contributions (i.e. editorials, essays, testimonies, and books) have raised concerns about the ways in which medical culture may contribute to physicians' vulnerability to and experience of burnout. **Table 1** presents a selection of such sources, with illustrative extracts. In this table, we deliberately included the full titles of the sources, as the titles themselves are

often revealing. Despite their diversity, these sources converge on several themes: medicine cultivates perfectionism and self-neglect; silence and stigma discourage help-seeking; and cultural blind spots can themselves become sources of distress. While not scientific in the strict sense of the term, such contributions remain valuable because they reflect the perspectives and lived experiences of (mainly) those within the profession. For the interested reader, a more comprehensive list of sources on medical culture and physician distress which were consulted during the development of the present thesis is provided in **Appendix D**.

Most of these contributions date from the past decade. This reflects the growing attention within the profession to the issues at hand. Yet some concerns have been voiced for much longer. For instance, Miller & McGowen's commentary '*The Painful Truth: Physicians Are Not Invincible*' was published 25 years ago. This article describes how medical training promotes sleep deprivation, emotional distancing, perfectionism, and 'workaholic standards', while fostering self-denial and other mechanisms that make it difficult for physicians to seek help. More 'recently', Montgomery, a professor of occupational and organizational psychology, explicitly argued that « **For physicians, burnout is the inevitable consequence of the way that medical education is organised and the subsequent maladaptive behaviours that are reinforced in healthcare organisations via the hidden curriculum** » (2014, p.50).

These two examples are illustrative of the broader set of contributions proposed in **Table 1**, which suggest that vulnerability to and experience of PB cannot be reduced to individual dynamics, but are deeply rooted in the cultural patterns of the profession. This is consistent with what we outlined in Chapter 1 (where we noted that certain correlates of PB, such as perfectionism or self-denial, may partly reflect cultural norms rather than purely individual dispositions) and Chapter 2 (where we described how such norms are transmitted through socialization and training into physicians' professional identity). Yet while valuable, these contributions remain anecdotal and lack systematic examination.

Table 1. *Selection of sources on medical culture, physician burnout and distress*

Title	Reference	Type	Example of extracts
The Painful Truth: Physicians Are Not Invincible	(Miller & McGowen, 2000)	Commentary	« The culture of medicine is one in which perfectionism and 'workaholic standards' rule the day. Many practice settings reward long hours and self-neglect. Physicians are encouraged to disregard themselves and deny their own needs. The process of medical education may enhance development of defence mechanisms that make it difficult to ask for help. Could this be part of the problem? »
Doctors' Health: Stigma And The Professional Discomfort In Seeking Help	(Garelick, 2012)	Editorial	« Having psychological health needs is often seen as a failure and weakness, and conflicts with the still prevalent culture that the doctor can, and should, cope with all the ills of life and work 'physician, heal thyself'.»
The Inevitability Of Physician Burnout: Implications For Interventions	(Montgomery, 2014)	Conceptual article	« For physicians, burnout is the inevitable consequence of the way that medical education is organised and the subsequent maladaptive behaviours that are reinforced in healthcare organisations via the hidden curriculum. »
Medicine: In Need Of Culture Change	(Ward & Outram, 2016)	Personal viewpoint	« Despite the positive aspects, medicine is commonly stressful. In some arenas, a subtle, hidden and until recently undiscussed toxic culture persists, which is clearly taking its toll on our vulnerable colleagues contributing to burnout and mental ill-health. »
Breaking The Stigma - A Physician's Perspective On Self-Care And Recovery	(Hill, 2017)	Testimony	« We may brand physicians who've had mental health conditions, while fostering environments that impede their ability to become and remain well. […] Indeed, we are to be ashamed not only of the condition, but of seeking treatment for it, which our culture views as a sign of weakness. »
Understanding Physician Burnout	(Grow et al., 2019)	Review	« Cultural factors play a role in driving physician burnout and can be particularly pronounced in physician training. Physicians expect a lot of themselves and of each other, and medicine is well-known for cultivating some subsequent maladaptive attitudes and behaviours predisposing to burnout […]. »
Healing The Professional	(Shanafelt et	Special	« Although physician distress and some of the contributing factors are now widely recognized, much

Culture Of Medicine	al., 2019)	article	of the distress physicians are experiencing is related to insidious issues affecting the cultures of our profession, our health care organizations, and the health care delivery system […].We must acknowledge that at the professional level, we have some blind spots and unhealthy norms that can lead to potentially destructive behaviour. »
Beyond Burnout: Looking Deeply Into Physician Distress	(Wong, 2020)	Review	« […] This self-neglect and isolation, together with self-recrimination, self-doubt, and guilt, exacerbated by a medical culture that demands stoicism and rationality, makes for an unhealthy mix that, over time, can lead to a dearth of self-compassion that causes immeasurable distress. […] To make matters worse, their colleagues do not speak up either, allowing such behaviour to go unchallenged, become normalized, and form part of the culture. »
Improving The Culture Of Medicine	(Lemire, 2020)	Editorial	« Physicians place high expectations on themselves in acquiring the necessary competencies for service delivery. Over the past few years, considerable distress has been experienced by many physicians. The rate of burnout in the medical profession has raised questions about the culture of medicine and whether strategies can be put in place to improve it. »
Uncaring: How The Culture Of Medicine Kills Doctors & Patients	(Pearl, 2021)	Book	« The evolution of physician culture has come in conflict with modern demands for accountability in cost and quality. This has led to frustration and physician burnout […]. Medicine has no choice but to evolve and in turn physicians will have to let go of many of the cultural values they hold dear. »
The Wicked Problem Of Physician Well-Being	(Sinskey et al., 2022)	Review	« In medicine, we have created a culture where personal boundaries are discouraged and perceived as a lack of dedication to the profession. […] Burnout is a symptom, not the underlying problem. […] We are in a crisis of burnout due to widespread moral injury and a longstanding culture of medicine that forces clinicians to 'do more with less' and robs them of the meaning and purpose in their work (Shanafelt et al., 2019). »
'I Wasn't Alone After All" - How Modelling Vulnerability Can Support Staff Wellbeing	(Morgan, 2024)	Opinion	« From as early as medical school, doctors build a sense of collective identity, a professional persona that unites them. Yet this sense of self too often comes with an unrealistic expectation that doctors will not be affected by witnessing the suffering and pain of others. This ingrained culture of stoicism leads doctors to conceal their feelings, impassively complying with the demands of the job (McCarthy et al., 2021). »

Note. This selection is *not* exhaustive, but illustrates key narrative and reflective contributions linking medical culture to physician burnout and distress.

2.2 A theoretical framework linking medical culture and physician well-being

The writings discussed above raise concerns and reflections on how medical culture may contribute to PB and distress, but they do not provide a structured framework to understand these dynamics. One of the few attempts to do so is the model proposed by Shanafelt and colleagues in their seminal article *'Healing the Professional Culture of Medicine'* (2019). Below, we summarize its key elements.

Shanafelt et al. (2019) argue that many of the difficulties currently faced by physicians (including PB) are **manifestations of insidious problems affecting the culture of medicine.** To analyze culture, the authors draw on Schein & Schein's typology of culture (2019) in organizational science. This typology distinguishes three interrelated levels (from most to least visible): artifacts or symbols (visible manifestations such as behaviours - 'what we do'), espoused values ('what we say is important' - the Hippocratic Oath being a notable example in medicine), and tacit assumptions (the unwritten rules that guide behaviour - 'what we truly believe'). Applied to medicine, this typology reveals frequent inconsistencies between levels.

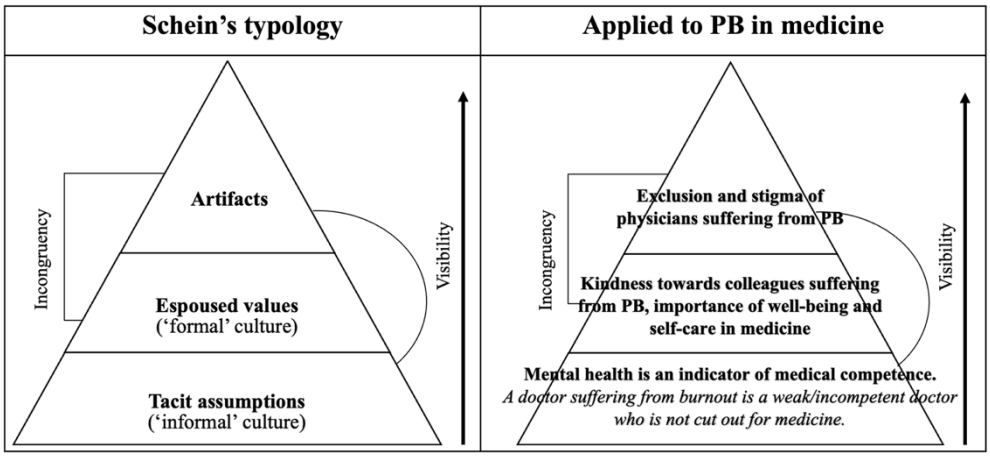
Discrepancies between behaviour and espoused values often reflect tacit assumptions that contradict the stated ideals, but exert stronger influence. For instance, Shanafelt et al. (2019) argue that while medicine formally recognizes that fatigue impairs performance, training and practice still valorize long hours and presenteeism. This reinforces the belief that dedication in medicine is measured by endurance[14]. As Hafferty (1998) and others noted in relation to medical education (cf. Chapter 2), what is learned informally often outweighs what is formally taught. The same dynamic can be seen here: tacit assumptions exert a stronger influence on daily behaviour than official values stated in the profession.

This framework is useful because it can be applied to physicians' experiences of distress. In **Figure 1**, we propose an adaptation of this framework to the case of *stigma around PB* in medical culture - an experience that is both documented in the literature (e.g. Alwatban et al., 2024; Dyrbye et al., 2015; Favre et al., 2023; Weiss et al., 2021) and echoed in our exchanges with physicians who suffered from burnout. The model helps structure and put words on what many accounts convey: the discordance between official discourse (e.g. the importance of self-care and

[14] Testimonies we have received from physicians further illustrate how such unspoken rules operate. One resident, for example, described how students quickly internalize that taking breaks, ranking below the top of the class, or lacking a clear career plan is 'not well seen' in medicine (personal communications, July 2023). Even though the formal rules or official discourse may say otherwise, such unspoken norms exert a stronger influence: everyone knows them, and the fear of consequences ensures they guide behaviour.

benevolence towards colleagues suffering from burnout) and what actually prevails in practice (e.g. exclusion and stigmatization of colleagues who struggle), underpinned by strong tacit assumptions (e.g. that physicians who experience burnout are weak or unsuited to the profession).

Figure 1. *Physician burnout as perceived within medical culture: an adaptation of Shanafelt et al.'s (2019) framework*



Note. This figure adapts Shanafelt et al.'s (2019) application of Schein & Schein's (2019) corporate culture model to the context of physician burnout. The present example was developed for this thesis, based on our review of the literature (cf. Table 1 and Appendix D) and exchanges with physicians.

Importantly, Shanafelt et al. (2019) apply the same framework both to the professional culture of medicine (medical culture) and to the **organizational cultures in healthcare institutions.** Indeed, each healthcare organization (e.g. hospitals) has its own artifacts (e.g. compensation), espoused values (e.g. mission statements), and tacit assumptions (e.g. the implicit primacy of business vs. employee health). Shanafelt et al. (2019) illustrate recurrent incongruences at this level too (e.g. 'patient-centered care' vs. 20-minute visits), and argue that such misalignments similarly breed cynism and distress in physicians. In this thesis, however, our focus remains on the professional culture shared by physicians (cf. Chapter 2); we will therefore not further develop this point here.

For the present thesis, the value of this framework lies in how it structures the dynamics of medical culture. In particular, it draws attention to the importance of tacit assumptions and norms, which quietly shape daily practices and may contribute to distress and dissonance in medicine. Importanty, the reasoning developed in this paper aligns with the socio-ecological perspective guiding this thesis, because it situates medical culture as a professional-level influence that interacts with organizational levels (Gerardi, 2005; Scott et al., 2018) and shapes PB.

Still, this framework remains conceptual. It does not yet provide *empirical* evidence of how the defined dynamics are patterned together, nor of their association to burnout or other outcomes of distress in the profession.

2.3 What emerges so far

So far, the narrative contributions (2.1) and the framework proposed by Shanafelt and colleagues (2.2) converge in describing that tacit cultural assumptions carry particular weight in physicians' daily lives, and may underlie much of the distress experienced in the profession. Similar examples recur across testimonies and theoretical accounts, suggesting recognizable patterns within medical culture. We have synthethized in **Table 2** the tacit assumptions that recur most often across this body of literature.

Table 2. *Recurring tacit assumptions and norms in the medical culture*

Tacit assumptions that recur most often in the literature about medical culture
Physicians are not expected to show vulnerability.
Physicians are expected to continue working even when ill.
In medicine, a physician's health is perceived as a reflection of professional competence.
A physician admitting difficulties or seeking help is regarded negatively and equated with being a 'bad doctor'.
By definition, physicians are not considered patients.
Physicians are expected to overwork and endure excessive hours.
Physicians are expected to self-sacrifice, consistently placing work above other life domains.
Medicine is seen as a vocation or calling, with professional and personal identities often intertwined.
Physicians are socialized to deny their own needs, delay gratification, and neglect self-care.
Dysfunctional perfectionism, competition, and self-criticism are common in physicians.
Imposter feelings, self-doubt, and guilt are normal in medicine.
Physicians are expected to show loyalty and solidarity toward peers, including remaining silent in the face of misconduct.
Physicians are encouraged to adopt a heroic, selfless persona.

Note. This list was compiled for the present thesis, based on the sources discussed in previous sections.

While the insights outlined until here are informative and valuable, they remain descriptive. We now turn to **scientific contributions** that have begun to examine, albeit in a fragmented way, whether and how culture-related constructs relate to physician well-being.

3. Empirical evidence

3.1 Qualitative evidence

Qualitative research provides rich insight into *how* physicians describe the cultural expectations that shape their professional lives and contribute to PB. Across interviews and focus groups, physicians share lived experiences that reveal how cultural norms influence well-being in ways that may heighten vulnerability to or contribute to burnout. For reference, **Appendix E** provides an overview of the qualitative studies reviewed. Here, we summarize the main themes that recur across this literature.

3.1.1 Recurring themes in the litterature

Medical culture as a barrier to self-care and help-seeking. Physicians frequently describe pressures to prioritize work above personal health and fears of stigma when seeking support. For instance, LaDonna et al. (2022) report how values rooted in an 'invincibility myth' lead physicians to resist wellness initiatives, as self-care appears illegitimate in the profession. Similarly, Thompson et al. (2001) describe how general practitioners often work through illness in order to maintain a 'healthy' image, while Zaman et al. (2022) highlight limited openness around mental health, stigma, and generational differences as persistent barriers to seeking support.

A vocational profession where personal and professional identities are blurred. Physicians describe medicine not only as a career but as a 'calling', a totalizing identity that legitimizes sacrifice and complicates efforts to balance work with other roles. For instance, Lenoir et al. (2021), drawing on psychologists' perspectives of treating physicians with burnout, highlight how this vocational ideal makes doctors uncomfortable in the patient role and more reluctant to accept care. Humphries et al. (2018) discuss the same expectations, but note that younger doctors increasingly challenge this ideal, expressing a stronger desire for work-life balance. Such shifts across generations will be further discussed in this thesis (cf. discussion of finding 7).

Expectations of invulnerability, endurance, and silence around weakness. Across contexts, physicians report pressure both in training and practice to appear strong, to 'push through' illness, and to minimize personal needs. LaDonna et al. (2022) describe how the invincibility myth sustains this superhuman ideal and sacrifice to the medical profession. In another qualitative investigation, LaDonna et al. (2018) note that physicians at different career stages experience self-doubt and imposter feelings, yet medical culture perpetuates insecurities and discourages their disclosure. This reinforces an ethic of endurance and silence around weakness.

Danielsson et al. (2018) identify infallibility and autonomy as central cultural norms that discourage discussion of mistakes and reinforce the expectation to act independently. Students and trainees echo these messages: Wainwright et al. (2017, 2019) describe how junior doctors internalize the message that 'doctors do not get ill', while Rich et al. (2024) and Verdonk et al. (2014) document the 'suck it up' mentality and silence around stress during training. These norms normalize presenteeism, concealment of distress, and an ethic of endurance that could exacerbate burnout in physicians. At the intersection of this theme and the precedent one (regarding identity), a recent qualitative study conducted in Germany described how the collective professional identity of physicians, constructed via a process of Professional Identity Formation (Cruess et al., 2015), seems to include tendencies to rate one's health as secondary or irrelevant. This might explain why interventions aimed at improving physicians' health present weak results (Schulte et al., 2024), and echoes LaDonna and colleagues' discussion of the invincibility myth as contributing to physicians' resistance to wellness interventions (2022).

Tensions in role transitions. When physicians experience illness or other personal difficulties, they are often seen as stepping outside the boundaries of their expected professional role, which can create tension with their sense of identity. Several qualitative studies (e.g. Klitzman, 2008; McKevitt et al., 1997; Thompson et al., 2001) discuss how physicians perceive illness as incompatible with their role, leading to embarrassment, reluctance to seek care, and discomfort adopting the patient identity. Other transitions, such as retirement or maternity leave, are likewise experienced as incongruent with the expectation of full professional commitment. For instance, Onyura et al. (2015) report that late-career physicians grapple with identity threat and loss of meaning when approaching retirement, while Scallan et al. (2025) describe surgical residents' return from maternity leave as both a source of discrimination and an opportunity to renegotiate their professional identity. In line with the themes noted above (e.g. 'physicians do not get ill'), burnout could also be experienced as a temporary role transition that challenges physicians' sense of (professional) identity.

3.1.2 Limitations of the qualitative evidence

Taken together, the themes that recur across qualitative evidence convey a sense that cultural norms are not isolated but interconnected, sustained by a **broader ideal of the physician** as selfless, invulnerable, and wholly devoted to medicine. While qualitative studies vividly capture how physicians describe cultural expectations, three limitations stand out. *First*, medical culture is rarely the primary focus of analysis. It usually surfaces indirectly in research on issues such as help-

seeking, work-family conflict, or career transitions, yet it is almost never examined as the main focus of inquiry. *Second*, although qualitative evidence is essential for the richness of perspectives it provides, it is not generalizable. This raises the question of whether the experiences it highlights can be confirmed in larger samples (e.g. in terms of associations between cultural expectations and health-related outcomes). *Third,* researchers seldom attempt to model the interrelations among these norms, although such work is vital to organize future research and to develop effective prevention and intervention approaches.

3.2 Quantitative evidence

Quantitative research is important to **test whether culture-related constructs are empirically associated with PB and to estimate the strength of these links**. An emerging body of work has begun to do so, though most studies focus on *single* constructs that reflect some of the assumptions described above. Below, we briefly define each construct, situate it in relation to medical culture, and summarize empirical findings on its association with PB.

3.2.1 Culture-related constructs investigated

Imposter phenomenon (IP). IP is a construct defined by a persistent sense that one's achievements are not genuinely earned, but instead result from external factors rather than personal competence, effort, or skill (Clance & Imes, 1978 ; Bravata et al., 2020 ; as cited in Shanafelt et al., 2022). In medicine, it is described as being linked to norms that valorize perfectionism, superhuman expectations, and reluctance to seek help (Shanafelt, Dyrbye, et al., 2022). This contributes to physicians' feelings of being a fraud, despite objective evidence of competence. In a national U.S. survey of 3116 physicians, more than half reported moderate-to-intense IP. IP was independently associated with higher odds of burnout after adjusting for personal (e.g. age), and work-related (e.g. specialty, hours worked per week) variables. Burnout prevalence increased in step with IP severity: compared with minimal IP, the odds of burnout were 1.28 for moderate, 1.79 for frequent, and 2.13 for intense IP (Shanafelt, Dyrbye, et al., 2022)[15].

Self-valuation (SV). SV refers to physicians' ability to prioritize self-care and respond constructively to errors and limitation. Low SV translates in self-condemnation after mistakes, deferral of personal needs, and difficulty maintaining healthy boundaries. In medicine, low SV reflects cultural norms that valorize

[15] These quantitative findings on imposter phenomenon complement qualitative work, such as LaDonna et al.'s (2018) study describing imposter feelings as a common experience in the medical culture.

perfectionism, endurance, and self-neglect, and where attending to one's own well-being is often perceived as secondary or, even selfish (Trockel et al., 2019, 2021). In a multi-center U.S. survey of 3899 physicians, each 1-point higher SV score was associated with significantly lower burnout (β = -0.53) after adjusting for sex and specialty (Trockel et al., 2019). In a subsequent national study comparing 5197 U.S. physicians with 1011 workers in other fields, physicians initially had higher odds of burnout (OR 1.51). This difference was no longer significant once self-valuation was taken into account (OR 0.93). After further adjustment for work hours, sex, and age, physicians showed *lower* odds of burnout than other workers (OR 0.82). This indicates that SV may capture a vulnerability specific to the culture of medicine, which is associated to PB (Trockel et al., 2021)

Reluctance to seek help. Delayed or absent help-seeking has long been recognized as part of medical culture (cf. **Table 1** and **2**; Dyrbye et al., 2015, 2021; Shanafelt et al., 2021). Quantitative research confirms its association with PB. For instance, in a national survey of 762 U.S. residents, those with burnout were less likely to report having sought professional help for mental health concerns (27% vs. 37% among residents without burnout). On multivariable analysis, they were also more likely to report barriers to seeking care such as a difficulty informing a supervising physician about the need for an appointment (OR 2.32), or concerns about negative career consequences if taking medical leave (OR 2.09) (Dyrbye et al., 2021).

Stigma. Stigma refers to negative attitudes towards a disapproved mark, in this case towards burnout or mental health concerns (Favre et al., 2023). In medicine, stigma[16] is deeply cultural and discourages help-seeking (cf. **Table 1** and **2**). For instance, in a multi-institutional U.S. study of 2449 medical students, those meeting burnout criteria were twice as likely to report observing supervisors negatively judge peers who sought care (OR 2.06) (Dyrbye et al., 2015). Similarly, in a survey of 308 physicians at a Swiss university hospital, nearly half met burnout criteria. Emotional exhaustion correlated moderately with perceived structural stigma (r = 0.37) and weakly with perceived stigma (r = 0.25), while depersonalization correlated weakly with personal stigma (r = 0.23) and with perceived other stigma (r = 0.25) (Favre et al., 2023).

[16] As all forms of stigmatization, stigma towards PB can be internalized by physicians (personal stigma), attributed to others (perceived stigma), or embedded in institutional structures (structural stigma) (Favre et al., 2023).

3.2.2 Limitations of the quantitative evidence

The quantitative studies reviewed here show that several constructs (imposter phenomenon, self-valuation, reluctance to seek help, and stigma) discussed by authors as being a part of medical culture (whether in the introduction or discussion of their research papers) are consistently associated with PB. They provide concrete evidence that cultural norms matter for physician well-being. Yet the scope of this work remains limited. Most studies were conducted in the United States, where healthcare systems and training conditions differ from those from other (i.e. European) countries[17]. Moreover, they typically address *single* constructs in isolation, and in so they overlook how physicians describe distress as arising from the combined weight of *multiple* expectations. For example, stigma surrounding burnout and mental health is closely tied to reluctance to seek help: admitting difficulties is often equated with being a 'bad doctor', making physicians conceal their struggles and avoid accessing care. **Consistent with definitions of culture as *patterns* of tacit assumptions** (Schein & Schein, 2019a; Shanafelt et al., 2019), **these elements need to be studied not separately but as *interdependent* aspects of a broader culture. This thesis seeks to move toward such an integrated perspective**. Finally, quantitative work to date has covered only a subset of assumptions, leaving many others unexplored (e.g. the conflation of personal and professional identity, vocational expectations of medicine, or the incompatibility between being a physician and being a patient).

4. Synthesis and gaps in the literature

Taken together, the evidence reviewed in this chapter suggest that cultural norms are a salient determinant of physicians' well-being, vulnerability to and experience of PB. Narrative and reflective accounts consistently highlight tacit assumptions of invulnerability, perfectionism, and self-sacrifice. Theoretical contributions, such as Shanafelt's cultural framework, emphasize how these norms operate at the levels of artifacts, values, and tacit assumptions. Qualitative accounts illustrate how physicians describe cultural expectations as shaping their identity, self-care, and experience of distress, while quantitative studies provide empirical evidence that selected constructs (imposter phenomenon, self-valuation, reluctance to seek help, stigma) are associated with PB.

Despite these rich insights, important gaps remain.

[17] For instance, in European systems, physician employment is mostly subject to collective agreements with governments, employer associations, or statutory insurers. In the US system, physician employment is largely decentralized and privately funded (Aiken et al., 2025).

First, while existing work identifies multiple cultural assumptions, no model integrates them into a coherent set. Importantly, physicians rarely experience these expectations in isolation; rather, their combined weight shapes daily practice and contributes to burnout. These norms also appear to cluster around a broader professional ideal of the physician; one that is selfless, invulnerable, and wholly devoted to medicine. Without a model that treats them as interrelated expressions of this ideal, their cumulative influence cannot be adequately captured. *Second*, no validated instrument currently exists that would allow to asses these cultural constructs and their relations. This absence has prevented the systematic empirical investigation of their association with PB and related health outcomes. *Third*, previous work largely treats physicians as a homogeneous group. Yet, it is plausible that the extent to which medical culture is both perceived and endorsed, and thus its impact on well-being, varies across subgroups (for example, between men and women, between residents and senior physicians, or across specialties). For prevention and intervention purposes, identifying who is most exposed is crucial. *Fourth*, while qualitative studies provide valuable insights into physicians' lived experiences, few explicitly take medical culture itself as their central focus in relation to physicians' health. We still lack a qualitative understanding of how physicians *directly* articulate and make sense of cultural expectations when reflecting on their well-being.

5. Aims of the present thesis

This thesis contributes to addressing these gaps through a multi-method exploratory approach, structured around four empirical chapters. By drawing on both quantitative and qualitative approaches, it seeks to make medical culture a more concrete and measurable construct, to examine how it relates to PB and related health outcomes, to provide a nuanced understanding of subgroup differences, and to explore how physicians directly perceive and describe medical culture in relation to their own health and well-being.

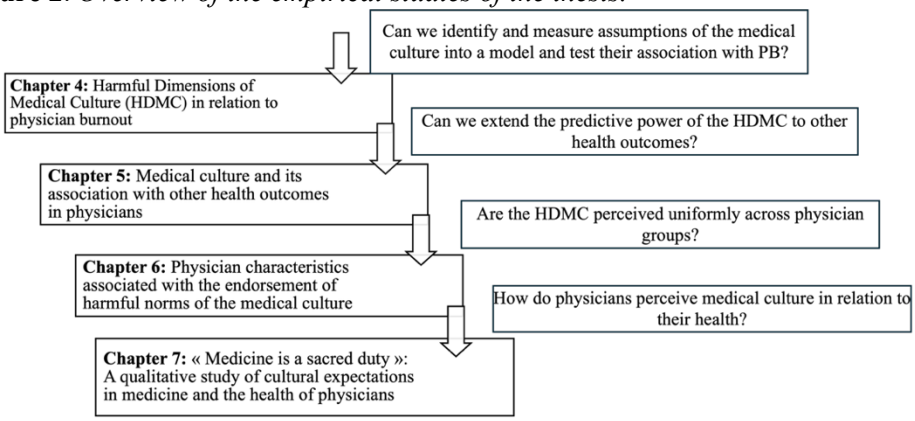
- **Chapter 4** lays the foundation by defining and validating a model of Harmful Dimensions of Medical Culture (HDMC). This study identifies seven first-order dimensions that cluster into three interrelated second-order (i.e. overarching) dimensions (Professional Commitment, Myth of Invulnerability, and Stigma toward Burnout). It also explores how each dimension is significantly and independently associated with PB. This initial study posits (aspects of the) medical culture as a measurable and important correlate of PB.
- **Chapter 5** extends the scope by examining associations between HDMC and a broader set of health outcomes, including depression, reluctance to seek help, self-treatment, presenteeism, and psychoactive medication use. In so doing, it

shows that cultural norms shape not only burnout but physician health behaviours and mental health.

- **Chapter 6** identifies specific physician groups who report higher endorsement of harmful norms and greater burnout. Supplementary analyses test whether HDMC mediates the link between sociodemographic and work-related characteristics of physicians and PB.
- **Chapter 7** extends and contextualizes the preceding findings through qualitative data that invite physicians to reflect explicitly on medical culture in relation to their health. Physicians' narratives illustrate how cultural expectations are internalized, reinforced, and contested through daily interactions, institutional practices, and unspoken norms. This chapter offers a more contextualized perspective and highlights that medical culture does not exist in isolation but interacts with personal, interpersonal, organizational and systemic influences.

A schematic overview of the four studies and their guiding research questions is provided in **Figure 2.**

Figure 2. *Overview of the empirical studies of the thesis.*



Note. Studies are illustrated on the left, along with their guiding research questions on the right.

Importantly, this thesis is situated within the socio-ecological perspective introduced in Chapter 1. Using Bronfenbrenner's terminology, medical culture will be conceptualized as a macrosystem-level influence: a professional-level influence that operates above and across organizational contexts (Gerardi, 2005; Scott et al., 2018), while also interacting with other systems to shape physicians' vulnerability to and experience of PB. Framing medical culture at this level ensures that this thesis not only explores culture as an explanatory factor, but also situates it within the broader ecology of determinants of physician well-being.

With this theoretical foundation established, the next chapters present the empirical studies that investigate how medical culture relates to PB and well-being.

Part 2. Empirical Section

Chapter 4. Harmful dimensions of medical culture in relation to physician burnout

Physician burnout (PB) is an emotional exhaustion in response to long-term workplace stress. Despite growing interest in how the medical culture contributes to physician burnout, there is little empirical research on the subject. In this study, we quantitatively evaluate specific dimensions of the medical culture, testing the hypothesis that a group of the interdependent aspects of medical culture would positively correlate with PB. We collected online survey results in a cross-sectional study of 1002 physicians in current clinical practice. Participants completed the Burnout Assessment Tool and additional survey items measuring aspects of contemporary medical culture. Using exploratory and confirmatory factor analyses, we first explored and confirmed the factorial validity of a model representing the medical cultural dimensions, and then undertook regression analyses to investigate their associations with physician burnout. The analyses revealed seven relevant factors of the medical culture clustering in three distinct but interdependent broader dimensions, which we designated as Physician's Professional Commitment, The Myth of the Invulnerable Physician, and Physician Stigma towards Burnout. These dimensions had independent associations with increased burnout, suggesting that they are detrimental to the welfare of physicians. Additionally, we identified a specific factor reflecting the Existential Significance of Being a Physician, which mitigated against burnout. Upon controlling for sociodemographic and professional characteristics, the investigated dimensions of medical culture accounted for 30% of the variance in PB. This quantitative exploration of the relations between medical culture and physician defined dimensions of medical cultural that are harmful to physicians and by extension to patient care. Present results highlight the need for further empirical investigations of medical culture and the pathways whereby certain dimensions of medical culture specifically relate to the well-being and health of physicians.

Reference

Banse, E., Mikolajczak, M., Bayot, M., Lenoir, A.-L., & De Timary, P. (2025). Harmful dimensions of medical culture in relation to physician burnout: A cross-sectional study. *PLOS Mental Health*, *2*(4), e0000301. https://doi.org/10.1371/journal.pmen.0000301

Harmful dimensions of medical culture in relation to physician burnout

1. Introduction

Physician burnout (PB) is highly prevalent and of rising incidence across all medical specialties (Dres et al., 2023; Grassi et al., 2022; Sexton et al., 2022; Vandenbroeck et al., 2017), bringing significant consequences for the health and welfare of physicians, and to the detriments of patient care and the effectiveness of healthcare institutions (Bianchi et al., 2017; Shanafelt, 2011).

Scholars and physicians are increasingly advocating for a broader recognition that aspects of contemporary medical culture are important contributors to PB (LaDonna et al., 2022; Shanafelt et al., 2019). In general terms, a culture represents a set of shared beliefs within a social group, which shapes expectations for behaviours and fosters a sense of identity among group members (Schein & Schein, 2019a; Shanafelt et al., 2019). The medical culture is a distinct and deeply ingrained professional culture (Danielsson et al., 2018), which consists of formal and informal elements acquired through socialization (Hafferty, 1998; Pearl, 2021). Aspiring physicians internalize prevailing attitudes, norms, and values during their training in the practice of medicine, which subsequently become implicit (and at times rigid) cultural tenets within the medical community (Hafferty, 1998).

The medical culture is commendable in many respects, being characterized by service, dedication, compassion, and an unwavering commitment to excellence and professional competence (Shanafelt et al., 2019). Physicians are profoundly motivated to attend to the needs and well-being of their patients, and the prevailing medical culture combines a strong dedication to healing with a continuous pursuit of progress in clinical care. These commonly held values maintain the practice of medicine as a highly respected and sought-after profession, and provide physicians with a profound sense of meaning and professional fulfillment (Pearl, 2021; Ward & Outram, 2016). Nonetheless, other specific aspects of medical culture may have detrimental consequences for the well-being and health of practicing physicians (Pearl, 2021; Shanafelt et al., 2019).Through editorials and personal viewpoints (Garelick, 2012; Lemire, 2020; Sarkar & Cassel, 2021; van Zalinge et al., 2009; Ward & Outram, 2016), reviews (Kay et al., 2008; Sinskey et al., 2022), testimonials (Gupta, 2018; Hill, 2017), and books (Gerada & Al-Naijar, 2020; Klitzman, 2008; Pearl, 2021), physicians are increasingly expressing concerns that aspects of medical

culture negatively impact their well-being, thus contributing to what might be called a professional malaise. Such personal attestations aside, empirical research on medical culture and physicians' distress remains a nascent field of study. Few investigations have quantitatively investigated associations between PB and recognized deleterious aspects of the medical culture such as low self-compassion (Trockel et al., 2021; Trockel et al., 2019), the imposter phenomenon in the medical profession (Shanafelt, Dyrbye, et al., 2022), as well as stigma and attitudes towards help-seeking by physicians in distress (Clough, Ireland, et al., 2019; Dyrbye et al., 2015; Shanafelt et al., 2021). However, those studies placed their primary focus on isolated elements of medical culture, without considering the interconnection and synergism of combined elements. This approach limits our understanding of the role of beliefs, norms, and attitudes typical of the medical culture that could bear a relation to the phenomenon of PB. Moreover, the preponderance of such empirical studies were conducted in the United States (Dyrbye et al., 2015; Shanafelt, Dyrbye, et al., 2022; Shanafelt et al., 2021; Trockel et al., 2019, 2021), with no comparable studies yet conducted in Europe. Overall, research in this field remains at an inchoate stage, as compared to the better developed state of investigations of risk factors for PB encountered at individual, work-related, and organizational levels (Abraham et al., 2020; Chong et al., 2022; Galaiya et al., 2020; Kansoun et al., 2019; Meredith et al., 2022; S. W. Yates, 2020; Zhou et al., 2020). Consequently, prevention and intervention strategies for PB currently fail to address the detrimental contributions of medical culture (Thomas & Bigatti, 2020).

On the other hand, there is an abundant qualitative literature highlighting various professional norms of medical culture that have not yet been captured by quantitative studies. For example, some studies have suggested that an expression by physicians of mental health concerns is tacitly equated with a lack of professional competence (Klitzman, 2008; LaDonna et al., 2022; Thompson et al., 2001). This misperception presents a unique challenge that shapes physicians' responses to their own distress (i.e. by delaying help-seeking) and that of their peers (i.e. the risk of ostracism) (Favre et al., 2023). Other examples of medical culture include the expectation of invulnerability (Mckevitt & Morgan, 1997; Wainwright et al., 2017), personal commitment to the professional role and identity (Onyura et al., 2015), or prioritization of work above personal well-being (King et al., 2023; Thompson et al., 2001). These deeply embedded norms likely reinforce each other. Although well-characterized in isolation, these norms have not yet been thoroughly quantified in relation to their roles in PB.

In response to this scenario, we designed the present study to evaluate quantitatively multiple dimensions of medical culture and their associations with PB.

Based on an extensive literature review including the available qualitative studies, we selected a set of norms that are repeatedly cited by physicians and scholars as potential contributors to PB, which are presented in detail in Table A of the appendix. In our first aim, we explored and validated a model of specific professional norms within the medical culture that may relate to PB incidence. While this psychometric work represents an important methodological contribution of the study, our main goal was to examine the relationship between harmful aspects of medical culture and burnout. We hypothesized that the relevant dimensions would be interdependent and would show independent associations with PB.

2. Methods

2.1 Ethics Statement

This cross-sectional study was approved by the Institutional Review Board (Ethics Committee of the Cliniques Universitaires Saint-Luc, Brussels) prior to data collection (Protocol Number: 2023/07MAI/219) and is a part of a larger research project preregistered on OSF (Preregistration). This report complies with the Checklist for Reporting of Survey Studies (Von Elm et al., 2007) and follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline for cross-sectional studies.

2.2 Survey instrument

An online survey was administered to participants, with anonymization to ensure participant confidentiality. Data collection and management was facilitated through REDCap electronic data capture tools (Harris et al., 2009). Recruitment of participants occurred iteratively during the data collection phase, which lasted from September 5 to November 5, 2023. Participants provided written consent before completing the survey. Participants provided the following personal and professional characteristics: age, gender, relationship status, parental status, specialty, work-setting, years in practice, average weekly work hours, and country of residence. The professional norms of the medical culture were assessed using a questionnaire of 35 items developed by the research team (detailed in Table A of the appendix), which had previously been reviewed and refined by researchers and professionals specializing in the care of physicians suffering from burnout. Some items were adapted from the Stigma of Occupational Stress Scale for Doctors (SOSS-D) (Clough et al., 2019). Responses were rated on a 5-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5). Burnout was measured using the 12-item version of the Burnout Assessment Tool (BAT-12), a recently validated self-assessment questionnaire for measuring burnout (Schaufeli, Desart, et al., 2020;

Schaufeli, De Witte, et al., 2020). We used the French version of the BAT-12, as proposed by the original authors of the scale (Schaufeli et al., 2019). The BAT-12 was developed to address certain conceptual, technical, and practical imperfections of the Maslach Burnout Inventory. It measures symptoms of exhaustion, mental distance, cognitive impairment, and emotional impairment. Responses were rated on a 5-point Likert scale ranging from "never" (1) to "always" (5). A global burnout score, ranging between 1 and 5, was calculated by averaging the item scores (Schaufeli, Desart, et al., 2020; Schaufeli, De Witte, et al., 2020). In the current sample, the Cronbach's' alpha (α) of the burnout scale was 0.88, indicating good interclass agreement.

2.3 Study population

The participants were French-speaking physicians in current clinical practice, encompassing general practitioners (GPs), specialist physicians (all specialties), and medical residents (postgraduates in training to become GPs or specialists). To construct a convenient sample representative of the broad physician population, we used several approaches to encourage participation. Leading medical organizations in Belgium, general medicine organizations and physicians' magazines also relayed the survey, with some additional recruitment in France. Deans of medical faculties at French-speaking universities in Belgium shared the survey via their mailing lists for residents and academic physicians at their respective university hospitals. Medical directorates and councils of different hospitals shared the survey among physicians. The survey was also disseminated on social media networks and via word of mouth. While the initial recruitment strategy was focused on physicians practicing in Belgium, this online dissemination allowed for the participation of French-speaking physicians from other countries as well. Participants were not excluded based on their country of residence, as long as they met the inclusion criteria. Participation was voluntary and without financial incentive.

This study employed convenience sampling, and as such, no census was conducted. Consequently, we did not estimate the exact participation rate per country, nor did we track the number of potential participants by country. The study's design did not aim to perform country-specific analyses, as this was not within the scope of the research objectives. Nevertheless, we acknowledge that the inclusion of participants from different countries may have introduced variability related to differing healthcare systems, cultural norms, and medical practices, an issue that we discuss further in the discussion.

2.4 Statistical analysis

Physician burnout was defined as the outcome (dependent variable). The independent variable, or predictor, was the structure of medical culture. The main analyses are described below, with provision of details in the appendix. Statistical analyses adhered to the preregistration, with the addition of a confirmatory factor analysis (CFA) to cross-validate the results of the exploratory factor analysis (EFA). According to our sample size calculation (described in Supplementary Methods), a minimum of 550 participants was necessary for the planned analyses. However, the final sample size significantly surpassed this threshold, enabling the execution of both EFA and CFA. Descriptive statistics were computed for all variables, and patterns of drop-out and missing values were examined. Missing values were primarily due to participant dropout during the survey. Participants with complete data on the cultural items (N = 1002) were compared to those with missing data (N = 236), revealing only small differences, notably a higher likelihood of survey dropout among residents ($\chi2(4) = 5.80$, $p = 0.02$, $\varphi = 0.070$). Potential differences were also examined between individuals who provided complete data on all items of interest (35 cultural items and 12 burnout items, N = 973) and those who provided complete data only on the cultural items (N = 1002) on demographic and work-related variables (age, gender, seniority, number of hours worked per week, status of the physician, specialty) as well as on burnout, using t-tests and $\chi2$ tests. No significant differences were found between these groups, indicating that they were comparable with respect to these variables. To maximize statistical power, analyses were conducted on the largest possible samples. No imputation was performed for incomplete answers and drop-out and missing data were deleted listwise.

To first ascertain and then cross-validate the factor structure of the investigated dimensions of the medical culture, the sample was randomly divided into two subsamples of 501 participants assigned for either EFA or CFA. Using $\chi2$ analyses for categorical variables, and t-tests and one-way ANOVAs for continuous variables, we first verified the comparability of the subsamples regarding sociodemographic characteristics and burnout scores. In the first subsample, we conducted EFA using principal axis factoring (PAF) with direct oblimin rotation on the 35 items (Field, 2009; Hayton et al., 2004; Tabachnick & Fidell, 2014; Watkins, 2021). We assessed suitability of our data with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. Item loadings of ≥ 0.40 and communalities > 0.20 were required; cross-loading items were defined as those items loading ≥ 0.30 on two or more factors. Such items were considered unstable and were therefore removed. The proportion of total variance explained (TVE) by the factors needed to be $\geq 50\%$. To determine the number of factors to

retain, we relied on various methods: Kaiser's criterion, the scree plot, and the parallel analysis (Field, 2009; Hayton et al., 2004; Tabachnick & Fidell, 2014; Watkins, 2021). We performed sensitivity analyses to test the stability of factor solutions (e.g. after removing outliers or changing factor retention criteria). These analyses supported the robustness of the identified factor structure.

Subsequently, in the second subsample, we conducted a CFA with the maximum likelihood estimation method to validate the structure emerging from the EFA. We compared five statistical models (outlined in Fig A through Fig E and described in Table E of the appendix) using different goodness-of-fit indices to determine the statistical acceptability of the models and to retain the best-fitting model: the chi-square indices ($\chi 2$) (B. M. Byrne, 2013), the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the comparative fit index (CFI), and the Tucker-Lewis index (TLI) (Hu & Bentler, 1995). Acceptable fit criteria included RMSEA and SRMR ≤ 0.08, CFI and TLI > 0.90 (B. M. Byrne, 2013; Hu & Bentler, 2000). After comparing various models, we retained the best-fitting model (B. M. Byrne, 2013; Hu & Bentler, 2000), yielding what we designate as harmful dimensions of medical culture (henceforth HDMC).

We conducted further analyses with this model on the entire sample, including descriptive statistics and assessment of internal consistency (Cronbach's α coefficients). We computed one-tailed correlation tests (Spearman correlations to account for non-normal data distribution) between the HDMC and PB scores, with significance level set at $p < 0.001$ after adjustment for multiple testing. A hierarchical multiple regression (two-block regression model) was then conducted to assess the additional variance in burnout scores explained by medical culture. The hierarchical regression analysis included the following potential confounders in the first step of the model: gender, relationship status, parental status, physician status (resident vs attending), specialty (generalist vs specialist), years in practice, and weekly working hours, as these personal and professional characteristics are known to be associated with PB (Kansoun et al., 2019; Meredith et al., 2022; Zhou et al., 2020). In step two, we included the investigated dimensions of medical culture. Statistical analyses were performed using IBM SPSS 28.0, except CFAs, which were conducted using Stata 18 Software (Statacorp, 2023).

3. Results

The main findings are summarized below. Comprehensive results are available in Table B to K of the appendix.

3.1 Participants

The final sample comprised those participants (N = 1002; 64.6% women) who had provided complete data for all survey items. The sociodemographic and work-related characteristics of the 1002 surveyed physicians, including detailed subsets for specialist physicians and general practitioners, are detailed in Table 1. Data are reported as number (percentage). The median age was 38 years (IQR, 30-50). 82.3% reported being in a relationship and 41.4% indicated having children. Nearly all respondents (92%) resided in Belgium, with the remainder in France and Switzerland. 27.7% of the sample were GPs, 6.1% were resident GPs, 45.6% were specialists, and 18.8% were resident specialists. A small proportion of respondents (1.5%) were either occupational, insurance, school physicians, or medical consultants. Among the 645 specialists, the most common specialties were anesthesiology, pediatrics, and surgery. 86.6% of the specialists and resident specialists worked in a hospital setting, largely at university hospitals (46.5%). On the other hand, 44.2% of the participating GPs worked in multidisciplinary groups. The median duration of practice was 12 years (IQR, 5-24) and the median estimated weekly working hours was 50 (IQR, 40-60). The median burnout score was 2.08 (IQR, 1.75-2.42).

Table 1. Sociodemographic and work-related characteristics of the 1002 surveyed physicians, including subsets for specialist physicians and general practitioners.

Sociodemographic and work-related characteristics (total sample, N = 1002)	**N (%)**
Gender	
Male	347 (34.6)
Female	547 (64.6)
Other	2 (0.2)
Missing	6 (0.6)
Relationship status	
Single	175 (17.5)
In a relationship	825 (82.3)
Missing	2 (0.2)
Parental status	
Yes	582 (58.1)
No	415 (41.4)
Missing	5 (0.5)
Country of residence	
Belgium	922 (92)
France	65 (6.5)
Switzerland	2 (0.2)
Other	6 (0.6)
Missing	7 (0.7)
Type of physician	
General practitioner	339 (33.8)

Specialist physician	646 (64.5)
Occupational medicine physicians / Insurance physicians / School physicians / Medical consultants	14 (1.4)
Missing	3 (0.3)
Work-related characteristics (specialist physicians only, N = 646)	**N (%)**
Status	
Attending	458 (70.9)
Resident	188 (29.1)
Work setting	
Hospital setting	560 (86.6)
Private consultation	13 (2.0)
Both	60 (9.3)
Missing	13 (2.0)
Type of hospital	
Public hospital	204 (32.9)
Private hospital	127 (20.5)
University hospital	288 (46.5)
Missing	27 (4.2)
Specialty	
Anesthesiology	60 (9.3)
Pediatrics	52 (8.1)
Surgery	49 (7.6)
Acute and emergency medicine	45 (7.0)
Neurology and pediatric neurology	40 (6.2)
Psychiatry	37 (5.7)
Internal medicine	35 (5.4)
Gynecology	25 (3.9)
Intensive care	24 (3.7)
Cardiology	19 (2.9)
Gastro-enterology	19 (2.9)
Geriatrics	18 (2.8)
Otolaryngology	18 (2.8)
Pneumology	18 (2.8)
Hematology	16 (2.5)
Physical medicine and rehabilitation	15 (2.3)
Dermatology	13 (2.0)
Endocrinology	13 (2.0)
Radiology	13 (2.0)
Clinical biology	11 (1.7)
Clinical infectiology	11 (1.7)
Oncology	11 (1.7)
Ophthalmology	10 (1.6)
Urology	9 (1.4)
Nuclear medicine	8 (1.2)
Nephrology	8 (1.2)
Pathological anatomy	7 (1.1)
Neurosurgery	6 (0.9)

Radiotherapy – oncology	5 (0.8)
Rheumatology	3 (0.5)
Neonatology	2 (0.3)
Stomatology	2 (0.3)
Palliative care	2 (0.3)
Other (hospital hygiene, medical information, orthodontics, legal medicine)	4 (0.6)
Missing	18 (2.8)
Work-related characteristics (general practitioners only, N = 339)	**N (%)**
Status	
Attending	278 (82.0)
Resident	61 (18.0)
Type of practice [a]	
General medicine (consultations and home visits)	327 (96.5)
Hospital setting	14 (4.1)
Other institution (e.g. family planning center, nursing home)	52 (15.3)
Non-conventional medicine	11 (3.2)
Work setting [a]	
Works alone	90 (26.5)
Monodisciplinary group	107 (31.6)
Multidisciplinary group	150 (44.2)

Note. N of the total sample = 1002, N of the subset of specialist physicians = 646, N of the subset of general practitioners = 339. [a] Multiple responses were possible.

3.2 Exploratory and confirmatory factor analysis

Depending on the criteria, there were seven to ten extractable factors from the initial EFA. We ran multiple EFAs, iteratively removing items until achieving a stable solution meeting all preestablished statistical criteria. The final structure comprised eight factors including 24 items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of this structure was high (0.84), and Bartlett's test of sphericity was highly significant, χ^2 (276) = 5069.83, $p < 0.000$. This solution accounted for 59% of item variance and yielded a simple structure (with no cross-loading items). Based on item content, we designated the factors as follows: (1) Work Priority Strain, (2) Self-Sacrificing Nature of Medical Practice, (3) Physician's Central Identity Role, (4) Physician's Discomfort with Patient Role, (5) Physician's Moral Obligation to Patients and Colleagues, (6) Colleagues' Stigma towards PB, (7) Personal Stigma towards PB, and (8) Existential Significance of Being a Physician.

CFA allowed the comparison of the EFA structure with alternative models using various fit indices (see Fig A to E Fig and Table E of the appendix for depictions of these models and their corresponding fit indices). All models demonstrated

satisfactory fittings to the data, but the hierarchical model displayed in Fig 1 emerged as the best model, in theoretical and statistical terms (RMSEA = 0.06 90% CI = [0.05 to 0.06]; CFI = 0.92; TLI = 0.91; SRMR = 0.05). In this model, seven of the eight first-order factors formed three second-order dimensions, with omission of factor eight, Existential Significance of Being a Physician from the model, as its inclusion reduced the overall fit. That initial finding suggests that factor eight may not align with the structure of *Harmful* Dimensions of the Medical Culture (HDMC), referring to our hypothesis to be validated by examining the correlations between the dimensions and burnout, as discussed below. The second-order dimensions, labelled (A) Physician's Professional Commitment, (B) The Myth of the Invulnerable Physician and (C) Physician Stigma towards Burnout, were informed by intercorrelations among first-order factors. This hierarchical model provides a concise representation of a complex structure, delineating distinct yet interconnected HDMC components.

3.3 Description and reliability of the HDMC

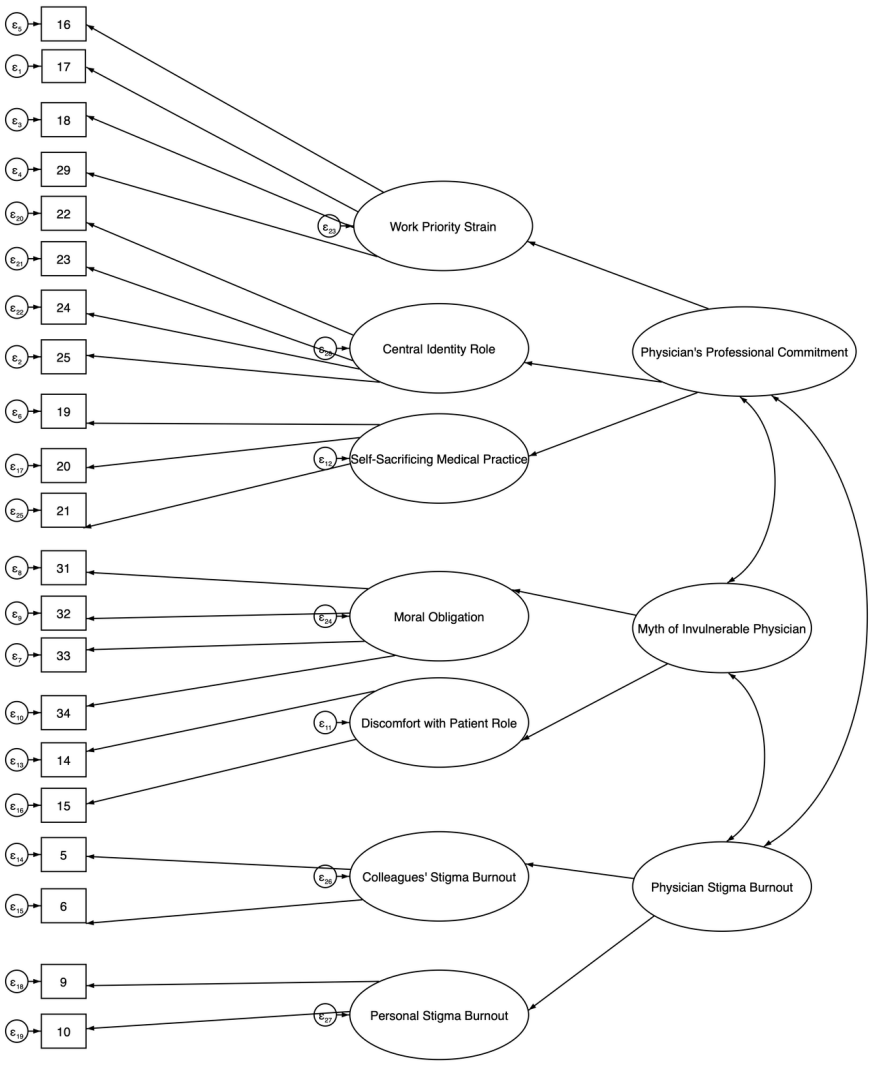
Table 2 describes the final HDMC along with descriptive statistics and internal consistency. As evidenced by the median scores and interquartile ranges (IQR), physicians exhibit strong endorsement of the HDMC (for items, see Table K of the appendix).

Table 2. Description of the Harmful Dimensions of the Medical Culture.

Second-order dimensions with definition	First-order factors	# of items	α [a]	Median (IQR)
Physician's Professional Commitment		11	0.85	3.72 [3.27;4.09]
Higher scores on this dimension reflect the physician's tendency to consider their medical profession as central to their manner of defining their identity and daily lives. This reflects the sacrifices made for the medical career and work-life imbalance often arising in the medical profession.	Work Priority Strain	4	0.87	4.00 [3.50;4.50]
	Physician's Central Identity Role	4	0.78	3.00 [3.50;4.50]
	Self-Sacrificing Nature of Medical Practice	3	0.86	4.33 [4.00;5.00]
The Myth of the Invulnerable Physician		6	0.77	3.83 [3.16;4.16]
Higher scores reflect the physician's tendency to perceive that physicians should be invulnerable, and the roles of physicians and patients as being incompatible. This reflects an inclination towards believing that physicians should not themselves experience illness.	Physician's Moral Obligation to Patients and Colleagues	4	0.78	3.75 [3.00;4.25]
	Physician's Discomfort with Patient Role	2	0.72	4.00 [3.00;4.50]
Physician Stigma towards Burnout		4	0.62	3.45 [3.05;4.80]
Higher scores on this dimension reflect the physician's proneness to negatively perceive the experience of burnout in physicians. This tendency is reflected by the physician's beliefs about stigmatizing attitudes held by his or her colleagues, and by their internalized stigmatizing attitudes towards burnout in the medical profession.	Colleagues' Stigma towards PB	2	0.84	3.00 [2.00;4.00]
	Personal Stigma towards PB	2	0.68	2.00 [1.50;3.00]
HDMC global score		21	0.85	3.45 [3.05;4.80]
Higher global score reflects a general tendency of the physician to endorse the harmful dimensions of the medical culture.				

Note. N = 1002. α = Cronbach's alpha, to assess the internal consistency of the scale. IQR = Interquartile Range. This table only includes the HDMC factors. [a] For testing internal consistency, we conducted inter-item correlation when only 2 items constituted a scale.

Figure 1. Visual representation of the final Harmful Dimensions of the Medical Culture Model.



Note. In this figure, the top left column represents the error (e) terms fit in the CFA. The second column (rectangles) starting from the left represents the items (21 in total). The third column (arrows) represents the item loadings onto the first order latent factors. The fourth column (ovals) represents the first order latent factors and their associated error (e) terms. The fifth column (arrows) represents the structural loadings from the first order latent factors to the second order latent factors. The last column (ovals) represents the second order latent factors with inter-factor correlations (arrows). This is a second-order hierarchical model in which seven of the eight first-order factors of the EFA load onto three second-order dimensions (HDMC).

3.4 Interdependency of the HDMC and correlations with burnout

As shown in Table 3, the first- and second-order HDMC had varying degrees of positive correlation. Table 3 also illustrates the correlations between the first-order factors and second-order dimensions, thereby affirming the relevance of all three dimensions. Strong positive correlations were found between the global HDMC score and the dimensions of Professional Commitment ($\rho = 0.84$, $p < 0.001$), and the Myth of the Invulnerable Physician ($\rho = 0.75$, $p < 0.001$), respectively, suggesting their central role in the concept of harmful medical culture. In contrast, Physician Stigma towards Burnout showed a significant but notably lower correlation ($\rho = 0.56$, $p < 0.001$) suggesting that, while still important, it represents a less central dimension compared to the others two.

Except for Personal Stigma towards PB, all first-order factors exhibited strong positive correlations with burnout scores ($p<0.001$) with varying effect sizes. These correlations suggest that the greater endorsement of each dimension by physicians corresponds to higher burnout scores. There were positive correlations of moderate effect size between burnout scores and the second-order dimensions, providing empirical support for our hypotheses.

Table 3. Correlations between factors of the Harmful Dimensions of the Medical Culture and Physician Burnout.

	First-order factors							Second-order dimensions			PB
	1	**2**	**3**	**4**	**5**	**6**	**7**	**A**	**B**	**C**	
1. Work Priority Strain	--							**.82****	.38**	.20**	*.40***
2. Physician's Moral Obligation to Patients and Colleagues	.37**	--						.40**	**.90****	.26**	*.33***
3. Colleagues' Stigma towards PB	.19**	.27**	--					.21**	.28**	**.82****	.23**
4. Personal Stigma towards PB	.08	.09*	.13**	--				.14**	.18**	**.65****	.06
5. Physician's Discomfort with Patient Role	.21**	.34**	.19**	.14**	--			.25**	**.68****	.24**	.23**
6. Physician's Central Identity Role	.35**	.26**	.11**	.13**	.16**	--		**.75****	.26**	.16**	.16**
7. Self-Sacrificing Nature of Medical Practice	.57**	.31**	.25**	.11**	.22**	.31**	--	**.72****	.33**	.26**	*.36***
A. Physician's Professional Commitment								--			*.38***
B. The Myth of the Invulnerable Physician								.42 **	--		*.35***
C. Physician Stigma towards Burnout								.25**	.30**	--	.22**
HDMC global score								.84**	.75**	.56**	*.42***

Note. HDMC = Harmful Dimensions of the Medical Culture, Physician Burnout =PB. Correlations are Spearman correlations (*ρ)*. *Correlation is significant at p<0.01 (1-tailed). **Correlation is significant at p<0.001 level (1-tailed), following adjustment for multiple testing. Inter-factor correlations are conducted among the entire participant group (N = 1002), and correlations with burnout were conducted among N = 996 participants. Inter-factor correlations are indicated in bold when a first-order factor is a part of the second order factor of the column. Correlations with burnout indicated italics are considered as being clinically meaningful, as they are of moderate effect size (Cohen's d ≥ 0.5, Spearman correlation coefficient ≥ 0.24.

3.5 Distinctiveness of Existential Significance of Being a Physician

Existential Significance of Being a Physician ($\alpha = 0.76$) exhibited a positive correlation with Physician's Central Identity Role ($\rho = 0.44$, $p < 0.001$), but minimal to negligible correlations with the other factors. Furthermore, Existential Significance of Being a Physician demonstrated relatively weaker correlations with the second-order dimensions ($\rho_{D1} = 0.28$, $p < 0.001$; $\rho_{D2} = 0.17$, $p < 0.001$; $\rho_{D3} = 0.04$, $p = 0.09$). Removing this factor from the HDMC structure resulted in better fitting of the data. Moreover, unlike the HDMC, Existential Significance was *negatively* correlated to burnout, albeit with a small effect size ($\rho = -0.14$, $p < 0.001$). This result supported our decision to exclude the factor from consideration among *Harmful* Dimensions of the Medical Culture.

3.6 Relative contribution of the HDMC and Existential Significance of Being a Physician to PB

The factors gender, relationship status, parental status, physician status, specialty, years in practice, and working hours together accounted for less than 4% of the variance in burnout scores (see Table I of the appendix for the full two-block regression model). The HDMC and Existential Significance accounted for an incremental 26% of the variance in burnout ($R^2 = 0.30$, adjusted $R^2 = 0.29$, $F(11, 963) = 36.58$, $p < 0.001$), as shown in Table 4. The three HDMC were independently associated with PB. Physician's Professional Commitment exhibited the strongest effect (Std B = 0.38, $p < 0.001$). Existential Significance was negatively associated with PB (Std B = -0.31, $p < 0.001$). Table J of the appendix presents the regression model upon controlling for social desirability.

Table 4. Hierarchical multiple regression of the association between the investigated dimensions of the medical culture and burnout, while controlling for covariates.

	Std. B	**95% CI for Std.B**	***p***
$F(11, 963) = 36.584$, $p < .001$, $R^2 = 0.297$, $R^2_{adjusted} = 0.289$			
(Constant)			<.001
Gender	.05	0.00 to 0.11	0.06
Relationship status	-0.01	-0.07 to 0.05	0.71
Parental status	-0.02	-0.10 to 0.06	0.65
Physician status	0.04	-0.04 to 0.11	0.34
Specialty	-0.06	-0.12 to 0.00	0.04
Years in practice	0.05	-0.02 to 0.14	0.24
Hours worked per week	-0.03	-0.11 to 0.05	0.39
Physician's Professional Commitment	0.38	0.31 to 0.44	<0.001
The Myth of the Invulnerable Physician	0.22	0.15 to 0.28	<0.001
Physician Stigma towards Burnout	0.08	0.03 to 0.14	0.004
Existential Significance of Being a Physician	-0.31	-0.37 to -0.26	<0.001

Note. N = 964. The dependent variable is the Burnout score. Std B = standardized beta. CI = Confidence Interval. Missing values excluded listwise. In step 1 of the model, we included the following covariates as referents: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice and working hours estimated per week. In step 2, we added the HDMC and Existential Significance. Excluding the factor Existential Significance of Being a Physician, the three second-order HDMC significantly contributed to the prediction of burnout, while controlling for demographic and professional characteristics ($R^2 = 0.21$).

4. Discussion

4.1 Summary of key findings

In our quantitative exploration of professional norms in medicine, we identified eight factors related to professional burnout (PB) in a large sample of mainly Belgian physicians. Seven of the eight factors regrouped into three dimensions of medical culture: Physician's Professional Commitment, the Myth of the Invulnerable Physician, and Physician Stigma towards Burnout. These dimensions were interdependent and positively correlated with PB, leading to their designation as Harmful Dimensions of Medical Culture (HDMC). However, the factor Existential Significance of Being a Physician did not fit in the HDMC structure but rather demonstrated an inverse correlation with PB. The associations between the investigated dimensions and PB scores survived multivariable analysis adjusting for gender, relationship status, parental status, physician status, specialty, years in practice, and working hours. Results of this study extend previous empirical work on aspects of the medical culture by identifying new (sub-) dimensions of medical culture and exploring their interrelations and associations with PB.

4.2 Investigated dimensions of medical culture

The first dimension of HDMC, Physician's Professional Commitment, underscores the significant investment of physicians in their professional role, and their profound dedication, which together bring a risk for work-life imbalance (Clement et al., 2015; Henderson et al., 2012; Klitzman, 2008). This dimension reflects how the practice of medicine is a vocational calling that frequently intertwines personal and professional identities (M. Henderson et al., 2012). Physicians often feel compelled to define themselves and their value in relation to their working persona (Klitzman, 2008; Wessely & Gerada, 2013), such that self-sacrifice for the sake of the profession often becomes a cultural imperative, even when still in medical school (Beckman, 2015). While this commitment to medicine is commendable, it can become emotionally burdensome for physicians. The second HDMC, the Myth of the Invulnerable Physician, encapsulates perceptions of the need for invincibility (Fox et al., 2009) and the incompatibility between the separate roles of physician and patient (Thompson et al., 2001). Within a professional culture that assumes invulnerability, even the concept of illness becomes unthinkable (LaDonna et al., 2022). Unfortunately, this notion is perpetuated through the process of medical education and is exacerbated by the real world contingencies of medical practices and organizations (Klitzman, 2008). The third HDMC, Physician Stigma towards Burnout, embodies negative attitudes, either in self-assessment or in the view of medical peers, towards physicians who are facing professional challenges, and the resultant perceptions of being flawed or outsiders to the prestigious medical community (Favre et al., 2023; Hill, 2017; Myers, 2017; Sinskey et al., 2022). Among physicians, stigma may be characterized by attitudes and processes that are unique to the profession (Clough et al., 2019).

The interdependency between the dimensions of Professional Commitment, Myth of the Invulnerable Physician, and Stigma towards Burnout suggests that the HDMC represents the composite of interconnected aspects of a broader medical culture; it is thus likely that the HDMC components reinforce one another. We found strong positive correlations between the global HDMC score and the dimensions of Professional Commitment and the Myth of the Invulnerable Physician, underscoring their centrality to the concept of harmful medical culture. In contrast, Physician Stigma towards Burnout showed a weaker correlation. This may partly stem from methodological factors, such as the smaller number of items and its lower internal consistency, which may have contributed to greater variability and weaker correlations. Theoretically, stigma towards burnout may be less central to harmful medical culture than the broader constructs of professional commitment and invulnerability, which are historically deeply ingrained in the profession. However,

our respondents' overall endorsement of the unofficial professional norms, such as invulnerability and professional commitment, highlights their pervasive nature in medical culture. Such norms are not unique to the field of medicine, but can also occur among members *inter alia* of the priesthood (Klitzman, 2008) or military (Gerada & Al-Naijar, 2020). Nevertheless, the demanding nature of medical training and work and the societal expectations placed upon physicians can amplify their impact (Gerada & Al-Naijar, 2020). Often internalized by physicians early in their medical training, the norms can become implicit over time, due to pervasive external reinforcement throughout a physician's career and professional environment.

While the investigated dimensions of medical culture may ill-serve the interests of physicians, and become detrimental to the care of patients (Pearl, 2021), they are manifestly advantageous to the healthcare system, and often align with organizational culture in medicine (Shanafelt et al., 2019). Indeed, physicians experience increasing pressure to continuously meet growing patient demands (Schaufeli et al., 2011) and workloads (C. P. West et al., 2018) without faltering. Institutions demand that physicians should function in systems based on external accountability (Berwick, 2016) and adapt to new clerical burdens and digital health record systems (Shanafelt et al., 2016). Physicians who seek alleviation from these stressors by taking time off, working part-time, or admitting their vulnerability, often suffer penalties for these behaviours, which are perceived as manifestations of professional detachment (LaDonna et al., 2022). As a result, these norms tend to become even more entrenched and difficult to address.

The factor Existential Significance of Being a Physician comprises items describing the extent to which a physician finds life-meaning through the practice of medicine. Physicians derive various aspects of meaning from their work (i.e. being a healer, developing a specific expertise, teaching) (Shanafelt, 2009), which is influenced by their personal and professional values (Shanafelt et al., 2006; Shanafelt, 2005). Since this factor is protective against burnout, we exclude it from the HDMC.

4.3 Associations with burnout

Our results show a strong association between PB and the individual endorsement of the HDMC, after controlling for characteristics associated with PB such as years in practice, gender, and physician status. This aligns with previous research on specific aspects of medical culture, including low self-compassion and the imposter phenomenon (Shanafelt, Dyrbye, et al., 2022; Trockel et al., 2019, 2021), which showed independent associations with burnout. Thus, aspects of the professional culture likely contribute to PB irrespective of personal and professional

characteristics (Trockel et al., 2021).

These results also support observations by physicians and researchers suggesting that medical culture may unintentionally contribute to burnout by perpetuating beliefs, values, and attitudes that are detrimental to physicians' health. Scholars have even argued that PB is an inevitable consequence of medical training and its encouragement of maladaptive behaviours (Grow et al., 2019; Montgomery, 2014). The professional norms of medical culture investigated herein are also likely related to other prevalent health issues among physicians, including depression (Grassi et al., 2022), suicidal ideation (Gerada, 2018), and poor self-care behaviours (Bazargan et al., 2009) such as delayed help-seeking, which previously research has linked to stigmatization in physicians (Dyrbye et al., 2015; Shanafelt et al., 2021).

Deriving existential meaning from the engagement in the medical profession is consistently associated with lower burnout, even when controlling for other dimensions of medical culture. Previous research underscores that finding purpose and fulfillment in work can buffer against burnout in physicians (Shanafelt, 2009) and enhance their psychological well-being (Steger et al., 2012). However, given the cross-sectional design of our study, we cannot infer causal relationships among our findings. Perceiving the practice of medicine as a source of meaning in life could shield physicians from burnout. Conversely, physicians experiencing burnout may cease to obtain life-meaning from engagement in their profession.

4.4 Limitations and future directions

By design, this investigation emphasizes the harmful aspects of medical culture, whereas other aspects of the professional culture of physicians may have positive effects. Many laudatory aspects of physicians' professional culture contribute to finding meaning and professional fulfillment, and reduced burnout risk. Physicians can exemplify qualities such as courage, dedication, altruism, and compassion (Pearl, 2021; Shanafelt et al., 2019; Ward et al., 2016), which are foundational to the medical profession and deeply ingrained in its culture. Future studies should explore the complex interplay between the positive and negative dimensions of medical culture and how they relate to physicians' well-being.

Due to the complex recruitment strategy, we are unable to estimate the net response rate for participation, which may raise caveats about the generalizability of our findings. For instance, the notably lower median age of our participants compared to the average age of the overall physician population in Belgium may suggest a self-selection bias. Also, the predominance of hospital-based specialty physicians may have influenced the findings. Future studies could benefit from a

more diverse sample that includes a broader representation of age groups, work settings, and career stages within the physician workforce.

While the present study primarily included Belgian physicians, the inclusion criteria allowed participation from French-speaking physicians practicing in other countries. This inclusion introduced the possibility of variations in general culture, healthcare systems, and local medical cultures between countries, which could have influenced our findings. While this diversity could be viewed as a limitation, as we were unable to account for potential differences linked to these contextual factors, in our assessment it represents a strength, as it permits exploration beyond a single national context. The consistent findings support the hypothesis that a shared medical culture exists across countries, characterized by professional norms and expectations instilled during medical training and professional practice, and that this culture significantly contributes to PB irrespective of national variations.

The investigated aspects of medical culture mainly encompassed a triad of dimensions showing a positive correlation with PB. However, our study did not explicitly investigate how medical culture and its association with burnout may vary according to various personal (e.g. personality, generation) and socio-professional (e.g. status, specialty, work setting) characteristics. For example, physicians in academic hospitals may face additional demands related to teaching and research, which might amplify certain aspects of medical culture, such as professional commitment (Dres et al., 2023; Onyura et al., 2015). Similarly, the realities of specific specialties may interact with cultural norms differently, thereby influencing their impact on burnout. A more nuanced future study might explore how these characteristics influence the endorsement of the HDMC, and how such characteristics moderate the association between the HDMC and PB. We consider it likely that intricate interactions among physician characteristics and their endorsement of specific aspects of medical culture would moderate the outcome of PB.

The cross-sectional design of the study precludes us from making causal inferences. Further investigations with longitudinal designs seem warranted to establish causal relationships among HDMC and PB. We also see a need to examine the relative contributions of the HDMC and known PB risk factors, such as aspects of personality and organizational risk factors. Future studies might also expand on the psychometric work initiated in this study. It would be particularly valuable to extend the examination of the criterion and predictive validity of the scale, notably by investigating its impact on variables related to physicians' health and well-being (e.g. depression, anxiety, reluctance to seek help, and self-medication), as well as team-level outcomes (e.g. quality of the work climate, interpersonal conflicts,

workload distribution, and team collaboration) and patient-level factors (e.g. diminished empathy, medical errors, or, conversely, enhanced dedication to patient care and continuity of care). These prospects for future studies could provide a more comprehensive understanding of the impact of harmful dimensions of medical culture (HDMC), and illustrate how these dimensions may exert differential effects, including potentially positive outcomes in specific contexts.

Present findings have broad implications for medical education, burnout prevention in students and physicians, and tailored interventions for PB. Demonstration of a causal relationship whereby HDMC leads to PB would call for changing the culture of medicine to prevent or mitigate burnout in the profession. This scenario aligns with physicians' perspectives reported in the literature, which highlight the urgent need to direct investigations towards the unhealthy culture of medicine (Sinskey et al., 2022), to start a "cultural revolution"(Hill, 2017), and to rethink the professional culture of medicine (Shanafelt et al., 2019). While many stressors may be inherent to the medical profession, those embedded within the contemporary medical culture might be alterable (Ward & Outram, 2016) to the benefit of the medical community (Sinskey et al., 2022) and patients (Pearl, 2021).

We perceive a need for nuanced strategies to address certain harmful cultural norms, while promoting the factors that enhance personal fulfillment in the medical profession. Such an initiative would by no means interfere with the knowledge, clinical skills, and ethical standards of physicians, but would promote a professional culture that is more attentive to the well-being of its members. Arguably, the time has come to reconcile the standards of excellence in the practice of medicine with a consideration of physicians' health. Unseating the deleterious professional norms identified in the present study calls for measures such as critically examining the detrimental aspects of the hidden curriculum in medicine (Hafferty, 1998), fostering role models and supervisors who do not conceal their vulnerability (A. Martin, 2022b, 2022a), reducing stigma through education and other pro-active initiatives (Brower, 2021), and initiating open discussions in the medical community on medical culture. Targeted interventions should also address organizational and systemic elements that perpetuate and derive benefit from the harmful aspects of the medical culture (Montgomery et al., 2019).

5. Conclusion

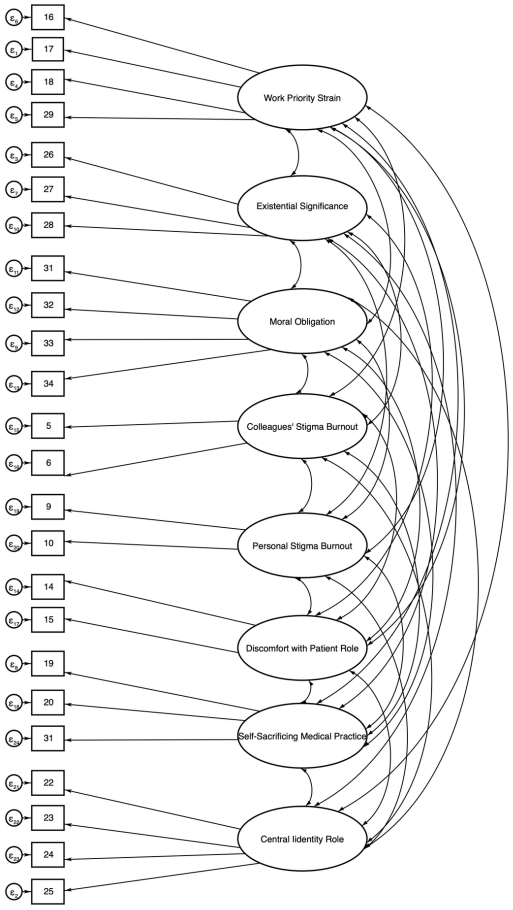
Physicians embody deeply entrenched positive values at the core of medical culture. However, the phenomenon of PB calls for an imperative to acknowledge the beliefs, norms, and attitudes prevailing in medical culture that adversely affect physicians' well-being. Present results underscore the significant relationships

between three cultural dimensions - Physician's Professional Commitment, the Myth of the Invulnerable Physician, and Physician Stigma towards Burnout - and the risk of PB. These dimensions emphasize the need for targeted interventions to mitigate PB and promote physician well-being. Engaging in a meaningful reflection upon the need for cultural adaptation is a crucial step towards reconciling the dual nature of medical culture. By making a concerted effort towards embracing its positive attributes with respect to life-meaning, while addressing harmful norms of medical culture, physicians could safeguard the sustainability of their profession in the face of increased challenges in the workplace.

6. Appendix to chapter 4

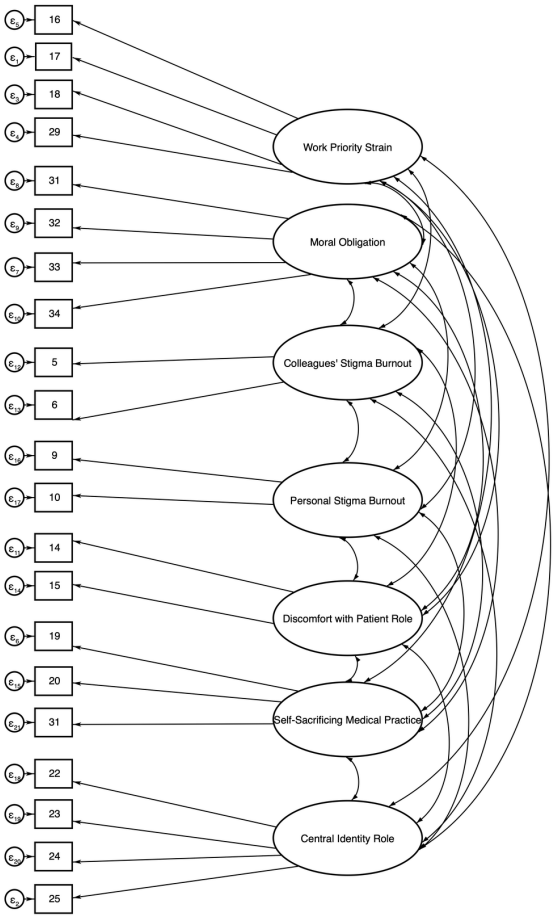
6.1 Figures

Figure A. CFA model 1.



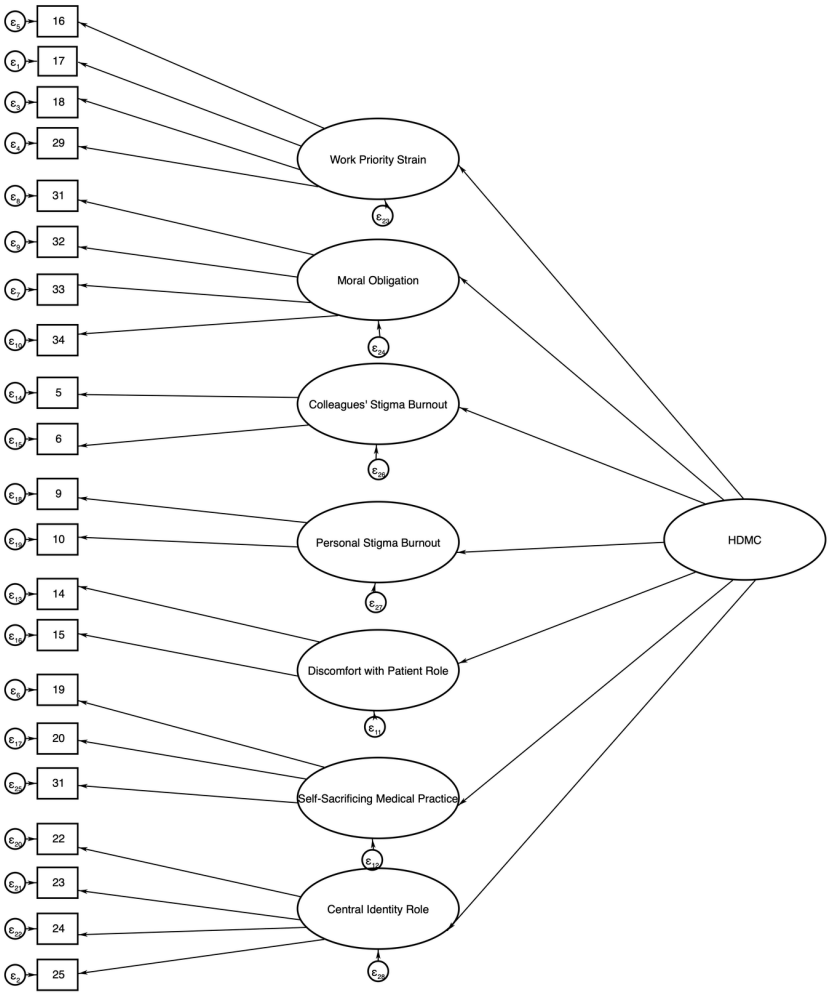
Note. First-order model of eight distinct but correlated factors as extracted from the EFA, representing the concepts of Work Priority Strain; Existential Significance of Being a Physician; Physician's Moral Obligation to Patients and Colleagues; Colleagues' Stigma towards PB; Personal Stigma towards PB; Physician's Discomfort with Patient Role; Physician's Central Identity Role; and the Self-Sacrificing Nature of Medical Practice and their indicators of 24 items. In this figure, the top left column represents the error (e) terms in the confirmatory factor analysis. The second column (rectangles) represents the items, the third column (arrows) represents the item loadings from the items to the first order latent factors, the fourth column (ovals) represents the first order latent factors found in the EFA, and the last column (arrows) represents the inter-factor correlations.

Figure B. CFA model 2.



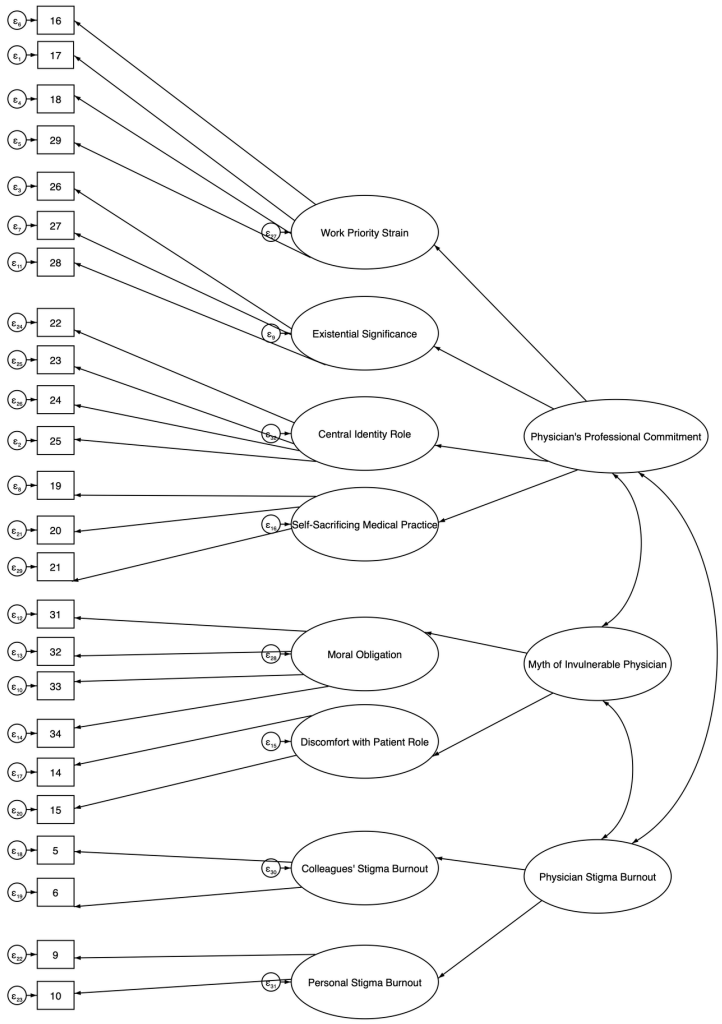
Note. First-order model of seven distinct but correlated factors extracted from the EFA, representing the concepts of Work Priority Strain; Physician's Moral Obligation to Patients and Colleagues; Colleagues' Stigma towards PB; Personal Stigma towards PB; Physician's Discomfort with Patient Role; Physician's Central Identity Role; and the Self-Sacrificing Nature of Medical Practice and their indicators of 21 items. The top left column represents the error (e) terms in the confirmatory factor analysis. The second column (rectangles) starting from the left represents the items. The third column (arrows) represents the item loadings from the items to the first order latent factors. The fourth column (ovals) represents the first order latent factors found in the EFA. The last column (arrows) represents the inter-factor correlations.

Figure C. CFA model 3.



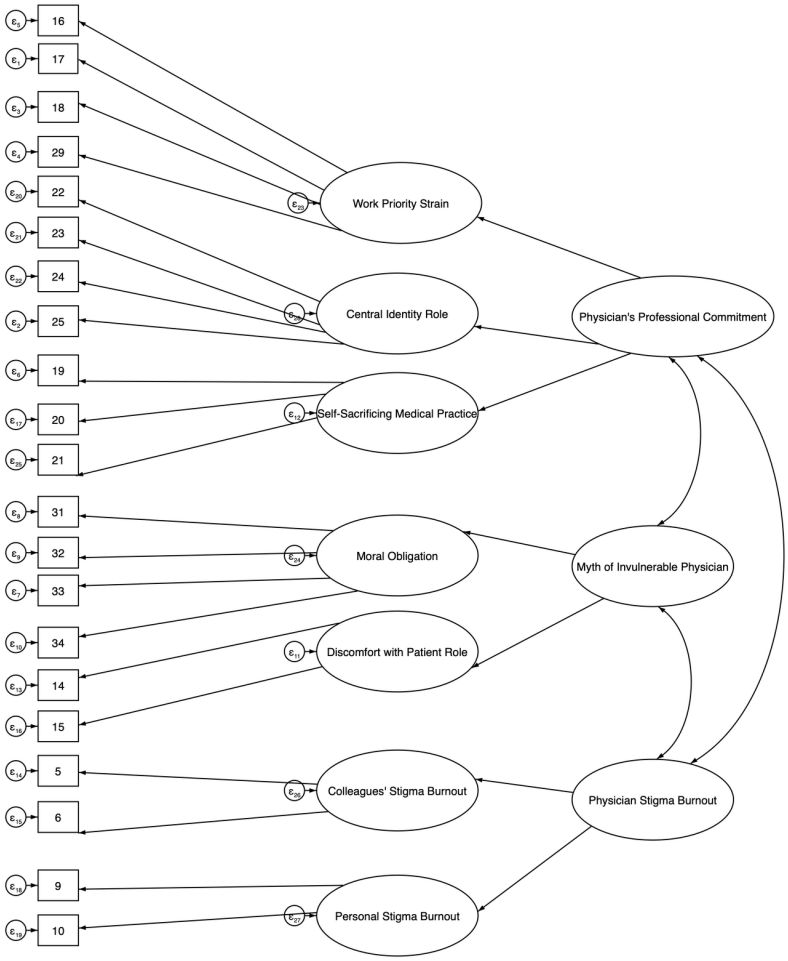
Note. The second-order one-factor model in which the latent factors of Model 2 are supposed to measure harmful dimensions of the medical culture, loading onto a general factor for Harmful Dimensions of the Medical Culture (HDMC). The top left column represents the error (e) terms the confirmatory factor analysis. The second column (rectangles) starting from the left represents the items. The third column (arrows) represents the item correlations with the latent constructs for each item, the fourth column (ovals) represents the first-order latent factors found in the EFA, the fifth column (arrows) represents the loadings from the first order latent factors to the second-order latent HDMC factor, and the final column (ovals) represents the second order latent factor HDMC.

Figure D. CFA model 4.



Note. Second-order hierarchical model where the eight initial factors of model 1 load onto three second-order dimensions (Physician's Professional Commitment; The Myth of the Invulnerable Physician; and Physician Stigma towards Burnout – with the latent factor of Existential Significance of Being a Physician). The top left column represents the error (e) terms in the confirmatory factor analysis. The second column (rectangles) starting from the left represents the 24 items. The third column (arrows) represents the item correlations with the latent constructs for each item, the fourth column (ovals) represents the first-order latent factors found in the EFA, the fifth column (arrows) represents the loadings from the first-order latent factors to the second-order latent dimensions, and the final column (ovals) represents the second-order latent factors with inter-factor correlations (arrows).

Figure E. CFA model 5.



Note. Second-order hierarchical model where *seven* factors of model 1 load onto three second-order dimensions (Physician's Professional Commitment; The Myth of the Invulnerable Physician; and Physician Stigma towards Burnout – *without* the latent factor of Existential Significance of Being a Physician). The top left column represents the error (e) terms in the confirmatory factor analysis. The second column (rectangles) starting from the left represents the 21 items. The third column (arrows) represents the item correlations with the latent constructs for each item, the fourth column (ovals) represents the first-order latent factors found in the EFA, the fifth column (arrows) represents the loadings from the first-order latent factors to the second-order latent dimensions, and the final column represents the second-order latent dimensions (ovals) with inter-factor correlations (arrows).

6.2 Tables

Table A. Identified potentially harmful professional norms of the medical culture following the review of literature with respective items and references.

Norms	Description	Items	Reference
Ethos of invincibility or invulnerab.	Being sick belongs to the patient but not physicians. Physicians are invincible and not supposed to get ill. Physicians are not like other humans, they are/should be invulnerable or are expected to be superhumans, impermeable to limitations affecting “normal” humans”.	1. As a doctor I feel pressure (internally and/or externally) to appear physically and mentally healthy. 2. As a doctor I should not fall ill myself. 3. As a doctor I feel that I have the knowledge and skills to protect myself from disease.	(Henderson et al., 2012; Mckevitt et al., 1997; Shanafelt, 2021; Shanafelt et al., 2019; Wainwright et al., 2017)
Stigma related to professional burnout in physicians **< SOSS-D** **(Clough et al., 2019)**	Stigma leads to considering burnout and seeking help as a sign of weakness and is a source of professional and social judgement in the medical profession. Stigma is an attitudinal barrier with potentially harmful consequences. Stigma towards burnout is not unique to physicians but seems amplified among them due to their training and medical socialization. In the SOSS-D(Clough, Ireland, et al., 2019), stigma is measured as a multidimensional phenomenon, including aspects of personal stigma (a person’s stigmatizing attitudes), perceived other stigma (a person’s beliefs about stigmatizing attitudes that other people hold, here colleagues) and perceived structural stigma (policies and practices restricting the opportunities of stigmatized persons).	4. A doctor who experiences occupational stress or burnout is somehow less capable than a doctor who does not experience those difficulties. 5. Most doctors would consider the experience of occupational stress or burnout as a sign that the doctor is not "right" for the profession. 6. Most doctors would consider a doctor who is experiencing occupational stress or burnout as too sensitive or weak. 7. Where I work, any doctor who is experiencing occupational stress or burnout would be given understanding and support. 8. Where I work, a doctor who is experiencing occupational stress or burnout would probably be better off not telling anyone. 9. I would try to distance myself from a doctor who is experiencing occupational stress or burnout. 10. I would have reservations about working with a doctor who is experiencing difficulties with occupational stress or burnout.	(Brooks et al., 2011; Brower, 2021; Dyrbye et al., 2021; Gerada, 2018; Henderson et al., 2012; Kay et al., 2008; Shanafelt, West, et al., 2022)
Perceived incompatib.	For some physicians, becoming a patient and having to adopt this new identity role when	11. In the collective imagination, it is the patients, not the doctors, who fall ill.	(Fältholm, 2007; M. Henderson et

between the roles of patient and physician	being sick leads to having to give up their other role of physician. It is like if individuals had a "zero-sum identity" and that being a patient or having to go off work for illness was felt as a loss of identity. When physicians are sick, they are confronted to colliding identities.	12. Doctors tend to believe that the role of patient and the role of doctor are incompatible. 13. Falling ill does not call into question my position as a doctor. 14. Having the role of doctor could become a barrier if I should ever have to adopt the role of patient (in case of illness; such as treating myself, taking a few days sick leave, seeing a doctor, etc.). 15. It is not comfortable for a doctor to have to be the patient and take on the role of the sick person.	al., 2012; Klitzman, 2008; Thompson et al., 2001)
Perceived investment and sacrifices to become a physician	To practice medicine, a great dose of effort, investment, and sometimes sacrifice is required. Medicine includes an extensive training and long working hours, requesting harsh commitment from those who which to practice.	16. I made many sacrifices (long, difficult studies, complicated work, heavy schedules, etc.) to be the doctor I am today. 17. I find that, compared to other professions, practicing medicine requires you to make more sacrifices on a personal level. 18. Becoming a doctor requires a considerable investment, sometimes to the cost of your personal life.	(Daloz, 2007; M. Henderson et al., 2012)
Personal and professional life imbalance	The medical culture suggests that work should always come first. Many physicians still suffer from insufficient work-life balance.	19. My professional life often invades my private life. 20. The demands of my work sometimes prevent me from devoting as much time as I would like to other areas of my life (friends, family, hobbies, etc.). 21. My work often comes before everything else (friends, family, hobbies, me-time).	(Shanafelt, West, et al., 2022)
Profession as identity	Medicine pressures its members to define themselves by their work. Future physicians go through a demanding learning process of socialization that inculcates well-established values into its members. Commitment and identification to the professional role is therefore a central aspect of such a specialized occupation. Identity and career are intertwined in physicians.	22. My profession as a doctor plays a key role in the way I define myself. 23. In my identity, my role as a doctor takes up much more space than my other roles (parent, brother/sister, friend, neighbor, etc.). 24. My first thought when I have to introduce myself to others is to say that I am a doctor. 25. For me, being a doctor is not just a job, it is who I am more generally.	(Clement et al., 2015; Onyura et al., 2015)
Existential meaning	Numerous physicians derive a great sense of meaning in life from their profession. For many	26. My work gives my life meaning. 27. My existence would be much less meaningful if I were not a	(Klitzman, 2008)

derived from work	physicians, medicine is not only a job. It is an identity, a way of being, a life choice, sometimes a vocation or calling.	doctor. 28. My work is one of the most important things in my life.	
Responsib. towards patients	Physicians experience a deep sense of responsibility, duty and obligation towards patients and their families. These values can lead to sacrificing their own well-being to meet patients' needs. As stated in the Physicians' Pledge, when taking their oath, physicians first say "As a member of the medical profession, I solemnly pledge to dedicate my life to the service of humanity, the health and well- being of my patient will be my *first* consideration". The Hippocratic Oath expresses the dedication of oneself (selflessness) as a part of the person (doctor) who decides to cure for the sick.	29. I often place my job and my patients before my own well-being. 30. Taking care of my patients is more important than taking care of myself. 31. If I had to temporarily stop working due to illness, I would feel that I was abandoning my patients. 32. I feel very guilty if I am unable to meet my patient's needs.	(Crawshaw, 1979; Grassi et al., 2022; Parsa-Parsi, 2017)
Responsib. towards colleagues	Physicians are driven by a great sense of duty and obligation towards their fellow physicians. Collegiality is a pillar of medical professionalism. Physicians do not want to let their colleagues down. For example, in case of illness, physicians often seem discouraged to take time off as they know that this will increase the workload of their colleagues, who are often already submerged with work. Solidarity among physicians is important, and sometimes, colleagues' needs are placed above their own.	33. I consider it important not to disappoint my fellow doctors. 34. If I were to temporarily stop working due to illness, I would feel guilty about increasing the workload for my colleagues. 35. Team spirit among doctors is central to the way I see my profession.	(E. F. M. Adams et al., 2010; Brewin & Firth-Cozens, 1997; Enns et al., 2001; Farrar, 2020; Fox et al., 2009; G. Walsh et al., 2019)

Note. Items 4 to 10 are items of the SOSS-D (The Stigma of Occupational Stress Scale for Doctors) (Clough et al., 2019).

Table B. Main parameters of the final EFA solution.

Factor →	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Cronbach's' alpha (α) of the factor →	0.86	0.76	0.78	0.84	0.68	0.72	0.78	0.86
Eigenvalue (rotated) →	5.78	2.37	1.96	1.16	0.98	0.81	0.59	0.50
Total % of variance explained →	23.04	9.89	8.18	4.85	4.10	3.37	2.46	2.10
Item ↓ with factor loading								
My professional life often invades my private life.	0.79							
The demands of my work sometimes prevent me from devoting as much time as I would like to other areas of my life (friends, family, hobbies, etc.).	0.79							
My work often comes before everything else (friends, family, hobbies, me-time).	0.78							
I often place my job and my patients before my own well-being.	0.63							
My work gives my life meaning.		0.77						
My existence would be much less meaningful if I were not a doctor.		0.68						
My work is one of the most important things in my life.		0.67						
I made many sacrifices (long, difficult studies, complicated work, heavy schedules, etc.) to be the doctor I am today.								-0.71
I find that, compared to other professions, practicing medicine requires you to make more sacrifices on a personal level.								-0.86
Becoming a doctor requires a considerable investment, sometimes to the cost of your personal life.								-0.81
My profession as a doctor plays a key role in the way I define myself.							-0.52	
In my identity, my role as a doctor takes up much more space than my other roles (parent, brother/sister, friend, neighbor, etc.).							-0.55	
My first thought when I have to introduce myself to others is to say that I am a doctor.							-0.59	
For me, being a doctor is not just a job, it is who I am more generally.							-0.76	
Having the role of doctor could become a barrier if I should ever have to adopt the role of patient (in case of illness; such as treating myself, taking a few days sick leave, seeing a doctor, etc.).						-0.68		
It is not comfortable for a doctor to have to be the patient and take on the role of the sick person.						-0.79		
If I had to temporarily stop working due to illness, I would feel that I was abandoning my patients.			0.72					

I feel very guilty if I am unable to meet my patient's needs.	0.79						
I consider it important not to disappoint my fellow doctors.	0.54						
If I were to temporarily stop working due to illness, I would feel guilty about increasing the workload for my colleagues.	0.56						
Most doctors would consider the experience of occupational stress or burnout as a sign that the doctor is not "right" for the profession.		0.90					
Most doctors would consider a doctor who is experiencing occupational stress or burnout as too sensitive or weak.		0.78					
I would try to distance myself from a doctor who is experiencing occupational stress or burnout.			0.67				
I would have reservations about working with a doctor who is experiencing difficulties with occupational stress or burnout.			0.80				

Note. This table includes loading parameter estimates, Cronbachs' alpha (α), Eigenvalues and Variance explained. N = 501. 24 items. Factor loadings in EFA > |0.40| are presented. For EFA; F1 = Work Priority Strain, F2 = Existential Significance of Being a Physician, F3 = Physician's Moral Obligation to Patients and Colleagues, F4 = Colleagues' Stigma towards PB, F5 = Personal Stigma towards PB, F6 = Physician's Discomfort with Patient Role; F7 = Physician's Central Identity Role, F8 = Self-Sacrificing Nature of Medical Practice.

Table C. Communalities of the final EFA solution before and after extraction using Principal Axis Factoring.

	Initial	Extraction
Most doctors would consider the experience of occupational stress or burnout as a sign that the doctor is not "right" for the profession.	0.56	0.82
Most doctors would consider a doctor who is experiencing occupational stress or burnout as too sensitive or weak.	0.56	0.65
I would try to distance myself from a doctor who is experiencing occupational stress or burnout.	0.30	0.45
I would have reservations about working with a doctor who is experiencing difficulties with occupational stress or burnout.	0.34	0.65
Having the role of doctor could become a barrier if I should ever have to adopt the role of patient (in case of illness; such as treating myself, taking a few days sick leave, seeing a doctor, etc.).	0.39	0.53
It is not comfortable for a doctor to have to be the patient and take on the role of the sick person.	0.39	0.63
My professional life often invades my private life.	0.62	0.68
The demands of my work sometimes prevent me from devoting as much time as I would like to other areas of my life (friends, family, hobbies, etc.).	0.61	0.66
My work often comes before everything else (friends, family, hobbies, me-time).	0.61	0.68
I made many sacrifices (long, difficult studies, complicated work, heavy schedules, etc.) to be the doctor I am today.	0.59	0.66
I find that, compared to other professions, practicing medicine requires you to make more sacrifices on a personal level.	0.55	0.67
Becoming a doctor requires a considerable investment, sometimes to the cost of your personal life.	0.64	0.74
My profession as a doctor plays a key role in the way I define myself.	0.44	0.49
In my identity, my role as a doctor takes up much more space than my other roles (parent, brother/sister, friend, neighbor, etc.).	0.46	0.52
My first thought when I have to introduce myself to others is to say that I am a doctor.	0.39	0.55
For me, being a doctor is not just a job, it is who I am more generally.	0.49	0.58
My work gives my life meaning.	0.41	0.56
My existence would be much less meaningful if I were not a doctor.	0.42	0.53
My work is one of the most important things in my life.	0.46	0.55
I often place my job and my patients before my own well-being.	0.57	0.59
If I had to temporarily stop working due to illness, I would feel that I was abandoning my patients.	0.45	0.53
I feel very guilty if I am unable to meet my patient's needs.	0.50	0.62
I consider it important not to disappoint my fellow doctors.	0.39	0.39
If I were to temporarily stop working due to illness, I would feel guilty about increasing the workload for my colleagues.	0.42	0.45

Table D. Spearman rho's correlations (ρ) between the EFA factors.

	Work Priority Strain	**Existential Significance of Being a Physician**	**Physician's Moral Obligation to Patients and Colleagues**	**Colleagues' Stigma towards PB**	**Personal Stigma towards PB**	**Physician's Discomfort with Patient Role**	**Physician's Central Identity Role**	**Self-Sacrificing Nature of Medical Practice**
Work Priority Strain	--							
Existential Significance of Being a Physician	0.10	--						
Physician's Moral Obligation to Patients and Colleagues	0.37**	0.24**	--					
Colleagues' Stigma towards PB	0.22**	0.03	0.30**	--				
Personal Stigma towards PB	0.15**	0.15**	0.13*	0.13*	--			
Physician's Discomfort with Patient Role	0.36**	0.46**	0.27**	0.09	0.19**	--		
Physician's Central Identity Role	0.37**	-0.01	0.21**	0.31**	0.08	0.03	--	
Self-Sacrificing Nature of Medical Practice	0.27**	0.07	0.41**	0.23**	0.17**	0.18*	0.17**	--

Note. In subsample 1 (N = 501). *The correlation is significant at p<0.01 (1-tailed). **The correlation is significant at p<0.001 (1-tailed). One-tailed correlations were privileged, as we suspected positive correlations between the factors, representing distinct but interdependent dimensions of the same underlying concepts (harmful dimensions of the medical culture).

Table E. Description and model fit indices for the different HDMC models.

Measurement model and description	# of items	χ2	Df	CFI	TLI	RMSEA (90% CI)	SRMR
1. First-order model of *eight* distinct but correlated factors extracted from the EFA, representing the concepts of Work Priority Strain; Existential Significance of Being a Physician; Physician's Moral Obligation to Patients and Colleagues; Colleagues' Stigma towards PB; Personal Stigma towards PB; Physician's Discomfort with Patient Role; Physician's Central Identity Role; and Self-Sacrificing Nature of Medical Practice.	24	603.90	224	0.91	0.89	0.06 (0.05 to 0.06)	0.05
2. First-order model of *seven* distinct but correlated factors, similar to model 1 but *without* the factor Existential Significance of Being a Physician.	21	454.15	168	0.93	0.91	0.06 (0.05 to 0.07)	0.05
3. Second-order one-factor model: the seven latent factors of model 2 measure harmful dimensions of the unique medical culture, therefore loading on one general "harmful dimensions of the medical culture" (HDMC) factor.	21	494.28	182	0.92	0.91	0.06 (0.05 to 0.07)	0.05
4. Second-order hierarchical model: the eight factors of model 1 load onto three second-order dimensions (Physician's Professional Commitment; The Myth of the Invulnerable Physician; and Physician Stigma towards Burnout – *with* the latent factor of Existential Significance of Being a Physician).	24	727.53	241	0.89	0.88	0.06 (0.06 to 0.07)	0.07
5. Second-order hierarchical model: the seven factors of Model 2 load onto three second-order dimensions (Physician's Professional Commitment; The Myth of the Invulnerable Physician; and Physician Stigma towards Burnout – *without* the latent factor of Existential Significance of Being a Physician.	21	469.43	179	0.92	0.91	0.06 (0.05 to 0.06)	0.05

Note. N = 501. χ2 = chi-squared; Df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual. Model 1 is the model that was derived from the EFA. Model 5 is the final retained model.

Table F. Standardized structural coefficients (CFA) for the final HDMC model.

CFA first-order factors → CFA second-order dimensions ↓	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**
Physician's Professional Commitment (α = 0.84)	0.83 (0.78 to 0.88)					0.53 (0.46 to 0.59)	0.82 (0.77 to 0.87)
The Myth of the Invulnerable Physician (α = 0.75)		0.82 (0.73 to 0.89)			0.60 (0.52 to 0.67)		
Physician Stigma towards Burnout (α = 0.62)			0.54 (0.39 to 0.68)	0.28 (0.17 to 0.39)			

Note. Results are presented along with their respected 95% confidence intervals and reliability estimates, estimated in the total sample (N = 1002) and on 21 items. All standardized coefficients are significant at p-value <0.000. F1 = Work Priority Strain, F2 = Physician's Moral Obligation to Patients and Colleagues, F3 = Colleagues' Stigma towards PB, F4 = Personal Stigma towards PB, F5 = Physician's Discomfort with Patient Role, F6 = Physician's Central Identity Role, F7 = and Self-Sacrificing Nature of Medical Practice.

Table G. Standardized covariances of the second-order dimensions for the final HDMC model.

	Physician's Professional Commitment	**The Myth of the Invulnerable Physician**
Physician's Professional Commitment	--	
The Myth of the Invulnerable Physician	0.62 (0.54 to 0.79)	--
Physician Stigma towards Burnout	0.56 (0.39 to 0.73)	0.74 (0.52 to 0.95)

Note. Results are presented along with their respected 95% confidence intervals (N = 1002).

Table H. Standardized measurements coefficients (CFA) of each item on the final HDMC model.

First-order factors of CFA Model 5 → Items ↓	**1**	**2**	**3**	**4**	**5**	**6**	**7**
16. My professional life often invades my private life.	0.80 (0.77 to 0.83)						
17. The demands of my work sometimes prevent me from devoting as much time as I would like to other areas of my life (friends, family, hobbies, etc.).	0.79 (0.76 to 0.82)						
18. My work often comes before everything else (friends, family, hobbies, me-time).	0.78 (0.75 to 0.81)						
29. I often place my job and my patients before my own well-being.	0.72 (0.69 to 0.76)						
19. I made many sacrifices (long, difficult studies, complicated work, heavy schedules, etc.) to be the doctor I am today.							0.79 (0.76 to 0.82)
20. I find that, compared to other professions, practicing medicine requires you to make more sacrifices on a personal level.							0.79 (0.76 to 0.82)
21. Becoming a doctor requires a considerable investment, sometimes to the cost of your personal life.							0.85 (0.83 to 0.88)
22. My profession as a doctor plays a key role in the way I define myself.						0.73 (0.68 to 0.77)	

23. In my identity, my role as a doctor takes up much more space than my other roles (parent, brother/sister, friend, neighbor, etc.).			0.70 (0.66 to 0.75)
24. My first thought when I have to introduce myself to others is to say that I am a doctor.			0.63 (0.58 to 0.68)
25. For me, being a doctor is not just a job, it is who I am more generally.			0.63 (0.58 to 0.68)
14. Having the role of doctor could become a barrier if I should ever have to adopt the role of patient (in case of illness; such as treating myself, taking a few days sick leave, seeing a doctor, etc.).		0.74 (0.68 to 0.81)	
15. It is not comfortable for a doctor to have to be the patient and take on the role of the sick person.		0.76 (0.69 to 0.82)	
31. If I had to temporarily stop working due to illness, I would feel that I was abandoning my patients.	0.67 (0.63 to 0.72)		
32. I feel very guilty if I am unable to meet my patient's needs.	0.75 (0.70 to 0.79)		
33. I consider it important not to disappoint my fellow doctors.	0.68 (0.64 to 0.73)		
34. If I were to temporarily stop working due to illness, I would feel guilty about increasing the workload for my colleagues.	0.68 (0.64 to 0.73)		

5. Most doctors would consider the experience of occupational stress or burnout as a sign that the doctor is not "right" for the profession.	0.84 (0.78 to 0.90)	
6. Most doctors would consider a doctor who is experiencing occupational stress or burnout as too sensitive or weak.	0.88 (0.82 to 0.95)	
9. I would try to distance myself from a doctor who is experiencing occupational stress or burnout.		0.57 (0.44 to 0.72)
10. I would have reservations about working with a doctor who is experiencing difficulties with occupational stress or burnout.		0.92 (0.71 to 1.14)

Note. F1 = Work Priority Strain, F2 = Physician's Moral Obligation to Patients and Colleagues, F3= Colleagues' Stigma towards PB, F4 = Personal Stigma towards PB, F5 = Physician's Discomfort with Patient Role; F6 = Physician's Central Identity Role, F7= Self-Sacrificing Nature of Medical Practice (N = 1002).

Table I. First and second block of the hierarchical multiple regression of the association between the investigated dimensions of medical culture and burnout, while controlling for covariates.

	Std. B	**95% CI for Std.B**	***p***
Block 1. $F(7, 963) = 5.047$, $p < .001$, $R^2 = 0.036$, $R^2_{adjusted} = 0.029$			
(Constant)			<0.001
Gender	0.12	0.05 to 0.18	<0.001
Relationship status	0.01	-0.05 to 0.08	0.72
Parental status	-0.00	-0.11 to 0.11	0.99
Physician status	0.03	-0.05 to 0.11	0.48
Specialty	-0.02	-0.09 to 0.05	0.60
Years in practice	-0.7	-0.17 to 0.2	0.11
Hours worked per week	0.10	0.04 to 0.16	0.003
Block 2. $F(11, 963) = 36.584$, $p < .001$, $R^2 = 0.297$, $R^2_{adjusted} = 0.289$			
(Constant)			<.001
Gender	.05	0.00 to 0.11	0.06
Relationship status	-0.01	-0.07 to 0.05	0.71
Parental status	-0.02	-0.10 to 0.06	0.65
Physician status	0.04	-0.04 to 0.11	0.34
Specialty	-0.06	-0.12 to 0.00	0.04
Years in practice	0.05	-0.02 to 0.14	0.24
Hours worked per week	-0.03	-0.11 to 0.05	0.39
Existential Significance of Being a Physician	-0.31	-0.37 to -0.26	<0.001
Physician's Professional Commitment	0.38	0.31 to 0.44	<0.001
The Myth of the Invulnerable Physician	0.22	0.15 to 0.28	<0.001
Physician Stigma towards Burnout	0.08	0.03 to 0.14	0.004

Note. Dependent variable is the PB score. The following covariates were controlled in the model in step 1: gender (female referent), relationship status (being in a relationship referent), parental status (having children referent), physician status (resident referent), specialty (specialist referent), years in practice, working hours estimated per week. In step 2, the HDMC and Existential Significance were added. N = 964. Missing values were excluded listwise. Std B = standardized beta. CI = Confidence Interval. By convention, we do not provide standardized betas for the constant of the regression. *Without* the factor Existential Significance of Being a Physician, the three second-order HDMC dimensions significantly contribute to the prediction of burnout, while controlling for the covariates ($R^2 = 0.21$).

Table J. First and second block of the hierarchical multiple regression of the association between the investigated dimensions of medical culture and burnout, while controlling for covariates and social desirability.

	Std. B	95% CI for Std.B	*p*
Block 1. $F(7, 933) = 4.542$, $p < 0.001$, $R^2 = 0.033$, $R^2_{adjusted} = 0.026$			
(Constant)			<0.001
Gender	0.11	0.04 to 0.18	0.001
Relationship status	0.03	-0.04 to 0.10	0.39
Parental status	-0.01	-0.10 to 0.08	0.82
Physician status	0.06	-0,03 to 0.15	0.17
Specialty	-0.04	-0,11 to 0.03	0.26
Years in practice	-0.05	-0,14 to 0.05	0.31
Hours worked per week	0.08	0,02 to 0.15	0.02
Block 2. $F(11, 933) = 36.493$, $p < 0.001$, $R^2 = 0.315$, $R^2_{adjusted} = 0.307$			
(Constant)			<0.001
Gender	0.05	-0,01 to 0.11	0.1
Relationship status	0.00	-0,05 to 0.06	0.86
Parental status	-0.03	-0,10 to 0.05	0.45
Physician status	0.07	-0,01 to 0.14	0.07
Specialty	-0.08	-0,14 to -0.02	0.008
Years in practice	0.08	0,00 to 0.14	0.04
Hours worked per week	-0.04	-0,11 to 0.02	0.18
Existential Significance of Being a Physician	-0.33	-0,39 to -0.28	<0.001
Physician's Professional Commitment	0.36	0,30 to 0.43	<0.001
The Myth of the Invulnerable Physician	0.25	0,18 to 0.31	<0.001
Physician Stigma towards Burnout	0.08	0,02 to 0.13	0.007
Block 3. $F(12, 933) = 43.992$, $p < 0.001$, $R^2 = 0.364$, $R^2_{adjusted} = 0.356$			
(Constant)			<0.001
Gender	0.05	-0,01 to 0.10	0.18
Relationship status	0.01	-0,04 to 0.07	0.64
Parental status	-0.05	-0,13 to 0.02	0.18
Physician status	0.06	-0,01 to 0.13	0.09
Specialty	-0.06	-0,11 to 0.00	0.04
Years in practice	0.12	0,05 to 0.19	0.002
Hours worked per week	-0.03	-0,10 to 0.05	0.40
Existential Significance of Being a Physician	-0.31	-0,36 to -0.25	<0.001
Physician's Professional Commitment	0.32	0,26 to 0.38	<.001
The Myth of the Invulnerable Physician	0.19	0,13 to 0.36	<.001
Physician Stigma towards Burnout	0.07	0,01 to 0.12	.021
Social desirability	-0.24	-0,30 to -0.19	<.001

Note. Similar note as for table I. In step 3, we added social desirability. N = 934. Missing values were excluded listwise. In this regression, 16 cases were excluded as they were considered outliers (> |2| standard residuals) in the model. Std B = standardized beta. CI = Confidence Interval. By convention, we do not provide standardized betas for the regression coefficient. Controlling for social desirability increased the proportion of variance in burnout explained by the model. This was unsurprising, as self-reported burnout may be impacted by the (un)desirability of suffering from burnout, especially so among physicians. Social desirability negatively predicted burnout (Std B = -0.24, $p < .001$), and the three HDMC and Existential Significance remained significant predictors of burnout. Note that results including social desirability need to be interpreted cautiously as the internal consistency of this measure was low in our sample ($\alpha = 0.46$).

Table K. Final HDMC measure.

The following statements relate to aspects specific to the medical profession. Please use the scales below to indicate the extent to which you agree or disagree with the following statements.					
	Totally disagree	Disagree	Neither disagree nor agree	Agree	Totally agree
Physician's Professional Commitment					
1. My professional life often invades my private life.	☐	☐	☐	☐	☐
2. The demands of my work sometimes prevent me from devoting as much time as I would like to other areas of my life (friends, family, hobbies, etc.).	☐	☐	☐	☐	☐
3. My work often comes before everything else (friends, family, hobbies, me-time).	☐	☐	☐	☐	☐
4. I often place my job and my patients before my own well-being.	☐	☐	☐	☐	☐
5. I made many sacrifices (long, difficult studies, complicated work, heavy schedules, etc.) to be the doctor I am today.	☐	☐	☐	☐	☐
6. I find that, compared to other professions, practicing medicine requires you to make more sacrifices on a personal level.	☐	☐	☐	☐	☐
7. Becoming a doctor requires a considerable investment, sometimes to the cost of your personal life.	☐	☐	☐	☐	☐
8. My profession as a doctor plays a key role in the way I define myself.	☐	☐	☐	☐	☐
9. In my identity, my role as a doctor takes up much more space than my other roles (parent, brother/sister, friend, neighbor, etc.).	☐	☐	☐	☐	☐
10. My first thought when I have to introduce myself to others is to say that I am a doctor.	☐	☐	☐	☐	☐
11. For me, being a doctor is not just a job, it is who I am more generally.	☐	☐	☐	☐	☐

The Myth of the Invulnerable Physician					
12. If I had to temporarily stop working due to illness, I would feel that I was abandoning my patients.	☐	☐	☐	☐	☐
13. I feel very guilty if I am unable to meet my patient's needs.	☐	☐	☐	☐	☐
14. I consider it important not to disappoint my fellow doctors.	☐	☐	☐	☐	☐
15. If I were to temporarily stop working due to illness, I would feel guilty about increasing the workload for my colleagues.	☐	☐	☐	☐	☐
16. Having the role of doctor could become a barrier if I should ever have to adopt the role of patient (in case of illness; such as treating myself, taking a few days sick leave, seeing a doctor, etc.).	☐	☐	☐	☐	☐
17. It is not comfortable for a doctor to have to be the patient and take on the role of the sick person.	☐	☐	☐	☐	☐
Physician Stigma towards Burnout					
18. Most doctors would consider the experience of occupational stress or burnout as a sign that the doctor is not "right" for the profession.	☐	☐	☐	☐	☐
19. Most doctors would consider a doctor who is experiencing occupational stress or burnout as too sensitive or weak.	☐	☐	☐	☐	☐
20. I would try to distance myself from a doctor who is experiencing occupational stress or burnout.	☐	☐	☐	☐	☐
21. I would have reservations about working with a doctor who is experiencing difficulties with occupational stress or burnout.	☐	☐	☐	☐	☐

Note. To obtain a score for each dimension separately, we averaged the items in each sub-dimension. To obtain an overall score for Harmful Dimensions of the Medical Culture (HDMC), we averaged all 21 items, where higher score indicates stronger internalization of the norms. This measure was developed in French language and has not yet been validated in an English-speaking sample. Items were back-translated from French to English.

6.3 Supplementary methods

6.3.1 Sample size calculation

The sample size for this study was determined based on the need to conduct Exploratory Factor Analyses (EFA), correlational analyses, and linear multiple regressions, following guidelines for each statistical procedure. For the EFA, which involved a total of 35 items and 3 expected factors, the sample size required for good factor recovery was estimated at 175 participants, based on the guidelines of Child (Child, 2006) and Watkins (Watkins, 2021). Since multiple analyses were to be conducted, we planned to recruit up to 50 additional participants beyond this minimum estimate to account for potential exclusions and dropout. For the correlational analyses, G*Power was used to determine the sample size required to achieve a power of 0.90 for detecting a medium effect size (r = 0.2). Based on this calculation, the minimum sample size required was 211 participants. The sample size for the linear multiple regressions could not be precisely predicted before the EFA results, as the number of factors representing the professional norms of the medical culture was not yet known. However, based on our expectations of having 3 independent factors (representing cultural dimensions) plus the control variable (social desirability), the sample size for linear regression with 4 independent variables was estimated at 124 participants, using G*Power with an expected small to medium effect size ($F^2 = 0.13$).Given the combination of these analyses, the minimum required sample size for the study was estimated to be 225 participants, and we aimed to recruit up to 550 participants to account for possible exclusions.

6.3.2 Missing values and drop-out analyses

For ethical reasons and as some questions in the survey might be sensitive for participants, participants were not required to answer to all questions, leading the door open to missing values. A total of 1292 physicians connected to the online survey, of which 1238 provided consent and 1002 provided complete data for the cultural items. Visual inspection of the missing values pattern indicated that most missing values were drop out cases throughout the survey. As, for the factorial analyses on cultural items, we were interested in participants who had no missing values on the items reflecting cultural dimensions (N = 1002), we tested whether differences existed between those participants and participants who had dropped out on the cultural items (N = 236), using t-tests and chi^2 tests. They were found to be similar on all variables of interest, except for the status of the physician (being an attending physician or being a resident). Indeed, there was a significant association between the status of the physician participant and whether or not he/she would drop out on the cultural items $\chi^2(4) = 5.80$, $p = 0.02$. The odds of participants dropping

out was 1.53 times higher if the participant was a resident physician than if the participant was an attending physician. However, the associated effect size was small ($\varphi = .070$, $p. = 0.02$). We also tested whether differences existed between individuals who provided complete data on all items of interest for the present analyses (i.e. 35 items of culture and 12 items measuring burnout) (N = 973) and individuals who provided complete data on the cultural items solely (N = 1002) on demographic and work-related variables (age, gender, seniority, number of hours worked per week, status of the physician, specialty) as well as on burnout using t-tests and chi^2 tests. They were found to be strictly similar regarding those variables. Statistical analyses were therefore conducted on the sample of 1002 to maximize the statistical power of the factorial analyses. Characteristics of non-responders cannot be given or compared to characteristics of the responders as the sample used in the present study is a convenience sample.

6.3.3 Exploratory factor analysis (EFA)

By means of cross-validation, the total sample was randomly split in two samples of 501 participants for either EFA or CFA. The comparability of the two sub-samples was assessed. Then, exploratory factor analysis was first conducted using principal axis factoring (PAF) and direct oblimin rotation on the 35 items (N = 501) using SPSS. EFA permits to explore the number of meaningful underlying factors and to retain a pool of items from the initial total number of items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity assessed suitability of our data. Item loadings of ≥ 0.40 and communalities > 0.20 were required, cross-loading items were defined as items loading ≥ 0.30 on two or more factors. Those items were considered unstable and were therefore removed. The proportion of total variance explained (TVE) by the factors needed to be $\geq$ 50%. To determine the number of factors to retain, we relied on various methods: Kaiser's criterion, the scree plot and the parallel analysis (Field, 2009; Hayton et al., 2004; Tabachnick & Fidell, 2014; Watkins, 2021). The KMO measure of sampling adequacy of the first EFA conducted on the initial 35-item pool was high (0.85) and Bartlett's test of sphericity was significant, $\chi^2(595) = 6723.81$, $p<0.001$, suggesting the item pool was suitable for EFA. According to Kaiser's criterion, ten factors were extractable (51.1% of TVE). However, the scree plot suggested a seven-factor structure (46.37% of TVE) and the parallel analysis (considered as the most reliable method for extraction) suggested an eight-factor structure (48.24% of TVE). Several analyses were run until a stable solution was found, removing items one by one until the solution satisfied all requirements mentioned above. Items 3 and 13 exhibited communalities < 0.20 and were removed. The PAF analysis was rerun among 33 items and the number of factors to extract

was set to 8, following the results of the parallel analysis (note that various analyses with 7, 8 and 9 factors to extract were tested. Solutions with 8 factors to extract were the most satisfactory as solutions with 7 or 9 factors showed signs of either under- or overextraction). Items 1, 2, 4, 7 and 8 presented no loading ≥ 0.40 and were therefore removed. An eight-factor PAF analysis was rerun on the remaining 28 items and items 11 and 12 were then removed as they presented no loading ≥ 0.40. Lastly, items 29 and 35 were also removed for the same reasons. The remaining 24 items were again submitted to PAF with 8 factors to extract. The KMO measure of sampling adequacy of this EFA was high (0.84) and Bartlett's test of sphericity was significant, $\chi^2(276) = 5069.83$, $p<0.000$. The solution accounted for 59% of item variance and *a simple structure was obtained* (with *no* cross-loading items). Communalities for all items were satisfactory (ranging between 0.45 and 0.82). Intercorrelations between the factors were low to medium, confirming the interest of using a Direct Oblimin rotation. Sensitivity analyses were conducted, as we compared if the solution obtained was the same without and with deleting outliers found in our sample. The structure was unchanged. This acted as a supplementary criterion for the stability of the model.

6.3.4 Confirmatory factor analysis (CFA)

A confirmatory factor analysis with maximum likelihood estimation method was then performed in the second subsample to cross-validate the structure emerging from the EFA (using STATA). CFA permits to cross-validate the factor structure that emerged from EFA, but also to compare this structure to other models based on theoretical and/or statistical grounds. A total of 5 models (outlined in S1 through S5 figures and described in S5 table) were compared using different goodness-of-fit indices to determine the statistical acceptability of the models and to retain the best-fitting model: the chi-square indices ($\chi 2$) (B. M. Byrne, 2013) the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the comparative fit index (CFI), and the Tucker-Lewis index (TLI) (Hu & Bentler, 1995). Acceptable fit criteria included RMSEA and SRMR ≤ 0.08, CFI and TLI > 0.90 (B. M. Byrne, 2013; Hu & Bentler, 2000).

6.3.5 Internal consistency of the scales

Final scales representing the dimensions were created on SPSS, based on the mean scores of the items of each dimension. Alphas of minimum 0.60 were deemed as acceptable regarding internal consistency for scales with 10 items or less. For scales/subscales with two items, interitem correlations were computed and values of minimum 0.50 were desirable (Watkins, 2021).

6.3.6 Multivariable regression analyses

Multivariable regression analyses to predict burnout based on the HDMC were conducted on SPSS (linear regression – two blocks – enter method), adjusted after controlling for well-known covariates of burnout. Cases with missing values were excludes listwise. Among our variables of interest, the following personal and professional characteristics were significantly associated to burnout in the sample: age (ρ = -0.10, p= 0.002), years in practice (ρ = -0.12, p< 0.001), the status of the physician (U = 76196.00, p = <0.001; residents had higher median scores of burnout, Mdn = 2.33, IQR = 0.75), the parental status (U = 105642.00, p = 0.002; physicians who had no children had higher median scores of burnout, Mdn = 2.33, IQR = 0.67). Regarding gender, a Kruskal-Wallis test showed that there was a statistically significant difference in burnout scores between the three categories of gender $\chi^2(2)$ = 23.76, p <0.001. Post-hoc pairwise comparisons using the Bonferroni correction revealed a significant difference in burnout scores between male and female with female reporting higher burnout scores adjusted (adjusted p = 0.000), a marginally significant difference in burnout scores between males and the "other" category (p = 0.051) and no significant difference in burnout scores between females and the "other" category (p = 0.15). Note that the category "other" had a very small sample size (N = 2). The variables relationship status (being single vs being in a relationship), hours working estimated per week and specialty (being a general practitioner vs being a specialist) were not significantly associated to burnout in our sample. To avoid multicollinearity between the variables age and years in practice, we selected years in practice and excluded age from the regression analysis. All other covariates were included as controls. Two physicians identified as belonging to the "other" gender category had significantly higher burnout scores. Due to the small number of physicians in this gender category, we decided to exclude these two cases from the regression analysis to ensure the stability and reliability of our statistical estimates. In the second step, the three second-order HDMC dimensions and the factor Existential Significance were added to the regression model using the enter method. Following Field's guidelines regarding casewise diagnostics in regressions (Field, 2009), 38 cases with standardized residuals less than -2 or greater than 2 were identified as outliers. However, the results did not significantly change when these outliers were excluded, so we decided to retain them in the analysis. Other assumptions were verified. S9 table presents the results with controls for social desirability, along with a brief interpretation of these findings. The interplay between the characteristics of the physicians, their burnout scores, and the internalization of the dimensions of medical culture will be further discussed in a forthcoming paper.

Chapter 5. Medical culture and its association with other health outcomes in physicians

Physician well-being is a critical issue, given the high prevalence of burnout, depression, and maladaptive health behaviours among doctors, as well as the broader implications for patient care quality and public health. Medical culture - defined by shared professional values and norms - may contribute significantly to physician distress. However, its relationship with physician mental health and self-care behaviours remains underexplored. In this study, we investigate the associations between harmful dimensions of medical culture and health-related outcomes in physicians, including burnout, depression, presenteeism, help-seeking behaviour, self-diagnosis, self-treatment, and psychoactive medication use. To do so, a cross-sectional survey of 1002 physicians assessed depression (PHQ-9), burnout (BAT-12), and health behaviours. The Harmful Dimensions of Medical Culture (HDMC) scale measured Professional Commitment, the Myth of the Invulnerable Physician, and Stigma Towards Burnout. Correlation and multivariate regression analyses examined associations between medical culture and health outcomes, adjusting for personal and professional factors. Results indicated that all three HDMC scores significantly associated with most health-related outcomes. Professional Commitment and the Myth of the Invulnerable Physician were strongly linked to burnout and depression but showed moderate to weak associations with health behaviours. Stigma Towards Burnout was strongly associated with depression and showed weak associations with burnout and health behaviours. Multivariable analyses confirmed the independent association between the HDMC and health outcomes after adjusting for personal and professional factors. The findings underscore the role of medical culture in shaping physicians' mental health and health-related behaviours. Addressing harmful cultural norms through targeted interventions could enhance physician well-being and support a more sustainable healthcare workforce.

Reference

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Medical culture and its association with other health oucomes in physicians

1. Introduction

Physicians face a unique set of challenges that make their profession highly demanding, often at the expense of their well-being (Shanafelt, 2021). Burnout and depression are alarmingly prevalent among physicians (Guille & Sen, 2024; E. Ryan et al., 2023). In relation to this, physicians often report engagement in maladaptive health behaviours (Bazargan et al., 2009) such as psychoactive medication use and abuse (Dumitrascu et al., 2014), presenteeism (Giæver et al., 2016), self-diagnosis and treatment (Montgomery et al., 2011), and delays in seeking professional help for health concerns (Thompson et al., 2001). These patterns of health behaviours highlight a pervasive struggle within the medical profession to conciliate self-care with professionalism. The high prevalence of poor well-being in the medical profession and the challenges physicians encounter to engage in self-care undermine their health, threaten the sustainability of the medical workforce, and, by extension, the quality of care delivered to patients (Wallace et al., 2009). While extensive studies have investigated the personal, work-related, and organizational contributors to physician distress, and how multilevel factors interact to exacerbate barriers to self-care in physicians (e.g., licensure-related concerns about disclosing mental illness in medicine; Dyrbye et al., 2017), emerging evidence suggests that some of these challenges may be rooted in medical culture (Shanafelt et al., 2019). Medical culture, defined as the shared set of beliefs, norms, and values that shape professional behaviour, is both a source of strength and a potential driver of harm (Shanafelt et al., 2019). Although many cultural elements such as commitment to excellence and patient-centred care are positive and fundamental to the profession, others, such as the valorisation of belief in invulnerability or stigmatization of distress in the profession, may perpetuate harmful health practices among physicians (G. Walsh et al., 2019).

A recent study (Banse et al., 2025a) empirically identified three harmful dimensions of medical culture (HDMC) that significantly predicted physician burnout in a large sample of physicians: Professional Commitment, reflecting the centrality of the medical profession in the identity of the physician, and the related work-life imbalance, which has also been shown to negatively impact personal

relationships (Trockel et al., 2024); The Myth of the Invulnerable Physician, emphasizing the perceived incompatibility between illness and the physician role and the moral obligation towards patients and colleagues; and Stigma towards Burnout, encompassing internalized and perceived stigmatizing attitudes about burnout among peers. Together, these dimensions explained up to 30% of the variance in physician burnout, after controlling for sociodemographic and professional factors (Banse et al., 2025a).

Building on these findings, the present study investigates whether the HDMC are associated to other health-related outcomes among physicians. Specifically, we examined whether the HDMC are associated with depression, use of psychoactive medications (tranquilizers, antidepressants, sleep aids), alcohol consumption, delay in help-seeking, presenteeism, and self-diagnosis and treatment.

2. Methods

This cross-sectional study, part of a broader research project on medical culture and physician well-being, was approved by the Institutional Review Board prior to data collection (2023/07MAI/219).

2.1 Population

French-speaking physicians (mainly from Belgium, France, Switzerland), including general practitioners, specialists, and residents, were recruited through professional networks, medical organizations, universities, and hospitals. Participation was voluntary, anonymous, and without financial incentive. A total of 1002 physicians completed the survey. A description of the sample is presented in Table 1 of the appendix.

2.2 Survey instrument

We collected the data via an anonymized online survey. Participants provided written consent and reported personal and professional characteristics (e.g. age, specialty, working hours). The survey included the previously validated Harmful Dimensions of Medical Culture (HDMC) scale (Banse et al., 2025a), which assesses three interdependent dimensions of medical culture: Professional Commitment, The Myth of the Invulnerable Physician, and Stigma towards Burnout (the composite score is referred to as the HDMC Global Score). The full HDMC measure is provided in SOM. Measures of health-related outcomes in physicians included burnout (BAT-12, French version (Schaufeli, Desart, et al., 2020)), depression (PHQ-9, French version (Carballeira et al., 2007)), alcohol consumption (AUDIT-C, French version (Bush et al., 1998)) and single-item 5 level Likert or frequency scales for the

propensity to seek help (from totally disagree to totally agree), presenteeism - defined as the act of attending one's job despite ill-health (Aronsson, 2000) - (item from never to several days a week), self-diagnosis and self-treatment (from never to almost always), and frequency of use of tranquillizers, antidepressants, and sleeping pills (from never to every day). Descriptive statistics and internal consistencies (ranging from acceptable to very good) of the scales are provided in appendix (Tables 2a and 2b).

2.3 Statistical analyses

The health-related outcomes of the physicians were the dependent variables, and HDMC scores were the independent variables. We computed descriptive statistics for all variables and handled missing data via listwise deletion. We first computed one-tailed Spearman correlations (adjusted significance level: $p < 0.001$) to explore associations between the HDMC and health-related outcomes, and next undertook multivariate regression analyses (enter method), adjusting for potential confounders, namely gender, relationship status, parental status, physician status (resident vs. attending), specialty (generalist vs. specialist), years in practice, and weekly work hours. Multivariate linear regressions were used for continuous outcomes (e.g. burnout, depression, help-seeking, presenteeism, self-diagnosis and self-treatment), and multivariate logistic regressions were used for frequency of psychoactive medication use (tranquilizers, antidepressants, sleeping pills; recoded into binary scores: User vs. non-user) and for alcohol consumption (recoded into binary scores: Problematic vs. non-problematic use). Finally, a multivariate general linear model (GLM) examined whether the HDMC Global Score significantly predicted variations across the specified health-related outcomes, while accounting for their covariance. Analyses were conducted using IBM SPSS 28.0 (IBM Corp., 2021). Detailed methods and results are provided in the appendix (Table 2 to Table 15).

3. Results

All three HDMCs - Physician's Professional Commitment, The Myth of the Invulnerable Physician, and Physician Stigma Towards Burnout - were significantly associated with most health-related outcomes (Table 1) with varying effect sizes. Professional Commitment and the Myth of the Invulnerable Physician were strongly linked to burnout and depression but showed moderate to weak associations with health behaviours. Stigma Towards Burnout was strongly associated with depression and showed weak significant associations with burnout and health behaviours. No significant associations were found with alcohol consumption.

Table 1. Correlations between the HDMC and health-related outcomes

		ρ_s			
	N	**Physician's Professional Commitment**	**The Myth of the Invulnerable Physician**	**Physician Stigma Towards Burnout**	**HDMC Global Score**
Depression (PHQ-9)	990	*0.42***	*0.40***	0.25**	*0.43***
Burnout (BAT-12)	998	*0.37***	*0.35***	0.22**	*0.35***
Help-seeking behaviour	982	-0.12**	-0.14**	-0.14**	-0.14**
Presenteeism	983	*0.27***	*0.27***	0.15**	*0.28***
Self-diagnosis	981	0.14**	0.18**	0.09*	0.17**
Self-treatment	981	0.21**	*0.28***	0.11**	*0.24***
Tranquillizers	976	0.13**	0.11**	0.05	0.12**
Sleeping pills	976	0.11**	0.07*	0.04	0.11**
Antidepressants	978	0.12**	0.11**	0.07*	0.14**
Alcohol consumption (AUDIT-C)	984	-0.06	-0.02	0.03	-0.03

Note. Correlations are one-tailed Spearman's rank correlations (ρ). *Correlation is significant at p<0.01. **Correlation is significant at p<0.001 level, following adjustment for multiple testing. Correlations indicated in italics are considered as clinically meaningful, as they are of moderate effect size (Cohen's d ≥ 0.5, Spearman correlation coefficient ≥ 0.24). For tranquillizers, sleeping pills and antidepressants, we measured frequency of use. For alcohol consumption, we relied on the AUDIT-C score.

Summary estimates ((un)standardized coefficients for the linear regressions and odd ratios for the logistic regressions) are provided in Table 2, with detailed results for each regression available in the appendix. For the present, we focus on the relationship between medical culture and health outcomes. A forthcoming study will explore the associations between medical culture and physician characteristics.

All three HDMC scores were significant predictors of both *depression* and *burnout* in physicians, accounting for respectively 24 and 21% of the variance, when controlling for covariates. Professional Commitment showed the strongest association with depression and burnout. The Myth of the Invulnerable Physician and Stigma towards Burnout were also significant predictors of depression and burnout, although to a lesser extent. After controlling for the covariates, the HDMC accounted for an incremental 16.3 and 17.4% of the variances in depression and burnout respectively.

Table 2. Summary estimates of the regressions to predict the health-related outcomes based on the HDMC

Regression and estimate	**Linear regressions: (un)standardized[b] coefficient estimates**						**Binary logistic regressions: odds ratios (Exp(B))**			
Dependent variable	**Depression**	**Burnout**	**Help-seeking behaviour**	**Presenteeism**	**Self-diagnosis**	**Self-treatment**	**Tranquillizers**	**Anti-depressants**	**Sleeping pills**	**Alcohol**
Predictors[a]										
Gender	0.34	0.06	0.50***	0.13*	0.07	-0.00	0.90	0.93	1.01	0.86
Rel. status	-0.61	-0.01	-0.07	-0.13	0.00	0.09	1.66*	1.53	1.57*	0.77
Par. status	0.79	0.02	-0.01	0.12	0.01	0.02	1.91*	1.62	1.02	1.06
Phys. status	1.65***	0.08	-0.17	0.04	-0.16	-0.19	1.03	1.01	1.19	0.61*
Specialty	-0.91**	-0.10*	-0.03	-0.24***	-0.31***	-0.22**	1.67*	0.76	1.10	0.90
Seniority	-0.07	-0.01	0.02	-0.05	0.04	-0.00	1.02	1.03*	1.01	1.00
WH	0.06	-0.01	-0.07*	0.02	-0.03	-0.03	1.02*	0.98	0.99	0.99
Commitment	0.29***	0.31***	-0.03	0.23***	0.11**	0.18***	1.70*	1.71*	1.50**	0.82
Myth	0.17***	0.18***	-0.15***	0.12**	0.14***	0.14***	1.26	1.47	1.21	1.10
Stigma	0.10**	0.09**	-0.09**	0.05	0.05	0.04	1.05	1.27	1.11	1.08
Model fit F	29.93***	25.32***	9.03***	13.14***	7.15***	8.41***				
Model fit $\chi 2$							40.02***	31.05***	25.21**	26.98**
2 LL							611.38	535.87	954.54	1291.01
R^2	0.24	0.21	0.09	0.12	0.07	0.08				
$R^2_{adjusted}$	0.23	0.20	0.08	0.11	0.06	0.07				
Pseudo R^2: Nagelkerke							0.08	0.07	0.04	0.04

Note. [a]The following covariates were included as reference categories (coded 0): female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours. *$p<.05$, **$p<.01$, ***$p<.001$. [b]For linear regressions, unstandardized coefficients are reported for categorical predictors (e.g. gender, relationship status, parental status, physician status, specialty), while standardized coefficients are provided for continuous predictors (e.g. seniority, working hours, HDMC). For binary logistic regressions, odds ratios are presented. Comprehensive regression results, including standard errors associated with the p-values for the estimates, are available in the appendix.

With regard the *health-related behaviours*, Professional Commitment was positively associated with presenteeism, self-diagnosis and self-treatment. The Myth of the Invulnerable Physician was negatively associated with help-seeking behaviour and positively associated with presenteeism, self-diagnosis and self-treatment. Finally, Stigma towards Burnout was negatively associated with help-seeking. The explained variances (R^2) for these models were low (< 12%). Logistic regression analyses revealed that, while controlling for covariates, Professional Commitment significantly predicted the use of tranquilizers, antidepressants, and sleeping pills. The two other HDMC scores were not significantly associated with any type of psychoactive medication use. Problematic alcohol consumption was not significantly predicted by any HDMC. Similarly to the health-related behaviours, the explained variances for these models were low (< 8%).

A multivariate General Linear Model (GLM) indicated a significant overall effect of the HDMC Global Score on the dependent variables ($F(10, 946) = 24.962$, $p < .001$, Wilk's $\Lambda = 0.791$, partial $\eta^2 = 0.209$), suggesting that the HDMC scores have an overall influence on health-related outcomes. The between-subject effects analysis revealed that the HDMC Global Score had a significant effect on all health-related variables except for alcohol consumption, after controlling for the covariance between the outcomes. The strongest effect size was observed for depression (Partial $\eta^2 = 0.16$). Detailed results are available in the appendix.

4. Discussion

While medical culture fosters positive values among practitioners, certain aspects of this culture may be detrimental to individuals. This study extends existing evidence that some beliefs, norms, and attitudes prevailing in the medical profession are associated not only with burnout, but also in a broader sense with deleterious health outcomes among physicians.

The predictive power of the Harmful Dimensions of Medical Culture (HDMC) varied depending on the outcome. Among the three dimensions, Professional Commitment showed the strongest associations across multiple domains, including depression, burnout, presenteeism, self-diagnosis, self-treatment, and psychoactive medication use. While professional dedication is of critical importance in the practice of medicine, our findings underscore its double-edged nature (M. Henderson et al., 2012). If not balanced appropriately, an excessive identification with the medical profession and overcommitment to its demands may compromise personal well-being (G. Walsh et al., 2019). The significant association between Professional Commitment and psychoactive medication use indicates that physicians with stronger professional commitment may also report greater use of such medications.

While the reasons for this association cannot be determined from cross-sectional data, prior studies have noted that physicians may be at increased risk of self-medicating when experiencing high levels of stress (Dumitrascu et al., 2014; Montgomery et al., 2011). The Myth of the Invulnerable Physician, although less predictive, was significantly associated with depression, presenteeism, help-seeking delays, self-diagnosis, and self-treatment. This belief (Thompson et al., 2001), shaped by medical education, the hidden curriculum, and professional socialization (Dyrbye et al., 2015), perpetuates the notion that physicians should be immune to illness and reinforces the perceived incompatibility between the roles of physician and patient. Such attitudes may contribute to delays in seeking appropriate care, as suggested by prior, qualitative work (e.g. Thompson et al., 2001). Stigma towards Burnout was the least predictive HDMC, showing relatively weaker associations with depression, burnout, and the help-seeking behaviour. Interestingly - and in contrast to medication use - none of the HDMC scores were associated with problematic alcohol consumption, suggesting that while harmful medical culture influences many health-related behaviours, its impact does not extend uniformly across all classes of substances.

While the regressions revealed that the HDMC scores were associated with most of the outcomes, the explained variance strongly varied across dependent variables, ranging from weak (e.g. use of sleeping pills) to high (e.g. burnout and depression). This finding suggests that medical culture could play a stronger role in physicians' psychological distress than in the health-related behaviours assessed here.

Given the important impacts of work-related psychological distress on the health and welfare of physicians, and by extension, on patient care and the effectiveness of healthcare institutions (Wallace et al., 2009), this study emphasizes the compelling need to address harmful cultural norms within the medical profession (Shanafelt et al., 2019). Targeted interventions are necessary to challenge stigmatizing attitudes, particularly those surrounding psychological distress and help-seeking (Dyrbye, 2025). Essential measures include normalizing vulnerability through role modelling and by fostering open discussions about mental health during training and throughout professional practice (Hill, 2017). Examining excessive professional dedication to the detriment of one’s health can help physicians balance their commitment to their work with appropriate self-care (G. Walsh et al., 2019). In addition, organizational practices that allow for meaningful recovery - such as optimizing the quality and characteristics of vacation time - are important, as they have recently been shown to contribute to physician well-being and to influence long-term career intentions (Sinsky et al., 2025). Engaging all stakeholders -

educators, administrators, and practitioners - in promoting a professional culture that prioritizes well-being is imperative. A shift toward such a culture will ultimately benefit physicians, their patients, and the delivery of high-quality healthcare (Wallace et al., 2009).

We acknowledge several limitations of this investigation. The cross-sectional study design precludes us from making causal inferences, which calls for further investigations with longitudinal designs. The use of limited measures to assess health behaviours was a necessary constraint to avoid an excessively long survey which might have reduced physician response rates. In addition, the study relied on a convenience sample of physicians rather than a representative sample, which may limit the generalizability of the findings. Future research should employ more comprehensive assessments to determine the replicability of the findings, and to explore potential variations across specialties, healthcare systems, and contexts. Finally, there is lacking investigation of the interplay between organizational factors and medical culture in shaping physician health. Future intervention studies targeting the identified cultural dimensions could also provide valuable insights into effective strategies for fostering a healthier medical culture.

5. Conclusion

This study demonstrates that harmful dimensions of medical culture are strongly associated with physicians' depression, burnout and, to a lesser extent, with their health-related behaviours. By identifying these cultural drivers, present results provide a foundation for targeted interventions to support physician well-being and sustain the healthcare workforce.

6. Appendix to chapter 5

6.1 Tables

Table 1. Sociodemographic and work-related characteristics of the sample

Sociodemographic and work-related characteristics[a]	**No. (%)**	**N (total = 1002)**
Age, median (IQR), years	38 (30;50)	972
Gender		996
Male	347 (34.6)	
Female	547 (64.6)	
Other	2 (0.2)	
Relationship status		1000
Single	175 (17.5)	
In a relationship	825 (82.3)	
Parental status		997
Yes	582 (58.1)	
No	415 (41.4)	
Country of residence		995
Belgium	922 (92)	
France	65 (6.5)	
Switzerland	2 (0.2)	
Other	6 (0.6)	
Physician status		999
Attending general practitioner	278 (27.7)	
Attending specialist	457 (45.6)	
Resident general practitioner	61 (6.1)	
Resident specialist	188 (18.8)	
Occupational medicine / Insurance physician / School physician / Medical consultants	15 (1.5)	
Work setting of the (resident) specialist		645
Hospital setting	560 (86.6)	
Private consultation	13 (2.0)	
Both	60 (9.3)	
Type of hospital of the (resident) specialist		620
Public hospital	204 (32.9)	
Private hospital	127 (20.5)	
University hospital	288 (46.5)	
Specialty of the (resident) specialist		645
Anesthesiology	60 (9.3)	
Pediatrics	52 (8.1)	
Surgery	49 (7.6)	
Acute and emergency medicine	45 (7.0)	
Neurology and pediatric neurology	40 (6.2)	
Psychiatry	37 (5.7)	
Internal medicine	35 (5.4)	
Gynecology	25 (3.9)	
Intensive care	24 (3.7)	
Cardiology	19 (2.9)	
Gastro-enterology	19 (2.9)	
Geriatrics	18 (2.8)	
Otolaryngology	18 (2.8)	
Pneumology	18 (2.8)	
Hematology	16 (2.5)	
Physical medicine and rehabilitation	15 (2.3)	

Sociodemographic and work-related characteristics[a]	**No. (%)**	**N (total = 1002)**
Dermatology	13 (2.0)	
Endocrinology	13 (2.0)	
Radiology	13 (2.0)	
Clinical biology	11 (1.7)	
Clinical infectiology	11 (1.7)	
Oncology	11 (1.7)	
Ophthalmology	10 (1.6)	
Urology	9 (1.4)	
Nuclear medicine	8 (1.2)	
Nephrology	8 (1.2)	
Pathological anatomy	7 (1.1)	
Neurosurgery	6 (0.9)	
Radiotherapy – oncology	5 (0.8)	
Rheumatology	3 (0.5)	
Neonatology	2 (0.3)	
Stomatology	2 (0.3)	
Palliative care	2 (0.3)	
Other	4 (0.6)	
Type of practice[c] **of the (resident) generalist**		339
General medicine (consultations and home visits)	327 (96.5)	
Hospital setting	14 (4.1)	
Other institution (e.g. family planning center, nursing home)	52 (15.3)	
Non-conventional medicine	11 (3.2)	
Work setting[c] **of the (resident) generalist** (N = 339)		339
Work alone	90 (26.5)	
Monodisciplinary group	107 (31.6)	
Multidisciplinary group	150 (44.2)	
Years in practice, median (IQR), years	12.00 (5;24)	1001
Hours worked per week, median (IQR), hours	50.00 (40;60)	1000

Note. N = 1002. No = Number. IQR = Interquartile Range. [a] Data were missing for some characteristics. [b] Includes hospital hygiene, medical information, orthodontics, legal medicine. [c] Multiple responses were possib

Table 2a. Descriptive statistics on burnout, depression, alcohol consumption (continuous measure) and the HDMC

	N	Median	IQR	Skewness	Kurtosis	α
Health-related outcomes						
Burnout (BAT-12)	998	2.25	0.67 [1.91 – 2.58]	0.82	1.39	0.88
Depression (PHQ-9)	990	5.00	7.00 [2.00 – 9.00]	1.29	1.63	0.88
Alcohol consumption (AUDIT-C, continuous)	984	3.00	2.00 [2.00 – 4.00]	0.50	0.30	0.61
Harmful Dimensions of the Medical Culture (HDMC)						
Physician's Professional Commitment	1002	3.73	0.91 [3.27 – 4.18]	-0.51	0.49	0.85
The Myth of the Invulnerable Physician	1002	3.83	1.00 [3.16 – 4.16]	-0.62	0.23	0.77
Physician Stigma towards Burnout	1002	2.50	1.00 [2.00 – 3.00]	0.12	-0.38	0.62
HDMC Global Score	1002	3.46	0.67 [3.05 – 4.80]	-0.31	0.31	0.85

Note. N = 1002. α = Cronbach's alpha, to assess the internal consistency of the scale. IQR = Interquartile Range.

Table 2b. Descriptive statistics on the health behaviours of the physicians

	N	No. (%)
Help-seeking propensity (*If I felt the need to obtain psychological or psychiatric support or assistance, I would not hesitate to consult a mental health professional.*)	982	
1. Totally disagree		53 (5.4)
2. Disagree		154 (15.7)
3. Neither agree nor disagree		167 (17.0)
4. Agree		341 (34.7)
5. Totally agree		267 (27.2)
Presenteeism (*In the past 12 months, how often have you gone to work while sick, in a situation where you would have recommended a patient to stay home?)*	983	
1. Never		103 (10.5)
2. Less than once a week		545 (55.4)
3. About once a month		219 (22.3)
4. Several times a month		97 (9.9)
5. Several days a week		19 (1.9)
Self-diagnosis (*Have you ever self-diagnosed a health issue for which you believe a patient should see a doctor?*)	981	
1. Never		78 (8.0)

2. Rarely		247 (33.1)
3. Sometimes		347 (35.4)
4. Often		232 (23.6)
5. Almost always		77 (7.8)
Self-treatment (*Have you ever self-treated a health issue for which you believe a patient should see a doctor?*)	981	
1. Never		90 (9.2)
2. Rarely		238 (33.4)
3. Sometimes		311 (31.7)
4. Often		238 (24.3)
5. Almost always		104 (10.6)
Frequency of use of tranquillizers *(How often do you take tranquilizers?)*	980	
1. Never		873 (89.1)
2. Once or a few times a year		54 (5.5)
3. A few times a month		27 (2.8)
4. Several times a week		14 (1.4)
5. Every day		12 (1.2)
➔ *Levels 2 to 5 (recoded for the binary logistic regression)*		*107 (9.9)*
Frequency of use of antidepressants *(How often do you take antidepressants?)*	978	
1. Never		890 (91.0)
2. Once or a few times a year		15 (1.5)
3. A few times a month		2 (0.2)
4. Several times a week		3 (0.3)
5. Every day		68 (7.0)
➔ *Levels 2 to 5 (recoded for the binary logistic regression)*		*88 (9.0)*
Frequency of use of sleeping pills *(How often do you take sleeping pills?)*	976	
1. Never		767 (78.6)
2. Once or a few times a year		113 (11.6)
3. A few times a month		36 (3.7)
4. Several times a week		26 (2.7)
5. Every day		34 (3.5)
➔ *Levels 2 to 5 (recoded for the binary logistic regression)*		*209 (21.4)*

Alcohol consumption (AUDIT-C, categorical)	981	
1. Non problematic use		480 (47.9
2. Problematic use		501 (50.0)

Table 3. One-tailed Spearman correlations (*ρ)* between the health-related outcomes of the physicians

		1	2	3	4	5	6	7	8	9	10
		Burnout	**Depression**	**Help-seeking behaviour**	**Presenteeism**	**Self-diagnosis**	**Self-treatment**	**AUDIT-C, continuous**	**Tranquillizers**	**Sleeping pills**	**Anti-depressants**
1	R_S	--									
	Sig.	.									
2	R_S	.72	--								
	Sig.	<.001	.								
3	R_S	-.08	-.13	--							
	Sig.	.013	<.001	.							
4	R_S	.36	.46	-.08	--						
	Sig.	<.001	<.001	.014	.						
5	R_S	.21	.26	-.04	.38	--					
	Sig.	<.001	<.001	.168	<.001	.					
6	R_S	.20	.27	-.09	.32	.75	--				
	Sig.	<.001	<.001	.005	<.001	<.001	.				
7	R_S	.02	.00	-.07	-.02	-.03	-.01	--			
	Sig.	.466	.928	.030	.446	.281	.743	.			
8	R_S	.23	.24	.04	.17	.08	.10	-.00	--		
	Sig.	<.001	<.001	.124	<.001	.006	.001	.459	.		
9	R_S	.17	.19	.06	.14	.11	.12	-.00	.30	--	
	Sig.	<.001	<.001	.03	<.001	<.001	<.001	.446	<.001	.	
10	R_S	.21	.21	.12	.16	.15	.13	.02	.30	.34	--
	Sig.	<.001	<.001	<.001	<.001	<.001	<.001	.278	<.001	<.001	.

Table 4. Median scores (with IQR) of the HDMC by category of the binary-recoded health-related outcomes

		HDMC					
Substance	**Category**	**Physician's Professional Commitment**	**P-value**	**The Myth of the Invulnerable Physician**	**P-value**	**Physician Stigma towards Burnout**	**P-value**
Tranquillizers	**Reported use**	3.90 (0.82)	<.001	4.00 (0.83)	<.001	2.75 (1.25)	.019
	No use reported	3.64 (0.82)		3.67 (1.00)		2.50 (1.00)	
Antidepressants	**Reported use**	3.90 (0.82)	.006	4.00 (0.88)	.002	2.88 (1.25)	.041
	No use reported	3.73 (0.82)		3.67 (1.00)		2.50 (1.00)	
Sleeping pills	**Reported use**	3.81 (0.82)	.042	3.83 (0.83)	.101	2.50 (1.25)	.250
	No use reported	3.63 (0.82)		3.67 (1.00)		2.50 (1.00)	
Alcohol consumption (AUDIT-C, categorical)	**Problematic use**	3.64 (0.86)	.311	3.83 (0.92)	.612	2.50 (1.00)	.916
	Non problematic use	3.73 (0.82)		3.67 (0.62)		2.50 (1.00)	

Note. Results of non-parametric tests are presented, comparing median scores on the HDMC dimensions across categories of substance use. Independent samples were analyzed using two-tailed tests with asymptotic significance. Median scores and interquartile ranges (IQR) are reported, along with p-values indicating differences in median scores between categories.

Table 5. Predictors of Depression Scores (General Linear Model with Robust Standard Errors)

$F(10, 955) = 29.925$, $p < .001$, $R^2 = 0.241$, $R^2_{adjusted} = 0.232$

					95% CI unst. B.		
Predictor	**Unst. B**	**Std. B**	**Robust Std. Error**	***p***	**Lower bound**	**Upper bound**	**Partial n^2**
Intercept	-8.011		1.334	<.001	-10.628	-5.383	0.037
Gender	0.335	0.031	0.345	.331	-0.314	0.985	0.001
Relationship status	-0.611	-0.045	0.414	.141	-1.390	0.169	0.002
Parental status	0.794	0.076	0.421	.060	-0.038	1.626	0.004
Physician status	1.649	0.139	0.475	<.001	0.753	2.545	0.013
Specialty	-0.905	-0.084	0.335	.007	-1.562	-0.248	0.008
Seniority	-0.031	-0.074	0.016	.055	-.064	0.003	0.004
Working hours	0.025	0.059	0.016	.116	-.002	0.052	0.003
Commitment	2.356	0.291	0.264	<.001	1.817	2.895	0.072
Myth	1.150	0.169	0.245	<.001	0.688	1.612	0.023
Stigma Burnout	0.646	0.098	0.214	.003	0.256	1.036	0.011

Note. Robust standard errors calculated using HC3 method. Partial η^2= Partial Eta Squared. Unst. B = unstandardized beta coefficient. Std. B = standardized beta coefficient. Std. Error = standard error. CI = confidence interval. The following covariates were included as reference categories: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours.

Table 6. Predictors of Burnout Scores (General Linear Model with Robust Standard Errors)

$F(10, 963) = 25.324$, $p < .001$, $R^2 = 0.210$, $R^2_{adjusted} = 0.202$

					95% CI unst. B.		
Predictor	**Unst. B**	**Std. B**	**Robust Std. Error**	***p***	**Lower bound**	**Upper bound**	**Partial n^2**
Intercept	0.660		.157	<.001	0.352	0.968	0.018
Gender	0.057	0.046	.039	.139	-0.018	0.132	0.002
Relationship status	-0.005	-0.003	.046	.914	-0.096	0.086	0.000
Parental status	0.017	0.014	.051	.735	-0.080	0.113	0.000
Physician status	0.076	0.056	.055	.151	-0.028	0.180	0.002
Specialty	-0.097	0.079	.037	.012	-0.174	-0.021	0.007
Seniority	-0.001	-0.011	.002	.788	-0.004	0.003	0.000
Working hours	-0.000	-0.006	.002	.850	-0.003	0.003	0.000
Commitment	0.284	0.307	.032	<.001	0.221	0.346	0.075
Myth	0.137	0.177	.031	<.001	0.084	0.191	0.020
Stigma Burnout	0.069	0.091	.026	.003	0.024	0.114	0.008

Note. Robust standard errors calculated using HC3 method. Partial η^2= Partial Eta Squared. Unst. B = unstandardized beta coefficient. Std. B = standardized beta coefficient. Std. Error = standard error. CI = confidence interval. The following covariates were included as reference categories: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours.

Table 7. Predictors of help-seeking behaviour (General Linear Model with Robust Standard Errors)

$F(7, 948) = 9.032$, $p < .001$, $R^2 = 0.088$, $R^2_{adjusted} = 0.078$

					95% CI unst. B.		
Predictor	**Unst. B**	**Std. B**	**Robust Std. Error**	***p***	**Lower bound**	**Upper bound**	**Partial n^2**
Intercept	5.337		0.321	<.001	4.707	5.968	0.247
Gender	0.499	0.199	0.085	<.001	0.333	0.665	0.036
Relationship status	-0.069	-0.022	0.099	.488	-0.269	0.131	0.001
Parental status	-0.013	-0.005	0.109	.907	-0.226	0.200	0.000

Physician status	-0.165	-0.060	0.119	.167	-0.395	0.065	0.002
Specialty	-0.032	-0.013	0.082	.692	-0.200	0.136	0.000
Seniority	0.002	0.018	0.004	.665	-0.007	0.010	0.000
Working hours	-0.007	-0.072	0.003	.034	-0.014	0.000	0.005
Commitment	-0.047	-0.025	0.070	.497	-0.185	0.090	0.000
Myth	-0.230	-0.146	0.060	<.001	-0.348	-0.112	0.015
Stigma Burnout	-0.134	-0.088	0.052	.010	-0.234	-0.034	0.007

Note. Robust standard errors calculated using HC3 method. Partial η^2= Partial Eta Squared. Unst. B = unstandardized beta coefficient. Std. B = standardized beta coefficient. Std. Error = standard error. CI = confidence interval. The following covariates were included as reference categories: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours.

Table 8. Predictors of presenteeism (General Linear Model with Robust Standard Errors)

$F(10, 949) = 13.14$, $p < .001$, $R^2 = 0.123$, $R^2_{adjusted} = 0.113$

					95% CI unst. B.		
Predictor	**Unst. B**	**Std. B**	**Robust Std. Error**	***p***	**Lower bound**	**Upper bound**	**Partial n^2**
Intercept	0.573		0.240	.017	0.102	1.043	0.006
Gender	0.133	0.073	0.059	.027	0,015	0.252	0.005
Relationship status	-0.133	-0.058	0.074	.067	-0.276	0.010	0.003
Parental status	-0.117	-0.067	0.080	.130	-0.035	0.269	0.002
Physician status	0.038	-0.019	0.084	.648	-0.126	0.202	0.000
Specialty	-0.241	-0.132	0.063	<.001	-0.361	-0.121	0.015
Seniority	-0.004	-0.050	0.003	.251	-0.010	0.003	0.001
Working hours	0.002	0.024	0.003	.480	-0.003	0.007	0.000
Commitment	0.316	0.231	0.052	<.001	0.218	0.414	0.038
Myth	0.135	0.118	0.047	.002	0.051	0.219	0.009
Stigma Burnout	0.051	0.046	0.038	.158	-0.020	0.123	0.002

Note. Robust standard errors calculated using HC3 method. Partial η^2= Partial Eta Squared. Unst. B = unstandardized beta coefficient. Std. B = standardized beta coefficient. Std. Error = standard error. CI = confidence interval. The following covariates were included as reference categories: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours.

Table 9. Predictors of self-diagnosis (General Linear Model with Robust Standard Errors)

$F(10, 947) = 7.146$, $p < .001$, $R^2 = 0.071$, $R^2_{adjusted} = 0.061$						
				95% CI unst. B.		
Predictor	**Unst. B**	**Std. B**	**Robust Std. Error**	***p***	**Lower bound**	**Upper bound**	**Partial n^2**
Intercept	1.258		0.301	<.001	0.667	1.848	0.018
Gender	0.068	0.031	0.078	.369	-0.081	0.216	0.018
Relationship status	0.000	0.000	0.086	.999	-0.179	0.178	0.001
Parental status	0.013	0.006	0.100	.896	-0.178	0.203	0.000
Physician status	-0.164	-0.067	0.110	.118	-0.369	0.041	0.000
Specialty	-0.305	-0.137	0.078	<.001	-0.455	-0.155	0.002
Seniority	0.003	0.037	0.004	.408	-0.004	0.011	0.016
Working hours	-0.002	-0.025	0.003	.487	-0.008	0.004	0.001
Commitment	0.187	0.113	0.066	.003	0.064	0.311	0.000
Myth	0.202	0.144	0.056	<.001	0.096	0.307	0.009
Stigma Burnout	0.062	0.045	0.046	.176	-0.028	0.151	0.014

Note. Robust standard errors calculated using HC3 method. Partial η^2= Partial Eta Squared. Unst. B = unstandardized beta coefficient. Std. B = standardized beta coefficient. Std. Error = standard error. CI = confidence interval. The following covariates were included as reference categories: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours. For this regression, 100 outliers were identified and excluded as that their exclusion changed the results of the regression.

Table 10. Predictors of self-treatment (General Linear Model with Robust Standard Errors)

$F(10, 947) = 8.411$, $p < .001$, $R^2 = .082$, $R^2_{adjusted} = .073$						
				95% CI unst. B.		
Predictor	**Unst. B**	**Std. B**	**Robust Std. Error**	***p***	**Lower bound**	**Upper bound**	**Partial n^2**
Intercept	0.893		0.317	.005	0.272	1.515	0.008
Gender	-0.001	0.000	0.079	.993	-0.158	0.157	0.000
Relationship status	0.088	0.030	0.095	.363	-0.101	0.277	0.001
Parental status	0.018	0.008	0.105	.864	-0.184	0.220	0.000
Physician status	-0.188	-0.072	0.120	.091	-0.405	0.030	0.003
Specialty	-0.221	-0.093	0.081	.007	-0.381	-0.062	0.008
Seniority	0.000	-0.002	0.004	.963	-0.008	0.008	0.000

Working hours	-0.003	-0.028	0.003	.426	-0.009	0.004	0.001
Commitment	0.310	0.175	0.070	<.001	0.179	0.441	0.021
Myth	0.211	0.141	0.058	<.001	0.099	0.322	0.014
Stigma Burnout	0.064	0.044	0.050	.186	-0.031	0.159	0.002

Note. Robust standard errors calculated using HC3 method. Partial η^2= Partial Eta Squared. Unst. B = unstandardized beta coefficient. Std. B = standardized beta coefficient. Std. Error = standard error. CI = confidence interval. The following covariates were included as reference categories: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours.

Table 11. Predictors of the use of tranquillizers (binary logistic regression)

2 Log Likelihood: 611.377
R^2 = .041 (Cox & Snell), .083 (Nagelkerke). Model χ^2 (10) = 40.016, p < .001

Predictors	**B**	**SE**	**Wald χ^2**	**p-value**	**Exp(B)**	**95% CI for Exp(B)**	
						Lower Bound	**Upper Bound**
Gender	-0.103	0.249	0.172	.679	0.902	0.554	1.469
Relationship status	0.509	0.257	3.927	.048	1.663	1.006	2.752
Parental status	0.646	0.302	4.574	.032	1.908	1.055	3.449
Physician status	0.025	0.315	0.006	.936	1.026	0.553	1.902
Specialty status	0.510	0.247	4.281	.039	1.665	1.027	2.700
Seniority	0.017	0.013	1.711	.191	1.017	0.992	1.042
Working hours	0.021	0.010	4.801	.028	1.022	1.002	1.041
Physician's Professional Commitment	0.532	0.215	6.146	.013	1.702	1.118	2.591
The Myth of the Invulnerable Physician	0.233	0.180	1.676	.195	1.263	0.887	1.797
Physician Stigma towards Burnout	0.052	0.144	0.130	.719	1.053	0.794	1.398
Constant	-7.063	1.007	49.218	<.001	0.001	0.554	1.469

Note. B = unstandardized beta coefficient. SE = standard error. Exp(B) = Odds Ratio. CI = confidence interval. The following covariates were included as reference categories (coded 0): female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours. After inspection of the variables' distributions, the dependent variable was recoded into binary scores (e.g. user vs. non-user) before conducting logistic regression analyses. The Hosmer and Lemeshow goodness-of-fit test was non-significant ($\chi^2(8) = 8.633$, $p = 0.374$), suggesting an adequate fit of the model.

Table 12. Predictors of the use of antidepressants (binary logistic regression)

2 Log Likelihood: 535.873							
R^2 = .032 (Cox & Snell), .072 (Nagelkerke). Model χ^2 (10) = 31.051, p < .001							
Predictors	**B**	**SE**	**Wald χ^2**	**p-value**	**Exp(B)**	**95% CI for Exp(B)**	
						Lower Bound	**Upper Bound**
Gender	-0.069	0.269	0.066	.798	0.934	0.551	1.581
Relationship status	0.428	0.287	2.215	.137	1.534	0.873	2.694
Parental status	0.483	0.336	2.062	.151	1.620	0.838	3.132
Physician status	0.014	0.360	0.001	.970	1.014	0.500	2.054
Specialty status	-0.270	0.279	0.931	.335	0.764	0.442	1.321
Seniority	0.027	0.013	3.906	.048	1.027	1.000	1.054
Working hours	-0.019	0.010	3.421	.064	0.981	0.961	1.001
Physician's Professional Commitment	0.538	0.235	5.237	.022	1.712	1.080	2.713
The Myth of the Invulnerable Physician	0.388	0.202	3.690	.055	1.474	0.992	2.190
Physician Stigma towards Burnout	0.242	0.158	2.344	.126	1.273	0.935	1.735
Constant	-6.128	1.113	30.292	<.001	0.002		

Note. B = unstandardized beta coefficient. SE = standard error. Exp(B) = Odds Ratio. CI = confidence interval. The following covariates were included as reference categories (coded 0): female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours. After inspection of the variables' distributions, the dependent variable was recoded into binary scores (e.g. user vs. non-user) before conducting logistic regression analyses. The Hosmer and Lemeshow goodness-of-fit test was non-significant ($\chi^2(8) = 8.030$, p = 0.431), suggesting an adequate fit of the model.

Table 13. Predictors of the use of sleeping pills (binary logistic regression)

2 Log Likelihood: 954.536							
R^2 = .026 (Cox & Snell), .041 (Nagelkerke). Model χ^2 (10) = 25.205, p =.005							
Predictors	**B**	**SE**	**Wald χ^2**	**p-value**	**Exp(B)**	**95% CI for Exp(B)**	
						Lower Bound	**Upper Bound**
Gender	0.005	0.184	0.001	.980	1.005	0.701	1.440
Relationship status	0.450	0.208	4.672	.031	1.568	1.043	2.357
Parental status	0.023	0.232	0.009	.922	1.023	0.649	1.612

Physician status	0.171	0.255	0.448	.503	1.186	0.719	1.957
Specialty status	0.099	0.183	0.290	.590	1.104	0.771	1.581
Seniority	0.010	0.009	1.118	.290	1.010	0.992	1.028
Working hours	-0.011	0.007	2.318	.128	0.989	0.975	1.003
Physician's Professional Commitment	0.402	0.157	6.564	.010	1.495	1.099	2.033
The Myth of the Invulnerable Physician	0.189	0.132	2.057	.152	1.208	0.933	1.564
Physician Stigma towards Burnout	0.102	0.109	0.884	.347	1.108	0.895	1.371
Constant	-3.618	0.726	24.842	<.001	0.027		

Note. B = unstandardized beta coefficient. SE = standard error. Exp(B) = Odds Ratio. CI = confidence interval. The following covariates were included as reference categories (coded 0): female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours. After inspection of the variables' distributions, the dependent variable was recoded into binary scores (e.g. user vs. non-user) before conducting logistic regression analyses. The Hosmer and Lemeshow goodness-of-fit test was non-significant ($\chi^2(8) = 10.916$, $p = 0.206$), suggesting an adequate fit of the model.

Table 14. Predictors of a problematic alcohol consumption (binary logistic regression)

2 Log Likelihood = 1291.011							
Pseudo^2: Cox & Snell = 0.028, Nagelkerke = 0.037. Model $\chi^2(10) = 26.975$, p = .003							
Predictors	**B**	**SE**	**Wald χ^2**	**p-value**	**Exp(B)**	**95% CI for Exp(B)**	
						Lower Bound	**Upper Bound**
Gender	-0.156	0.149	1.103	.294	0.855	0.639	1.145
Relationship status	-0.265	0.180	2.167	.141	0.767	0.539	1.092
Parental status	0.056	0.191	0.085	.770	1.057	0.728	1.537
Physician status	-0.490	0.208	5.584	.018	0.612	0.408	0.920
Specialty status	-0.109	0.151	0.519	.471	0.897	0.667	1.206
Seniority	-0.004	0.008	0.253	.615	0.996	0.981	1.011
Working hours	-0.007	0.006	1.203	.273	0.993	0.981	1.005
Physician's Professional Commitment	-0.197	0.124	2.519	.112	0.821	0.644	1.047
The Myth of the Invulnerable Physician	0.091	0.106	0.736	.391	1.096	0.889	1.349
Physician Stigma towards Burnout	0.073	0.090	0.655	.418	1.076	0.902	1.283
Constant	1.125	0.568	3.922	.048	3.079		

Note. B = unstandardized beta coefficient. SE = standard error. Exp(B) = Odds Ratio. CI = confidence interval. The following covariates were included as reference categories: female gender, being in a relationship, having children, being a resident, being a specialist, years in practice, and estimated weekly working hours. After inspection of the variables' distributions, the dependent variable was recoded into binary scores before conducting logistic regression analyses: alcohol consumption was categorized as "problematic use" versus "non-problematic use" based on established scoring guidelines (≥3 for women, ≥4 for men, as per the original scale authors. The Hosmer and Lemeshow goodness-of-fit test was non-significant ($\chi^2(8)$ 1.987, $p = 0.981$), suggesting an adequate fit of the model.

Table 15a. Multivariate model predicting HDMC score across health outcomes – test of between subject effects.

$F(10, 946) = 24.962$, $p < .001$, Wilk's $\Lambda = 0.791$, partial $\eta^2 = 0.209$			
	F	**Sig.**	**Partial η^2**
Depression	182.56	<.001	0.16
Burnout	145.33	<.001	0.13
Help-seeking behaviour	25.16	<.001	0.02
Presenteeism	77.43	<.001	0.08
Self-diagnosis	26.20	<.001	0.03
Self-treatment	54.61	<.001	0.05
Frequency of use of tranquillizers	16.57	<.001	0.02
Frequency of use of sleeping pills	16.33	<.001	0.02
Frequency of use of antidepressants	11.61	<.001	0.01
Alcohol consumption, continuous	0.40	0.53	0.00

Note. Multivariate general linear model of the prediction of the overall HDMC score on variations across all health-related variables, while accounting for their covariance.

Table 15b. Multivariate model predicting HDMC score across health outcomes – parameter estimates.

						95% Confidence Interval		
Dependent Variable	**Parameter**	**B**	**Std. Error**	**t**	**Sig.**	**Lower Bound**	**Upper Bound**	**Partial η^2**
Depression	Intercept	-8.282	1.068	-7.753	<.001	-10.378	-6.186	0.059
	HDMC_score	4.152	0.307	13.512	<.001	3.549	4.755	0.160
Burnout	Intercept	0.826	0.125	6.625	<.001	0.581	1.070	0.044
	HDMC_score	0.432	0.036	12.055	<.001	0.362	0.502	0.132
Help-seeking	Intercept	4.954	0.265	18.680	<.001	4.434	5.475	0.267
behaviour	HDMC_score	-0.383	0.076	-5.016	<.001	-0.532	-0.233	0.026
Presenteeism	Intercept	0.724	0.190	3.820	<.001	0.352	1.096	0.015
	HDMC_score	0.480	0.055	8.800	<.001	0.373	0.587	0.075
Self-diagnosis	Intercept	1.793	0.235	7.626	<.001	1.331	2.254	0.057
	HDMC_score	0.346	0.068	5.118	<.001	0.213	0.479	0.027
Self-treatment	Intercept	1.219	0.247	4.935	<.001	0.734	1.704	0.025
	HDMC_score	0.525	0.071	7.390	<.001	0.386	0.665	0.054
Frequency of use of	Intercept	0.601	0.147	4.096	<.001	0.313	0.889	0.017
tranquillizers	HDMC_score	0.172	0.042	4.070	<.001	0.089	0.255	0.017
Frequency of use of	Intercept	0.692	0.207	3.346	<.001	0.286	1.098	0.012
sleeping pills	HDMC_score	0.203	0.059	3.408	<.001	0.086	0.319	0.012
Frequency of use of	Intercept	0.383	0.228	1.676	0.094	-0.065	0.831	0.003
antidepressants	HDMC_score	0.265	0.066	4.041	<.001	0.137	0.394	0.017
Alcohol consumption,	Intercept	3.325	0.463	7.177	<.001	2.416	4.234	0.051
continuous	HDMC_score	-0.084	0.133	-0.632	0.528	-0.346	0.177	0.000

Note. Multivariate general linear model of the prediction of the overall HDMC score on variations across all health-related variables, while accounting for their covariance.

6.2 Supplementary methods

6.2.1 Preliminary statistical analyses

Descriptive statistics were first conducted for all variables, including a summary of sample characteristics and data distribution based on variable type: frequencies and percentages, median scores with interquartile ranges (IQR), and internal consistency (Cronbach's alpha) for applicable scales (burnout, depression, and the HDMC). For scales with 10 items or fewer, a minimum alpha of 0.60 was considered acceptable.

Health behaviours were assessed using single-item Likert scales (5 levels, agreement, or frequency). After inspecting the distribution of scores, certain variables were treated as continuous measures: help-seeking propensity, presenteeism, self-diagnosis, and self-treatment. Variables related to psychoactive medication use and alcohol consumption were recoded as binary variables. Specifically, frequency of use of tranquilizers, antidepressants, and sleeping pills was categorized as "no reported use" (level 1) versus "reported use" (levels 2 to 5). Alcohol consumption was categorized as "problematic use" versus "non-problematic use" based on established scoring guidelines (≥3 for women, ≥4 for men, as per the original scale authors). Spearman correlations were performed to examine associations between the variables of interest, including their statistical significance (Table 3 in the additional files represents associations between the health-related outcomes; Table 1 in the main paper represents associations between these outcomes and the HDMC). Correlations were deemed significant at the $p<0.001$ level, following adjustments for multiple testing. For binary-coded health-related outcomes, differences in median scores on the HDMC dimensions across categories were analysed (results are provided in Table 4 of the additional files).

6.2.2 Multivariable regression analyses

Multivariable regression analyses to predict the health-related outcomes based on the HDMC scores were conducted on SPSS, adjusting for potential confounders: gender, relationship status, parental status, physician status (resident vs. attending), specialty (generalist vs. specialist), years in practice, and weekly working hours. Cases with missing values were excluded listwise. Two physicians identified as belonging to the "other" gender category and had significantly higher scores on all DVs. Due to the small number of physicians in this gender category, we decided to exclude these two cases from the regression analysis, to ensure the stability and reliability of our statistical estimates. Linear regressions were used for continuous outcomes (e.g. burnout, depression, presenteeism). After inspection of the variables'

distributions, variables related to substance use (alcohol, tranquilizers, antidepressants, and sleeping pills) were recoded into binary scores (e.g. user vs. non-user) before conducting logistic regression analyses. The assumptions required for the regression analyses were verified. Specifically, the normality of the residuals' distribution was assessed for linear regressions. We also verified whether our regressions presented signs of multicollinearity, and casewise diagnostics were performed following Field's guidelines.

Instances of heteroscedasticity were detected in most linear regression analyses. Consequently, the robust or heteroskedasticity-consistent (HC3, default option in SPSS) standard errors are reported in the tables of the additional files. To facilitate interpretation, and in accordance with the recommendations of the Statistical Support Team of our university, we reported unstandardized coefficients for categorical predictors (e.g. gender, relationship status, parental status, physician status, and specialty) and standardized coefficients for continuous predictors (e.g. seniority, working hours, and HDMC scores) in the linear regression models. For binary logistic regression analyses, odds ratios are presented in the table of the manuscript. Model fitting to the data was assessed using the Hosmer and Lemeshow goodness-of-fit test. The omnibus test of model coefficients was used to assess whether the explanatory variables significantly improved the model performance. Comprehensive regression results, including the standard errors associated with the p-values for all estimates, are provided in the appendix. A detailed exploration of the interplay between physicians' characteristics, health outcomes, and the internalization of medical culture dimensions will be addressed in a subsequent publication.

6.2.3 Multivariate general linear model

A multivariate general linear model (GLM) was performed to assess whether the overall HDMC score - a composite measure encompassing the three HDMC dimensions - significantly predicted variation across all health-related variables, while accounting for covariance among these variables. Results are reported using the Wilks' Lambda statistic, along with significance tests and partial eta squared values. The significance threshold was set at $p < .005$ (0.05/10).

Chapter 6. Physician characteristics associated with the endorsement of harmful dimensions of the medical culture

Physician distress is a growing public health concern, encompassing high rates of burnout, depression, and maladaptive health behaviours. Although structural and occupational stressors have long been acknowledged as contributing factors, there is growing recognition of the role that cultural norms within the medical profession play in shaping physician well-being. Specifically, three interrelated Harmful Dimensions of Medical Culture (HDMC) - Physicians' Professional Commitment, the Myth of the Invulnerable Physician, and Stigma towards Burnout - have been linked to negative psychological and behavioural outcomes among physicians. This study aimed to explore whether physicians' endorsement of the HDMC varies according to key demographic and professional characteristics, including gender, age, parental status, relationship status, specialty, career stage, and weekly working hours. A cross-sectional online survey was administered to French-speaking physicians in clinical practice, using the validated HDMC scale and collecting demographic and professional data. Group comparisons were conducted using t-tests and ANOVAs, and multiple linear regressions were used to identify independent predictors of HDMC endorsement. 1002 physicians participated. The HDMC were not uniformally endorsed across physician groups. Higher HDMC endorsement was significantly associated with younger age, female gender, specialist practice, and longer working hours. Multivariate models further confirmed these associations, with gender, age, specialty, and workload persisting as significant predictors of the endorsement of the HDMC in physicians. In conclusion, the endorsement of harmful cultural norms in medicine is not homogeneous across the physician population. Instead, it varies meaningfully by demographic and professional factors, particularly among groups already at elevated risk of burnout. These findings underscore the need for tailored interventions that address both the cultural and structural determinants of physician distress to support a more sustainable medical workforce.

Reference

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Physician characteristics associated with the endorsement of harmful dimensions of the medical culture

1. Introduction

1.1 Physician distress and cultural norms in medicine

Physician well-being is a growing public health concern, with consistently high rates of burnout, depression, suicidal ideation, and maladaptive health behaviours reported across the profession (Bazargan et al., 2009; Mata et al., 2015; Rotenstein et al., 2018; Shanafelt et al., 2021; Zimmermann et al., 2024). These issues not only impact individual physicians but also jeopardize workforce sustainability and the quality of patient care (Grassi et al., 2022; Wallace et al., 2009). While structural and occupational stressors have long been recognized as key contributors to distress in the profession, increasing attention has turned to medical culture, i.e. the implicit norms, values, and expectations that shape professional identity and behaviour, as a critical yet underexamined contributor to physician distress and poor self-care (Armas-Neira et al., 2024; Feist et al., 2020; Schein & Schein, 2019a; Shanafelt et al., 2019).

Recent research has conceptualized three interrelated Harmful Dimensions of Medical Culture (HDMC) with particular relevance to physician well-being (Banse et al., 2025a): 1) Physicians' Professional Commitment captures the extent to which physicians internalize their professional role as central to their personal identity and daily life. It reflects the perception that a successful medical career necessitates significant personal sacrifice and is often accompanied by a persistent sense of work-life imbalance. 2) The Myth of the Invulnerable Physician reflects the enduring belief that physicians should be impervious to personal struggle. It encompasses the idea that the roles of physician and patient are inherently incompatible, and that physicians bear a moral obligation to prioritize the needs of patients and colleagues above their own. 3) Stigma towards Burnout refers to both internalized and perceived stigma surrounding burnout within the medical community. It includes negative attitudes, held by physicians themselves or attributed to peers, toward experiencing or disclosing burnout in professional settings. These medical cultural norms are implicitly conveyed through medical training (Cleland & Johnston, 2012) and further reinforced by organizational environments that perpetuate unrealistic expectations (Shanafelt et al., 2019). They tend to co-occur and amplify one another (Banse et al., 2025a). Critically, physicians' endorsement of the HDMC has been

linked to adverse outcomes including burnout, depression, avoidance of care, presenteeism, and self-medication (Banse et al., 2025b). Given the growing recognition of physician distress and maladaptive health behaviours as a major concern for the health system, examining the antecedents of medical culture is essential to further understand and ultimately address the root causes of these pervasive issues. Yet despite growing recognition of their deleterious impact, no study to date has systematically examined whether the endorsement of these harmful cultural norms varies across different groups of physicians. Although indirect evidence from related literature suggests that factors such as gender, specialty, career stage, and personal life context may influence how physicians relate to professional norms, the HDMC have never been directly empirically examined in relation to demographic and professional characteristics. This constitutes a significant gap in our understanding of whether vulnerability to distress may differ across physician subgroups (Farrar, 2020).

1.2 Aim and rationale of the present thesis

This study explores whether the endorsement of three Harmful Dimensions of the Medical Culture (Physicians' Professional Commitment, The Myth of the Invulnerable Physician, and Stigma towards Burnout) varies according to various demographic and professional characteristics. Specifically, we examine possible variations in relation to gender, age, parental status, relationship status, specialty, career stage, and working hours per week. Given the absence of prior empirical work on this specific topic, our approach is exploratory in nature. We expect that endorsement of HDMC may vary across physician subgroups but make no assumptions about the direction or strength of these associations.

2. Methods

This study is part of a broader research project investigating the interplay between psychological distress, health behaviours, and medical culture. The study received ethical approval from the Institutional Review Board (Ethics Committee of the Cliniques Universitaires Saint-Luc, Brussels - Protocol Number: 2023/07MAI/219) prior to data collection.

2.1 Survey instrument

The present study relies on the same dataset, survey methodology, and participant sample as reported in a prior publication (Banse et al., 2025a) which centred on the psychometric validation of the Harmful Dimensions of Medical Culture (HDMC) and its links to burnout among physicians.

An online survey was administered to participants, with anonymization to ensure confidentiality. Data collection and management were facilitated through REDCap electronic data capture tools (Harris et al., 2009). Participants provided informed consent electronically prior to survey completion. The survey collected personal and professional characteristics, including age, gender, relationship status, parental status, career status, specialty, and average weekly work hours.

The survey also included the Harmful Dimensions of Medical Culture (HDMC) scale (Banse et al., 2025a) which assesses three interdependent dimensions of medical culture: Physicians' Professional Commitment, the Myth of the Invulnerable Physician, and Stigma towards Burnout. In the HDMC scale, each dimension comprises several first-order subfactors: Physicians' Professional Commitment includes work priority strain, the self-sacrificing nature of medical practice, and the physician's central identity role; the Myth of the Invulnerable Physician encompasses physician's moral obligation to patients and colleagues and physician's discomfort with the patient role; and Stigma towards Burnout consists of colleagues' stigma towards burnout and personal stigma towards burnout. The dimensions and corresponding subfactors are measured with specific items that are rated on a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). Illustrative items for each dimension include respectively: "My professional life often invades my private life"; "Having the role of doctor could become a barrier if I should ever have to adopt the role of patient"; "Physicians who experience burnout are often judged as being weak by their colleagues". Composite scores for each dimension are calculated by averaging the corresponding items, with higher scores indicating greater endorsement of the respective cultural norm. An overall HDMC global score is computed as the mean of the scores on each dimension, reflecting the participant's general tendency to internalize or endorse harmful cultural norms.

2.2 Study population

The participants were French-speaking physicians in current clinical practice, encompassing general practitioners (GPs), specialist physicians (all specialties), and medical residents (postgraduates in training to become GPs or specialists). To construct a convenience sample representative of the broad physician population, we used several approaches to encourage participation. First, the survey was disseminated on social media networks and via word of mouth. Leading medical organizations in Belgium, general medicine organizations and physicians' magazines relayed the survey, with some additional recruitment in France. Deans of medical faculties at French-speaking universities in Belgium shared the survey via

their mailing lists for residents and academic physicians at their respective university hospitals. Medical directorates and councils of hospitals shared the survey among their physicians. Participation was voluntary and without financial incentive.

2.3 Statistical analyses

All statistical analyses aimed to identify potential patterns in the endorsement of the HDMC across physician subgroups. Following initial data cleaning, descriptive statistics were computed for all variables, and the internal consistency of each HDMC scale and sub-dimension was assessed using Cronbach's alpha. Missing data were handled through listwise deletion.

Age and weekly working hours were recoded into meaningful categories for the purpose of group comparisons, following similar literature (Tawfik et al., 2021; Trockel et al., 2021): age was categorized as < 35 years old, between 35 and 44 years old, between 45 and 54 years old, between 55 and 64 years old, and ≥ 65 years old; weekly working hours were categorized as < 30 hours, between 30 and 39 hours, between 40 and 50 hours, and > 50 hours.

To explore group differences in HDMC endorsement across physician characteristics (e.g. age categories, gender, relationship status, parental status, physician status, specialty, and weekly working hours categories), we used independent samples t-tests or one-way ANOVAs as appropriate. Prior to conducting these inferential tests, we verified the relevant assumptions. The distribution of HDMC variables was assessed through visual inspection of histograms and Q-Q plots. Homogeneity of variance was examined using Levene's test. When Levene's test indicated a violation of the homogeneity of variance assumption, we reported the adjusted test statistics and corresponding p-values (Welch's ANOVA), as appropriate. Independence of observations was assumed by design. To assess the robustness of findings, non-parametric equivalents (Mann-Whitney U and Kruskal-Wallis tests) were also conducted. As results were consistent with those of parametric tests, only the latter are reported for clarity and statistical power.

Post-hoc comparisons were performed using Bonferroni correction to adjust for multiple testing where relevant (see Table 2 of the appendix). Complementary exploratory analyses were also conducted on the HDMC sub-dimensions (see Table 3 of the appendix) and other characteristics of the physicians (e.g. working context - see Table 4 to 7 of the appendix). Due to unequal representation across specialty groups (see Table 1), no inferential statistics were conducted for this variable. However, descriptive statistics on HDMC endorsement by medical specialty are

available in Table 8 of the appendix for the interested reader.

Second, to address potential confounding effects and shared variance among physician characteristics, multiple linear regression analyses were performed. Separate models were constructed for each HDMC and for the total HDMC score. Predictor variables were entered simultaneously using the enter method and were dummy coded to facilitate the analysis of categorical differences. This allowed us to examine whether observed group differences held when controlling for the influence of other characteristics. To maintain model parsimony and limit the risk of multicollinearity, the continuous variables age and weekly working hours were dichotomized into binary categories. Regression assumptions (including independence of errors, multicollinearity, casewise diagnostics, homoscedasticity and normality of residuals) were verified following Field's guidelines for regressions (Field, 2009), as described in the Additional file 9. For all analyses, statistical significance was set at $p < .05$. Analyses were conducted using IBM SPSS Statistics version 28.0 (IBM Corp., 2021).

3. Results

3.1 Participants

A total of 1002 physicians participated to the survey. A description of the sample is provided in Table 1. Participants represented a range of ages (with a majority under 35 years old, 39.7%) and were predominantly female (64.6%). The sample included attending general practitioners (27.7%), attending specialists (45.6%), and medical residents (24.9%). Most physicians worked over 40 hours per week (84.4%) and practiced primarily in hospital (specialists) or multidisciplinary settings (general practitioners). Specialists covered a broad spectrum of disciplines, with internal medicine, acute medicine, anaesthesiology, and paediatrics being the most represented.

Table 1. Sociodemographic and work-related characteristics of the sample.

Sociodemographic and work-related characteristics[a]	No. (%)
Age category	
< 35 years old	398 (39.7)
Between 35 and 44 years old	216 (21.6)
Between 45 and 54 years old	183 (18.3)
Between 55 and 64 years old	130 (13.0)
≥ 65 years old	45 (4.5)
Missing	30 (3.0)
Gender	
Female	547 (64.6)
Male	347 (34.6)

Missing	6 (0.6)
Other	2 (0.2)
Relationship status	
In a relationship	825 (82.3)
Single	175 (17.5)
Missing	2 (0.2)
Parental status	
No	415 (41.4)
Yes	582 (58.1)
Missing	5 (0.5)
Physician (career) status	
Attending specialist	457 (45.6)
Attending general practitioner	278 (27.7)
Resident specialist	188 (18.8)
Resident general practitioner	61 (6.1)
Occupational medicine / Insurance physician / School physician / Medical consultants	15 (1.5)
Missing	3 (0.3)
Work setting of the (resident) specialist (N = 645)	
Hospital setting only	560 (86.6)
Both hospital setting and private consultation	60 (9.3)
Private consultation only	13 (2.0)
Missing	12 (1.9)
Specialty of the (resident) specialist (N = 645)	
Internal medicine	173 (27.4)
Surgery	66 (10.5)
Acute medicine	70 (11.1)
Clinical pathology	18 (2.9)
Anaesthesiology	60 (9.5)
Dermatology	13 (2.1)
Gynaecology and obstetrical	25 (3.4)
Nuclear medicine	8 (1.3)
Physical medicine	15 (2.4)
Paediatrics and neonatology	54 (8.6)
Ophthalmology	10 (1.6)
Otolaryngology	18 (2.9)
Psychiatry	36 (5.7)
Radiology	14 (2.2)
Palliative care	2 (0.3)
Neurology	39 (6.2)
Radiotherapy - oncology	5 (0.8)
Other[b]	5 (0.8)
Missing	18 (2.8)
Type of practice[c] of the (resident) generalist (N = 339)	
General medicine (consultations and home visits)	327 (96.5)
Other institution (e.g. family planning center, nursing home)	52 (15.3)
Hospital setting	14 (4.1)

Non-conventional medicine	11 (3.2)
Work setting[c] of the (resident) generalist (N = 339)	
Multidisciplinary group	150 (44.2)
Monodisciplinary group	107 (31.6)
Works alone	90 (26.5)
Weekly working hours category	
< 30 hours	34 (3.4)
Between 30 and 39 hours	121 (12.1)
Between 40 and 50 hours	452 (45.1)
> 50 hours	394 (39.3)
Missing	1 (0.1)

Note. N = 1002. No = Number. [a] Data were missing for some characteristics. [b] Includes hospital hygiene, medical information, orthodontics, legal medicine. [c] Multiple responses were possible

3.2 Descriptive statistics on the HDMC

Descriptive statistics for the Harmful Dimensions of Medical Culture (HDMC) global score and its three dimensions across the sample are presented in Table 2. Internal consistency for the dimensions ranged from acceptable to very good (α = 0.62 - 0.87). The mean scores and standard deviation (SD) indicate a strong endorsement of the HDMC among the overall sample of physicians. Descriptive statistics on the sub-factors of the HDMC are provided in the Additional file 1.

Table 2. Descriptive statistics on the HDMC.

HDMC	# of items	Mean	SD	α
Physician's Professional Commitment	11	3.68	0.64	0.85
The Myth of the Invulnerable Physician	6	3.64	0.75	0.77
Physician Stigma towards Burnout	4	2.56	0.78	0.62
HDMC global score	21	3.43	0.50	0.85

Note. N = 1002. SD = standard deviation. Internal consistency measured by Cronbach's alpha (α).

3.3 Group comparisons

Independent samples t-tests and one-way ANOVA analyses indicated significant differences in HDMC endorsement based on several physician characteristics (see Table 3). Figures 1 and 2 of the appendix present the mean plots associated to the one-way ANOVAs for age and working hours categories.

Table 3. HDMC depending on the physicians' characteristics.

	N	Commitment (Mean, SD)	t (p) or F (p)	Myth (Mean, SD)	t (p) or F (p)	Stigma Burnout (Mean, SD)	t (p) or F (p)	HDMC (Mean, SD)	t (p) or F (p)
Age category			F = 1.03, p = 0.391		F = 30.17, p <0.001***		F = 10.74, p <0.001***		F = 5.52, P < 0.001***
< 35 years old	398	3.67 ± 0.65		3.85 ± 0.64		2.73 ± 0.75		3.51 ± 0.49	
35 - 44 years old	216	3.66 ± 0.65		3.70 ± 0.74		2.56 ± 0.80		3.21 ± 0.53	
45 - 54 years old	183	3.69 ± 0.61		3.59 ± 0.72		2.37 ± 0.74		3.44 ± 0.53	
55 - 64 years old	130	3.75 ± 0.60		3.24 ± 0.84		2.37 ± 0.73		3.41 ± 0.47	
≥ 65 years old	45	3.53 ± 0.66		2.97 ± 0.74		2.37 ± 0.78		3.35 ± 0.50	
Gender									
Male	347	3.64 ± 0.66	t = -1.34, p = 0.180	3.38 ± 0.81	t = -7.95, p < 0.001***	2.52 ± 0.77	t = -1.28, p = 0.202	3.34 ± 0.53	t = -4.43, p < 0.001***
Female	647	3.70 ± 0.62		3.79 ± 0.68		2.58 ± 0.78		3.49 ± 0.48	
Relationship status									
Single	175	3.66 ± 0.67	t = -0.24, p = 0.808	3.61 ± 0.80	t = -0.68, p = 0.498	2.52 ± 0.78	t = 0.70, p = 0.486	3.42 ± 0.52	t = -0.39, p = 0.700
In relationship	825	3.68 ± 0.63		3.65 ± 0.75		2.56 ± 0.78		3.44 ± 0.50	
Parental status (children to care for)									
Yes	582	3.66 ± 0.62	t = -0.98, p = 0.328	3.52 ± 0.79	t = -6.49, p < 0.001***	2.48 ± 9.78	t = -3.89, p < 0.001***	3.39 ± 0.51	t = -3.74, p < 0.001***
No	415	3.70 ± 0.66		3.82 ± 0.66		2.67 ± 0.77		3.51 ± 0.49	
Type of physician									
GP	339	3.48 ± 0.68	t = -6.97, p < 0.001***	3.60 ± 0.78	t = -1.49, p = 0.135	2.50 ± 0.78	t = -1.95, p = 0.051	3.31 ± 0.51	t = -5.86, p < 0.001***
Specialist	646	3.78 ± 0.59		3.67 ± 0.74		2.60 ± 0.77		3.51 ± 0.48	
Physician (career) status									
Attending	736	3.67 ± 0.64	t = -0.76, p = 0.448	3.57 ± 0.78	t = -6.48, p < 0.001***	2.50 ± 0.77	t = -4.26, p <0.001	3.41 ± 0.50	t = -3.08, p = 0.002**
Resident	249	3.71 ± 0.64		3.88 ± 0.61		2.74 ± 0.77		3.53 ± 0.49	
Weekly working hours category			F = 38.66, p <0.001***		F = 3.07, p = 0.027*		F = 4.62, p = 0.003**		F = 22.33, p < 0.001***
< 30 hours	34	3.33 ± 0.67		3.46 ± 0.76		2.31 ± 0.72		3.20 ± 0.57	
30 - 39 hours	121	3.35 ± 0.56		3.49 ± 0.73		2.50 ± 0.78		3.23 ± 0.45	
40 - 50 hours	452	3.39 ± 0.66		3.66 ± 0.76		2.50 ± 0.78		3.39 ± 0.51	
> 50 hours	394	3.91 ± 0.54		3.69 ± 0.74		2.66 ± 0.77		3.58 ± 0.47	

Note. Depending on the number of categories compared, either independent samples *t*-tests or one-way ANOVAs were conducted. Reported values indicate the test statistic (t or F) followed by the corresponding *p*-value. *Significant at p<0.05. ** Significant at p<0.01 level. *** Significant at p<0.001 level. All *p*-values are two-sided.

3.3.1 Gender

Two participants identified their gender as other. Given the extremely small sample size, they were excluded from group comparisons for statistical validity. Female physicians reported significantly higher scores than their male counterparts for the Myth of the Invulnerable Physician and the HDMC global score. No significant differences were observed for Physician's Professional Commitment or Stigma towards Burnout.

3.3.2 Age category

There were significant age-related differences in the endorsement of the Myth of the Invulnerable Physician, Stigma towards Burnout and the HDMC global score. Post-hoc analyses revealed that physicians under 35 years endorsed these cultural norms significantly more than those aged 55 or older. The largest effects were observed between the youngest (< 35) and oldest (> 65) age groups for the Myth of the Invulnerable Physician. No significant differences were found for Physician's Professional Commitment. Full post-hoc results are available in the Table 2 of the appendix.

3.3.3 Relationship status

There were no significant differences in scores based on relationship status (single vs. in a relationship) across any of the dimensions or the global HDMC score.

3.3.4 Parental status

Physicians without children showed significantly higher scores on the Myth of the Invulnerable Physician, Stigma towards Burnout and the HDMC global score. No significant group differences were found for Physician's Professional Commitment.

3.3.5 Type of physician

Specialist physicians reported significantly higher Professional Commitment scores and HDMC global scores than general practitioners, but there were no differences in the other dimensions.

3.3.6 Career status

Residents showed significantly higher scores than attending physicians on the

Myth of the Invulnerable Physician, on Stigma towards Burnout and on the HDMC global score. No significant differences were observed on Commitment.

3.3.7 Weekly working hours

Significant group differences were found based on weekly working hours for Professional Commitment, the Myth of the Invulnerable Physician, Stigma towards Burnout, and the HDMC global score. Post-hoc comparisons indicated that physicians working more than 50 hours per week consistently reported higher scores. For example, the mean difference in Professional Commitment between those working between 30 and 39 hours per week and more than 50 hours per week was -0.56 ($p < 0.001$). Full post-hoc results are presented in the appendix.

3.4 Hierarchical regressions

Results of the multiple linear regressions are presented in Table 4.

3.4.1 Physicians' Professional Commitment

The regression model examining predictors of Physicians' Professional Commitment was statistically significant, accounting for 11.4% of the variance in scores. Among the sociodemographic and professional characteristics, gender, specialty, and working hours per week emerged as significant predictors. Female physicians reported higher Professional Commitment scores than males. Physicians specializing in fields other than general practice endorsed this dimension more strongly than general practitioners. Additionally, working more than 50 hours per week was strongly associated with increased endorsement of Professional Commitment. Other factors, including age, relationship status, parental status, and physician status, were not significant in the model.

3.4.2 Myth of the Invulnerable Physician

The model predicting endorsement of the Myth of the Invulnerable Physician was also statistically significant with an adjusted R^2 of 0.12. Younger physicians (< 45 years) reported significantly higher scores compared to their older counterparts. Gender was another significant factor, with female physicians more likely to endorse this norm than males. Other predictors, including parental and relationship status, physician status, specialty, and weekly working hours, did not contribute significantly to the model.

Table 4. Multiple linear regressions of the associations between the sociodemographic and professional variables and the HDMC.

Dependent variable	**Physician's Professional Commitment**		**The Myth of the Invulnerable Physician**		**Physician Stigma towards Burnout**		**HDMC score**	
Predictors[a]	**Coefficient (SE)**	***p***	**Coefficient (SE)**	***p***	**Coefficient (SE)**	***p***	**Coefficient (SE)**	***p***
Constant	3.33 (0.08)	<0.001	3.41 (0.09)	<0.001	2.51 (0.10)	<0.001	3.20	<0.001
Age	0.04 (0.05)	0.461	-0.30 (0.06)	<0.001	-0.26 (0.06)	<0.001	-0.07	0.060
Gender	0.13 (0.04)	0.003	0.34 (0.05)	<0.001	0.03 (0.06)	0.591	0.17	<0.001
Relationship status	0.05 (0.05)	0.356	0.11 (0.06)	0.085	0.04 (0.07)	0.613	0.05	0.239
Parental status	-0.09 (0.06)	0.177	-0.10 (0.07)	0.130	-0.02 (0.07)	0.737	-0.08	0.058
Specialty	0.22 (0.04)	<0.001	0.09 (0.05)	0.088	0.07 (0.06)	0.217	0.15	<0.001
Physician status	-0.11 (0.06)	0.071	0.02 (0.07)	0.729	0.06 (0.08)	0.466	-0.06	0.180
Hours worked per week	0.34 (0.04)	<0.001	0.09 (0.05)	0.098	0.15 (0.06)	0.008	0.20	<0.001
Model fitting (F)	F (7, 940) = 17.22, p <.001		F (7, 940) = 19.42, p <.001		F (7, 940) = 6.58, p <.001		F (7, 940) = 14.92, p <.001	
R^2	0.114		0.127		0.047		0.101	
$R^2_{adjusted}$	0.108		0.121		0.040		0.094	

Note.[a] The reference categories (coded 0) for each predictor are the following: age (under 45 years old referent), gender (male referent), relationship status (single referent), parental status (having no children referent), specialty (general medicine referent), physician status (attending referent), working hours estimated per week (< 50 hours worked per week referent). Coefficients are the unstandardized betas as predictor variables are dummy coded. SE = standard error. Missing values were excluded listwise.

3.4.3 Stigma towards Burnout

The regression model for Stigma towards Burnout reached statistical significance, although it explained a modest proportion of variance (adjusted R^2 = 0.04). Younger age was a significant predictor, with physicians under 45 years reporting higher stigma scores. Weekly working hours were also associated with stigma levels, with those working more than 50 hours per week endorsing greater stigma. Other variables, including gender, relationship status, parental status, physician status, and specialty, did not emerge as significant predictors.

3.4.4 HDMC global score

The final regression model predicting the overall HDMC score was significant with an adjusted R^2 of 0.09. Higher endorsement of harmful cultural norms was independently associated with being female, working more than 50 hours per week, and being in a specialty other than general practice. Age showed a marginal inverse association, with younger physicians tending to report higher HDMC scores, though not statistically significant. Relationship status, parental status, and physician career stage were not significant predictors in the multivariate model.

4. Discussion

4.1 Summary of key findings and interpretation

This study explored whether physicians' endorsement of Harmful Dimensions of Medical Culture (HDMC), including Physicians' Professional Commitment, the Myth of the Invulnerable Physician, and Stigma towards Burnout varies according to key demographic and professional characteristics. Univariate analyses suggested that the endorsement levels varied by gender, age, parental status, specialty, physician status, and working hours, depending on the specific HDMC dimension. Multivariate regression analyses further identified independent associations with age, gender, specialty, and workload.

Given the number of variables, we choose to structure the discussion around the key findings that emerged from the data. While other associations were identified, their effect sizes were modest and are therefore not addressed in detail here.

Central to this study is the finding that **HDMC are not uniformly endorsed across the physician population**. This challenges the notion of a monolithic medical culture and supports the hypothesis that physicians relate to specific norms in diverse ways, shaped by both individual characteristics and professional socialization. We now turn to central key patterns that emerged from the data.

A first key finding is that **younger physicians show greater vulnerability to endorsing the HDMC**, particularly the Myth of the Invulnerable Physician and Stigma towards Burnout. Age remained a significant predictor of these two dimensions in multivariate analyses, with some of the strongest coefficients observed in the regression. This result may reflect the strong influence of professional socialization during the early stages of medical training and career in shaping physicians' internalization of professional norms. During this period, early career physicians are faced with unique challenges (Castillo et al., 2020) and identity development and cultural absorption are central (Cleland & Johnston, 2012; De Lasson et al., 2016; Gordon et al., 2012).

The higher scores on the Myth among younger physicians suggest that, despite generational shifts toward greater openness about mental health and a rejection of the perceived need to appear invulnerable (Gerada, 2022; Gerada & Al-Naijar, 2020), younger physicians seem to remain exposed to a powerful enculturation process in medicine. Role modelling, the hidden curriculum, and unspoken expectations of resilience and sacrifice (Castillo et al., 2020; Lam et al., 2025; Louie et al., 2007) may compel early-career physicians to internalize those norms they might otherwise challenge. The stigma around burnout - often seen as incompatible with the physician role - can be especially strong for those seeking legitimacy within the profession (Dyrbye et al., 2021). Older physicians may have re-evaluated these norms over time or express distress less readily (Peisah et al., 2009), while younger colleagues face a tension between endorsing cultural change and conforming to enduring expectations (Humphries et al., 2018; Jovic et al., 2006). No age-related differences were observed for Physicians' Professional Commitment, i.e. this dimension appears to be consistently endorsed across age groups. This indicates that young physicians rapidly internalize ideals of dedication and self-sacrifice, shaped early in training by both the structural demands of medical work and the implicit messages of the hidden curriculum (Cleland & Johnston, 2012; Gaufberg et al., 2010; Mitra et al., 2022). Such norms may persist across the career span, particularly in professional environments that continue to reward and expect unwavering commitment.

A second key finding is that **female physicians tend to endorse the HDMC more strongly than their male counterparts**, even after adjusting for relevant factors. They reported significantly higher scores on the Myth of the Invulnerable Physician and the HDMC global score in univariate analyses, with gender being a significant predictor of both these aspects, but also of Physicians' Professional Commitment in multivariate models. Specifically, this suggests that some gender effects regarding Professional Commitment may have been masked in univariate

comparisons due to confounding variables such as age, workload, or career status. This is likely due to the uneven distribution of these variables across gender in our sample.

Female physicians face an intensified pressure to conform to a professional culture shaped by historically male-coded norms (Lemire, 2020; Wainwright et al., 2017). The higher endorsement of Physicians' Professional Commitment among female physicians, while controlling for covariates, is consistent with literature highlighting the dual demands many female physicians navigate, as they must balance professional expectations with disproportionate caregiving responsibilities both in the domestic sphere, where they often shoulder the majority of family care duties, and in their professional roles, which frequently involve relational and emotional labour not equally distributed among peers (Jolly et al., 2014; Roter et al., 2002; Tawfik et al., 2024; Walsh, 2013). Even as the profession becomes more feminized and striving towards more balance, the cultural ideal of the self-sacrificing physician remains deeply embedded (LaDonna et al., 2022; Phillips, 2009). Within a medical culture that expects constant availability and work priority (Cruess et al., 2015; Hafferty, 2008), female physicians may feel compelled to demonstrate heightened commitment to counter implicit biases questioning their dedication to the profession (Stucky, 2020; Winkel et al., 2021).

Female physicians' higher endorsement of the Myth of the Invulnerable Physician is equally telling. Although in society, women are socialized to express emotional vulnerability more readily than men (Prentice & Carranza, 2002), the medical culture's strong expectation of stoicism applies across gender and may prevent both men and women from using emotional expression as a valuable coping mechanism. For women in medicine, however, the need to appear resilient may be further reinforced by their generally higher levels of imposter phenomenon and lower self-valuation (Shanafelt, Dyrbye, et al., 2022; Trockel et al., 2021) which interact with perceived high standards of professionalism in the field (Crowe & Brugha, 2018; Humphries et al., 2018).

Third, differences in HDMC endorsement were observed between general practitioners and specialists, with specialists reporting significantly higher scores particularly on Physicians' Professional Commitment and the overall HDMC score. This suggests that distinct subcultures may exist within different specialties, likely shaped by the specific demands, training environments, and historical norms associated with each field (Danielsson et al., 2018; Zaman et al., 2022). For example, hospital-based specialties such as surgery are characterized by cultures that valorise overwork, high personal sacrifice, and endurance (Gerada & Al-Naijar, 2020). In contrast, general practice typically involves shorter training, greater autonomy, and

more regular hours (Gerada, 2020a), likely resulting in lower perceived expectations around self-sacrifice and devotion. Additional factors such as competitiveness, status, and performance pressure in certain specialties may further reinforce harmful cultural expectations (Gerada & Al-Naijar, 2020; Pearl, 2021).

Last, **working hours per week emerged as a consistent and strong predictor of HDMC endorsement** across both univariate and multivariate analyses. Physicians working longer hours reported higher scores on all three HDMC dimensions. This association between HDMC scores and long working hours probably reflects the influence of two interrelated dynamics: on the one hand, structural pressures within healthcare institutions that demand excessive work, and on the other, physicians' internalization of self-sacrifice as a professional norm (and defining feature of Physicians' Professional Commitment). Historically, long working hours have been considered as markers of vocation and dedication in medicine (Gerada & Al-Naijar, 2020; M. Henderson et al., 2012; Jovic et al., 2006; LaDonna et al., 2022). Today, this is still reinforced by both medical training and institutional structures that valorise overwork and undermine efforts to establish healthy boundaries (Gerada, 2022; LaDonna et al., 2022). This structural overwork also resonates with medical culture and in particular the Myth of the Invulnerable Physician. From early training onward, physicians are expected to endure without showing vulnerability, reinforcing a perceived incompatibility between their professional role and acknowledging personal limits (Miller & McGowen, 2000; Shanafelt et al., 2019). Overwork normalizes the deferral of self-care and discourages expressions of weakness, further embedding stoicism in the culture of medicine (Trockel, 2019; Wessely & Gerada, 2013). In addition, long working hours contribute to stigma by creating practical barriers to seeking help (i.e. time constraints) and therefore rendering access to mental health support difficult. This reinforces the belief that experiencing burnout undermines professional legitimacy (Clough, March, et al., 2019; Garelick, 2012; Shanafelt, Dyrbye, et al., 2022) with, in our results, a marked increase observed in HDMC scores among physicians working more than 50 hours per week.

Taken together, the findings of the current study suggest that the endorsement of harmful dimensions of medical culture varies meaningfully across subgroups, with younger age, female gender, specialist practice and longer working hours associated with greater internalization of professional norms that emphasize self-sacrifice, invulnerability, and stigma towards burnout. Notably, these patterns align with physician characteristics previously associated with higher physician burnout risk in the literature, including younger age, female sex, hospital-based specialties, and excessive workload (Amoafo et al., 2015; Azam et al., 2017; C. P. West et al.,

2018; Zhou et al., 2020). This overlap suggests that harmful cultural norms may act as a mediating mechanism contributing to vulnerabilities to burnout and associated distress. Interestingly, unlike sociodemographic and professional characteristics such as age, gender, or specialty - which may predispose physicians to internalize certain cultural norms – long working hours likely function both as a consequence and a perpetuating factor of medical cultural values.

4.2 Theoretical and practical implications

The findings of this study contribute to a more nuanced understanding of how medical culture is internalized across different groups of physicians and highlight that medical culture is not experienced in the same way by all physicians.

This has important implications for both theory and practice.

Theoretically, this study suggests that physicians' internalization of professional norms varies depending on both individual and professional circumstances. Given the strong associations between the endorsement of the harmful norms of the medical culture and physician burnout (Banse et al., 2025a) as well as depressive symptoms and certain maladaptive health behaviours (Banse et al., 2025b), the observed differences in endorsement across subgroups may help explain why specific physician profiles (e.g. younger, female physicians, or those working long hours) are frequently identified in the literature as vulnerable to burnout (Amoafo et al., 2015; Azam et al., 2017; C. P. West et al., 2018; Zhou et al., 2020), suboptimal self-care (Oreskovich et al., 2015; Wijeratne et al., 2021), and mental health difficulties, including suicidality (Guille & Sen, 2024; Harvey et al., 2021).

From a practical standpoint, the observed differences in the endorsement of harmful medical culture norms (HDMC) across physician subgroups highlight the need for well-being interventions that are sensitive to the diverse personal and professional contexts of physicians. Given the established links between HDMC and physician distress (Banse et al., 2025a, 2025b), such interventions should be tailored to address the distinct challenges faced by different subgroups, both during training and in clinical practice (Dyrbye & Shanafelt, 2016; Panagioti et al., 2018; Panagioti, Panagopoulou, Bower, et al., 2017). Efforts to promote healthier norms (such as modelling vulnerability, setting boundaries, and openly discussing burnout (Brower, 2021; A. Martin, 2022b, 2022a; Montgomery et al., 2019) should be adapted to the specific realities of different physician groups. For example, early-career physicians or those in high-intensity specialties may benefit from distinct strategies compared to late-career or general practice colleagues (Castillo et al., 2020). Cultural norms

are often absorbed during early socialization, particularly during training (Cleland & Johnston, 2012; De Lasson et al., 2016; Gordon et al., 2012), suggesting that interventions at this stage could be crucial. For instance, early exposure during medical training to the testimonies of physicians who have experienced burnout or related distress may serve as a powerful pedagogical tool to challenge the idealized notions of invulnerability in medicine (A. Martin, 2022b, 2022a). Similarly, female physicians face unique challenges in medicine that need to be considered when designing such interventions (J. Walsh, 2013). Finally, the findings underline the importance of considering culture as an evolving set of norms that interact with structural conditions. Structural stressors such as long working hours may reinforce certain cultural expectations (e.g. stoicism, self-sacrifice), and vice versa (Shanafelt et al., 2019). Improving physician well-being, therefore, calls for attention to the structural environments and organizations physicians navigate, not only at the institutional level, but also within specialty-specific and career-stage contexts. To conclude, and as noted by Castillo and colleagues, when it comes to well-being and burnout interventions in medicine, "one size does not fit all" (Castillo et al., 2020).

4.3 Limitations and future directions

Several limitations should be acknowledged. First, the cross-sectional design of this study limits the ability to draw causal inferences. While associations between physician characteristics and endorsement of cultural norms are evident, potential bidirectional influences with some of the characteristics (e.g. working hours, as discussed earlier) remain unclear. Second, the use of convenience sampling may restrict generalizability. Third, the focus on Belgian (Western, Northern) physicians may introduce particularities that could limit the applicability of findings to other contexts. Replication in other contexts, particularly Eastern and Southern contexts is needed. Fourth, other variables should be considered. It is plausible that the HDMC are not internalized in a uniform way within each demographic or professional subgroup (e.g. not all female physicians or younger physicians endorse them to the same extent). Incorporating psychological variables such as self-valuation (Trockel et al., 2021), imposter phenomenon (Shanafelt, Dyrbye, et al., 2022), or other individual traits (variables that were not examined in this study) could refine the prediction of HDMC endorsement and, indirectly, risks to physician health.

Longitudinal studies are needed to examine how the HDMC endorsement develops and potentially changes across stages of medical education and professional life. Such designs would help further clarify whether internalization of harmful norms increases, stabilizes, or declines with experience. Additionally, intervention research is essential to evaluate strategies that can mitigate the uptake

of these norms, particularly during training periods. Future research should also explore creative avenues to change medical culture in ways that (re)concile physicians' well-being and health with their professional commitment and patient care. Such research would be especially valuable in identifying effective systemic changes to support physician health.

5. Conclusion

This study demonstrates that harmful dimensions of medical culture are not uniformly internalized across physicians but vary meaningfully according to demographic and professional characteristics. Younger physicians, female physicians, specialists, and physicians with long working hours all reported stronger endorsement of norms emphasizing self-sacrifice, invulnerability, and stigma towards burnout in medicine. These findings highlight the need to acknowledge that medical cultural norms are not experienced uniformly but are shaped by multiple variables, including physicians' demographics and professional contexts. Addressing the cultural underpinnings of these norms may be an important step towards fostering healthier professional environments and supporting a more sustainable medical workforce.

6. Appendix to chapter 6

6.1 Figures

Figure 1. HDMC mean plots depending on age categories

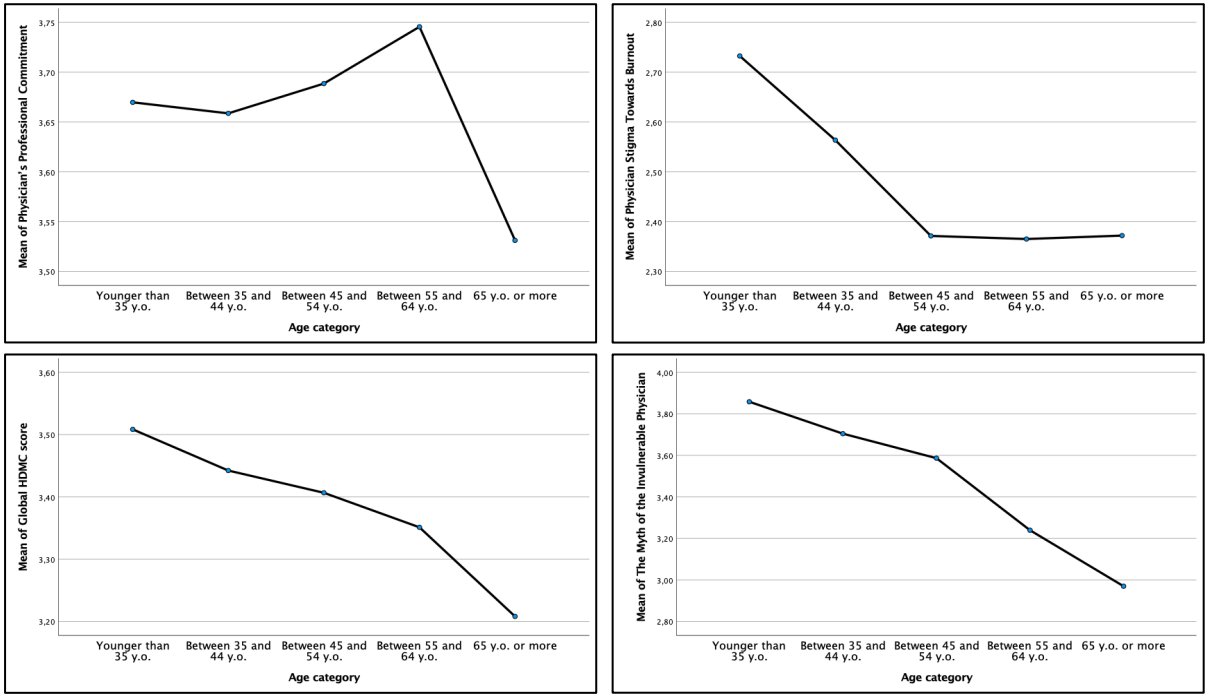
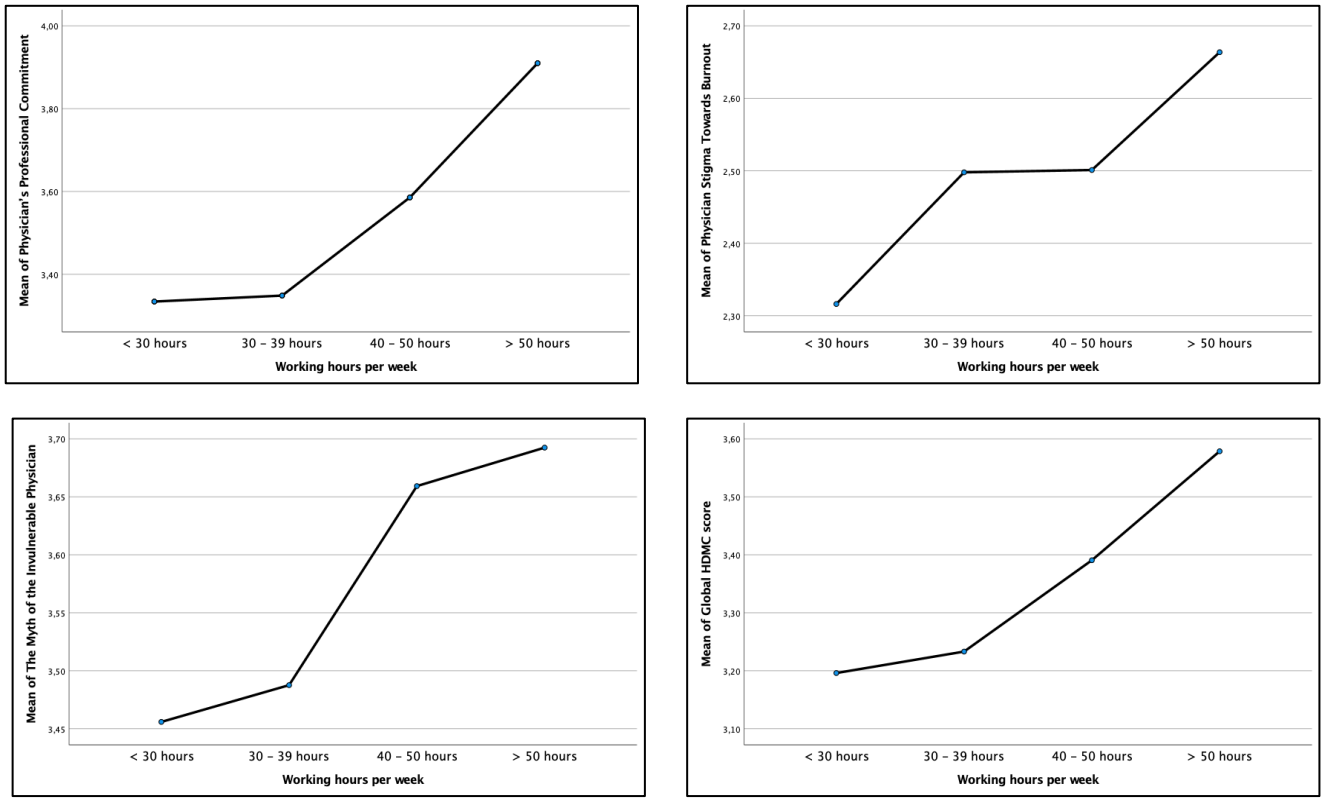


Figure 2. HDMC mean plots depending on weekly working hours categories



6.2. Tables

Table 1. Descriptive statistics on the Harmful Dimensions of the Medical Culture (HDMC).

HDMC	Related sub-factors	# of items	Mean	SD	α
Physician's Professional Commitment		11	3.68	0.64	0.85
	Work Priority Strain	4	3.90	0.82	0.87
	Physician's Central Identity Role	4	3.04	0.84	0.78
	Self-Sacrificing Nature of Medical Practice	3	4.22	0.78	0.86
Myth of the Invulnerable Physician		6	3.64	0.75	0.77
	Physician's Moral Obligation to Patients and Colleagues	4	3.63	0.85	0.78
	Physician's Discomfort with Patient Role	2	3.67	1.00	0.72
Physician Stigma towards Burnout		4	2.56	0.78	0.62
	Colleagues' Stigma towards PB	2	2.84	1.14	0.84
	Personal Stigma towards PB	2	2.27	0.91	0.68
HDMC global score		21	3.43	0.50	0.85

Note. N = 1002. SD = standard deviation. Internal consistency measured by Cronbach's alpha (α).

Table 2. Post-hoc comparisons on the HDMC

HDMC	Group variable	Group comparison	Mean difference	95% CI	p-value
Physician's Professional Commitment					
	Weekly working hours				
		<30h vs 40–50h	-0.58	[-0.89; -0.26]	<0.001
		30–39h vs 40–50h	-0.24	[-0.39; -0.08]	<0.001
		30–39h vs >50h	-0.56	[-0.71; -0.41]	<0.001
		40–50h vs >50h	-0.32	[-0.43; -0.22]	<0.001
Myth of the Invulnerable Physician					
	Age category				
		<35 vs >65	0.89	[0.57; 1.20]	<0.001
		<35 vs 45–54	0.27	[0.09; 0.45]	<0.001
		<35 vs 55–64	0.62	[0.42; 0.82]	<0.001
		35–44 vs >65	0.73	[0.41; 1.06]	<0.001
		35–44 vs 55–64	0.46	[0.24; 0.69]	<0.001
		45–54 vs 55–64	0.35	[0.12; 0.58]	<0.001
		45–54 vs >65	0.62	[0.29, 0.95]	<0.001
Physician Stigma Towards Burnout					
	Age category				
		<35 vs >65	0.36	[0.02; 0.70]	0.027
		<35 vs 45–54	0.36	[0.17; 0.55]	<0.001
		<35 vs 55–64	0.37	[0.15; 0.58]	<0.001
	Weekly working hours				
		<30h vs >50h	-0.34	[-0.69; 0.00]	0.049
		40–50h vs >50h	0.16	[0.03; 0.30]	0.013
Global HDMC Score					
	Age category				
		<35 vs >65	0.30	[0.08; 0.52]	0.001
		<35 vs 55–64	0.16	[0.02; 0.30]	0.019
		35–44 vs >65	0.23	[0.00; 0.46]	0.043
	Weekly working hours				
		<30h vs >50h	-0.38	[-0.65; -0.11]	0.003
		30–39h vs 40–50h	-0.16	[-0.28; -0.04]	0.005
		30–39h vs >50h	-0.35	[-0.47; -0.22]	<0.001
		40–50h vs >50h	-0.19	[-0.27; -0.11]	<0.001

Note. p-values are Bonferroni-adjusted. Only comparisons with $p < .05$ are shown (two-sided). All pairwise comparisons refer to mean differences in HDMC dimension scores across specified categories. Significant differences are reported with exact values; others are omitted.

Table 3. Group comparisons on the HDMC sub-factors.

HDMC		Work priority strain		Central Identity Rol		Sacrif. Nature of Medical Practice		Colleag. Stigma towards BO		Personal Stigma towards BO		Moral Obligation Patients/Colleag.		Discomf. with Patient Role	
	N	(Mean, SD)	t (p) or F (p)	(Mean, SD)	t (p) or F (p)	(Mean, SD)	t (p) or F (p)	(Mean, SD)	t (p) or F (p)	(Mean, SD)	t (p) or F (p)	(Mean, SD)	t (p) or F (p)	(Mean, SD)	t (p) or F (p)
Gender															
Male	347	3.87 ± 0.83	t = - 0.93, p = 0.352	3.03 ± 0.81	t = 0.27, p = 0.790	4.15 ± 0.81	t = -2.34, p = 0.019	2.73 ± 1.06	t = -2.26, p = 0.024	2.30 ± 0.88	t = 0.57, p = 0.570	3.32 ± 0.92	t = -8.19, p < 0.001	3.50 ± 1.06	t = -4.03, p < 0.001
Fem-ale	647	3.92 ± 0.81		3.04 ± 0.86		4.27 ± 0.76		2.90 ± 1.18		2.26 ± 0.94		3.79 ± 0.76		3.77 ± 0.95	
Age categories															
< 35	398	3.86 ± 0.85	F = 1.79, p = 0.129	3.00 ± 0.89	F = 1.91, p = 0.107	4.32 ± 0.75	F = 5.55, p <0.001	3.11 ± 1.15	F = 11.52, p <0.001	2.35 ± 0.91	F = 3.08, p = 0.016	3.86 ± 0.74	F = 26.56, p < 0.001	3.85 ± 0.91	F = 12.85, p < 0.001
35 - 44	216	3.70 ± 0.87		3.14 ± 0.72		3.83 ± 0.88		2.47 ± 0.97		2.28 ± 0.88		2.96 ± 0.79		3.00 ± 1.19	
45 - 54	183	3.90 ± 0.82		3.00 ± 0.87		4.22 ± 0.77		2.78 ± 1.16		2.34 ± 0.91		3.70 ± 0.83		3.71 ± 0.98	
55 - 64	130	3.94 ± 0.77		3.03 ± 0.79		4.23 ± 0.79		2.66 ± 1.08		2.08 ± 0.92		3.58 ± 0.79		3.60 ± 1.02	
65 +	45	4.02 ± 0.79		3.21 ± 0.77		4.10 ± 0.75		2.51 ± 1.02		2.22 ± 0.93		3.19 ± 0.94		3.33 ± 1.04	
Relationship status															
Single	175	3.92 ± 0.88	t = 0.34, p = 0.734	3.02 ± 0.86	t = -0.36, p = 0.719	4.19 ± 0.89	t = -0.53, p = 0.527	2.88 ± 1.14	t = 0.54, p = 0.589	2.16 ± 0.91	t = -1.86, p = 0.064	3.59 ± 0.87	t = -0.65 , p = 0.518	3.65 ±1.06	t = -0.39, p = 0.695
Relat.	825	3.90 ± 0.81		3.04 ± 0.84		4.23 ± 0.75		2.83 ± 1.15		2.30 ± 0.91		3.64 ± 0.84		3.68 ± 0.98	
Parental status															
Yes	582	3.90 ± 0.79	t = -0.02, p = 0.986	3.04 ± 0.80	t = 0.22, p = 0.829	4.16 ± 0.78	t = -3.27, p = 0.001	2.70 ± 1.10	t = -4.81 p < 0.001	2.26 ± 0.93	t = -0.63, p = 0.531	3.51 ± 0.88	t = -5.68, p < 0.001	3.55 ± 1.04	t = -4.87, p <0.001
No	415	3.90 ± 0.86		3.03 ± 0.89		4.32 ± 0.76		3.05 ± 1.17		2.30 ± 0.90		3.81 ± 0.77		3.85 ± 0.91	
Type of physician															
GP[c]	339	3.61 ±	t = -8.11,	2.96 ±	t = -2.20,	4.00 ±	t = -6.24,	2.64 ±	t = -4.27,	2.35 ±	t = 1.99,	3.54 ±	t = -2.34,	3.70 ±	t = 0.57,

		0.87	p <0.001	0.83	p =0.028	0.90	p < 0.001	1.13	p <0.001	0.91	p = 0.047	0.87	p = 0.020	1.04	p = 0.569
Specialist	645	4.06 ± 0.74		3.08 ± 0.85		4.35 ± 0.68		2.97 ± 1.14		2.23 ± 0.92		3.68 ± 0.83		3.66 ± 0.97	
Status of physician															
Attending	736	3.88 ± 0.82	t = -2.13, p = 0.034	3.08 ± 0.82	t = 2.73, p = 0.007	4.18 ± 0.79	t = -3.67, p < 0.001	2.74 ± 1.12	t = -5.38, p <0.001	2.26 ± 0.91	t = -0.53 , p = 0.596	3.55 ± 0.87	t = -5.82, p < 0.001	3.61 ± 1.03	t = -4.30, p < 0.001
Resident	249	4.00 ± 0.80		2.91 ± 0.90		4.37 ± 0.71		3.18 ± 1.17		2.30 ± 0.93		3.87 ± 0.72		3.89 ± 0.86	
Work hours categories															
< 30	33	3.36 ± 0.92	F = 75.38, p <0.001	2.99 ± 0.88	F = 2.26, p = 0.080	3.85 ± 0.88	F = 21.26, p < 0.001	2.67 ± 1.02	F = 5.94, p < 0.001	2.00 ± 0.95	F = 2.66, p = 0.047	3.52 ± 0.84	F = 3.60, p = 0.013	3.39 ± 1.04	F = 1.16, p = 0.323
30 - 39	121	3.31 ± 0.76		2.92 ± 0.75		3.96 ± 0.81		2.58 ± 1.13		2.42 ± 0.93		3.42 ± 0.82		3.62 ± 1.01	
40 - 50	452	3.76 ± 0.83		3.00 ± 0.83		4.14 ± 0.84		2.78 ± 1.15		2.23 ±0.92		3.63 ± 0.85		3.71 ±1.03	
50 +	394	4.30 ± 0.60		3.12 ± 0.87		4.45 ± 0.60		3.01 ± 1.13		2.31 ± 0.89		3.70 ± 0.85		3.68 ± 0.95	

Note. Two-sided p-values are reported. Post-hoc comparisons were note conducted.

Table 4 . HDMC depending on the physicians' characteristics – context of work only for specialists (N = 639)

	N	Physician's Professional Commitment		F (p)	Myth of the Invulnerable Physician		F (p)	Physician Stigma towards Burnout		F (p)
		Mean	SD		Mean	SD		Mean	SD	
Working context				F = 0.63, p = 0.501			F = 1.23, p = 0.293			F = 0.89, p = 0.411
Hospital setting	560	3.80	0.59		3.67	0.75		2.60	0.77	
Private practice	13	3.66	0.55		3.92	0.59		2.69	0.66	
Both	60	3.72	0.54		3.58	0.69		2.47	0.76	

Table 5. HDMC depending on the physicians' characteristics – hospital type only for specialists working in hospital setting (N = 619)

	N	Physician's Professional Commitment		F (p)	Myth of the Invulnerable Physician		F (p)	Physician Stigma towards Burnout		F (p)
		Mean	SD		Mean	SD		Mean	SD	
Hospital type				F = 2.06, p = 0.128			F = 0.60, p = 0.550			F = 1.13, p = 0.322
Public hospital	204	3.73	0.60		3.71	0.70		2.53	0.77	
Private hospital	127	3.77	0.60		3.64	0.77		2.67	0.78	
University hospital	288	3.83	0.58		3.64	0.76		2.59	0.70	

Table 6. HDMC depending on the physicians' characteristics – work context of the GPs only (N = 339).

	N	Physician's Professional Commitment		t (p)	Myth of the Invulnerable Physician		t (p)	Physician Stigma towards Burnout		t (p)
		Mean	SD		Mean	SD		Mean	SD	
Work setting - general medicine (consultation and home visits)										
No	12	3.53	0.62	t = 0.26,	3.60	0.64	t = 0.00,	2.60	1.00	t = 0.49,
Yes	327	3.48	0.68	p = 0.793	3.60	0.78	p = 0.999	2.49	9.78	p = 0.626
Work setting - in hospital setting										
No	325	3.47	0.68	t = -0.88,	3.59	0.78	t = -0.87,	2.49	0.78	t = -0.89,
Yes	14	3.64	0.63	p = 0.380	3.77	0.58	p = 0.384	2.69	0.91	p = 0.373
Work setting - in other institutions (e.g. family planning center, nursing home, ...)										
No	287	3.47	0.67	t = -0.82,	3.58	0.80	t = -0.67,	2.47	0.78	t = -1.34,
Yes	52	3.55	0.74	p = 0.413	3.66	0.66	p = 0.502	2.63	0.81	p = 0.180
Work setting – nonconventional medicine										
No	328	3.48	0.68	t = 0.08,	3.62	0.76	t = 2.82,	2.50	0.76	t = 0.21,
Yes	11	3.46	0.79	p = 0.934	2.95	0.85	p = 0.005	2.40	1.44	p = 0.841

Table 7. HDMC depending on the physicians' characteristics – type of practice of the GPs only (N = 339).

	N	Physician's Professional Commitment		t (p)	Myth of the Invulnerable Physician		t (p)	Physician Stigma towards Burnout		t (p)
		Mean	SD		Mean	SD		Mean	SD	
Type of practice – works alone										
No	249	3.44	0.68	t = -1.97,	3.70	0.74	t = 4.09,	2.46	0.75	t = -1.20,
Yes	90	3.60	0 .66	p = 0.050	3.31	0.81	p < 0.001	2.58	0.86	p = 0.230
Type of practice – works in a monodisciplinary group										
No	232	3.45	0.70	t = -1.20,	3.51	0.79	t = -3.05,	2.51	0.80	t = 0.64,
Yes	107	3.54	0.63	p = 0.233	3.78	0.72	p = 0.002	2.46	0.74	p = 0.524
Type of practice – works in a multidisciplinary group										
No	189	3.56	0.65	t = 2.40,	3.56	0.80	t = -0.94,	2.51	0.80	t = 0.47,
Yes	150	3.38	0.71	p = 0.017	3.64	0.74	p < 0.350	2.47	0.77	p = 0.642

Table 8. HDMC depending on the physicians' characteristics – specialty only for specialists (N = 631).

	N	Physician's Professional Commitment		The Myth of the Invulnerable Physician		Physician Stigma towards Burnout	
Specialty		**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Internal medicine	173	3.84	0.56	3.71	0.73	2.58	0.78
Surgery	66	3.89	0.57	3.58	0.79	2.83	0.80
Acute medicine	70	3.71	0.53	3.50	0.81	2.63	0.83
Clinical pathology	18	3.82	0.97	3.66	0.81	2.32	0.84
Anaesthesiology	60	3.74	0.53	3.53	0.62	2.62	0.62
Dermatology	13	3.37	0.34	3.58	0.47	2.38	0.56
Gynecology and obstetrical	25	3.67	0.65	3.85	0.60	2.45	0.67
Nuclear medicine	8	3.68	0.76	3.77	0.69	2.47	0.80
Physical medicine	15	3.90	0.62	3.67	0.74	2.63	0.77
Pediatry and neonatology	54	3.73	0.55	3.78	0.53	2.50	0.80
Ophtalmology	10	4.06	0.66	3.62	0.58	2.28	0.61
Otolaryngology	18	3.65	0.53	3.84	0.79	2.43	0.60
Psychiatry	36	3.70	0.68	3.81	0.92	2.51	0.88
Radiology	14	3.74	0.42	3.49	0.96	2.71	0.73
Palliative care	2	3.59	0.96	4.50	0.47	3.13	0.53
Neurology	39	3.83	0.62	3.74	0.75	2.84	0.77
Radiotherapy - oncology	5	4.11	0.45	3.73	0.87	2.10	1.14
Other	5	4.00	1.18	3.83	1.00	2.25	1.15

6.2 Supplementary methods

We adhered to Field's guidelines for verifying the assumptions underlying regression analysis (Field, 2009). For each regression model, we conducted the following checks:

- **Independence of errors** was assessed using the Durbin–Watson statistic, ensuring values were close to 2 (acceptable range: 1–3).
- **Multicollinearity** was evaluated through Variance Inflation Factors (VIFs), confirming that all VIFs were below 4 and that the average VIF was not substantially greater than 1.
- **Casewise diagnostics** included:
  - Examination of **standardized residuals**, ensuring that no more than 5% of cases had absolute values greater than 2, and no more than approximately 1% exceeded 2.5. When these thresholds were breached, we reviewed the profiles of the relevant cases and reran the regressions excluding them. If the results remained consistent, the outliers were retained. If

results differed, we further evaluated the relevance of excluding these outliers by examining their profiles and considering additional diagnostics described below, before making a decision to retain or exclude them.
  - Identification of influential cases through **Cook's distance**, flagging those with values above 1.
  - Evaluation of **leverage**, identifying cases with values exceeding two to three times the average leverage.
  - Detection of multivariate outliers via **Mahalanobis distance**, using a threshold of 25.
- To assess **generalizability**, we examined residual plots to verify the assumptions of **homogeneity of variance** and **normality of residual distribution**.

7. Complementary analyses: unpacking the mechanisms

Building on the findings from chapters 4 and 6, we carried out additional analyses to explore whether the Harmful Dimensions of Medical Culture (HDMC) might help explain how certain physician characteristics are linked to burnout. Indeed, in Chapter 4, we found that stronger endorsement of the HDMC was independently associated with higher levels of physician burnout. Chapter 6 showed that these harmful cultural norms are not experienced uniformly across the profession. Instead, they were more strongly endorsed by younger physicians, women, specialists, and those working longer hours. As outlined in Chapter 1, the same groups are also consistently identified in the literature as being at higher risk for burnout. This overlap led us to wonder whether the HDMC might be acting as a 'missing link' between these known risk factors and burnout itself. In other words, could the internalization of harmful professional norms be one of the ways certain physicians become more vulnerable to burnout?

To test this hypothesis, we conducted mediation analyses to examine whether the endorsement of the HDMC (global score) mediates the association between these at-risk characteristics and physician burnout. Separate models were created for each demographic and professional characteristic (age, gender, relationship status, parental status, specialty, physician status and working hours). Analyses were carried out using the PROCESS macro (Hayes & Little, 2022) for SPSS (IBM Corp., 2021). Model 4 was selected with 1000 bootstrap samples, bias-corrected accelerated (BCa) 95% confidence intervals (CI) and OLS standard errors. All models controlled for both direct and indirect pathways. Mediation model assumptions were tested, including linearity, normality of residuals, multicollinearity, homoskedasticity, and influential observations. All models showed good linear fit, normally distributed residuals with only minor skewness/kurtosis deviations within acceptable limits, no highly influential observations (all DFBETAs small; Bonferroni-corrected $p > .05$), no multicollinearity (all VIFs = 1.000), and homoscedastic residuals (all Breusch–Pagan test $p > .05$).

The **Additional Table** presents the estimates for each model, including indirect, direct, and total effects. A visual representation of each model is provided in the **Additional Figure**, with each predictor depicted in its respective model (e.g. age is shown in model a; gender in model b; etc.).

Below, we report the results of the mediation models consistently with recent recommendations in the statistical literature (Hayes & Little, 2022): we report the point-estimate of the indirect effect (b = unstandardized regression coefficient) as the limits of the 95% bias-corrected accelerated bootstrap confidence interval (BCa

CI) of the indirect effect. Mediation is inferred when the 95% bias-corrected accelerated bootstrap confidence interval (BCa CI) for the indirect effect does not include zero.

- **Age** (model a). The indirect effect of age on burnout via HDMC was statistically significant (b = -0.00, 95% BCaCI [-0.00, -0.00]), indicating that HDMC endorsement explains part of the association between age and burnout. However, as the BCaCI narrowly crosses zero, any mediation effect is likely minimal in practical terms.
- **Gender** (model b). The indirect effect was statistically significant (b = 0.06, 95% BCa CI [0.03, 0.09]), suggesting that the higher burnout scores observed among female physicians could partly be explained by their higher endorsement of the HDMC.
- **Relationship status** (model c). The indirect effect was not significant (b = 0.00, 95% CI [–0.03, 0.04]), providing no evidence that HDMC endorsement explains the association between relationship status and burnout.
- **Parental status** (model d). The indirect effect was statistically significant (b = –0.05, 95% CI [–0.08, –0.03]), suggesting that having children is associated with lower HDMC endorsement, which in turn relates to reduced burnout risk.
- **Specialty** (GP vs non-GP) (model e). For specialty, a significant indirect effect was observed (b = 0.09, 95% CI [0.06, 0.13]). However, the direct effect of specialty on burnout has an opposite sign (see Additional Table 1). This suggests that the higher endorsement of the HDMC by specialist physicians could mask an otherwise protective influence of specialty on burnout.
- **Physician status** (model f). The indirect effect was significant (b = 0.05, 95% CI [0.02, 0.08]), indicating that higher HDMC endorsement could in part explain higher burnout among resident physicians.
- **Working hours** (model g). A small but significant indirect effect was found (b = 0.00, 95% CI [0.00, 0.01]), indicating that the association between working hours and increased burnout is mediated by higher endorsement of the HDMC.

Additional Table. Estimates of the indirect, direct and total effects

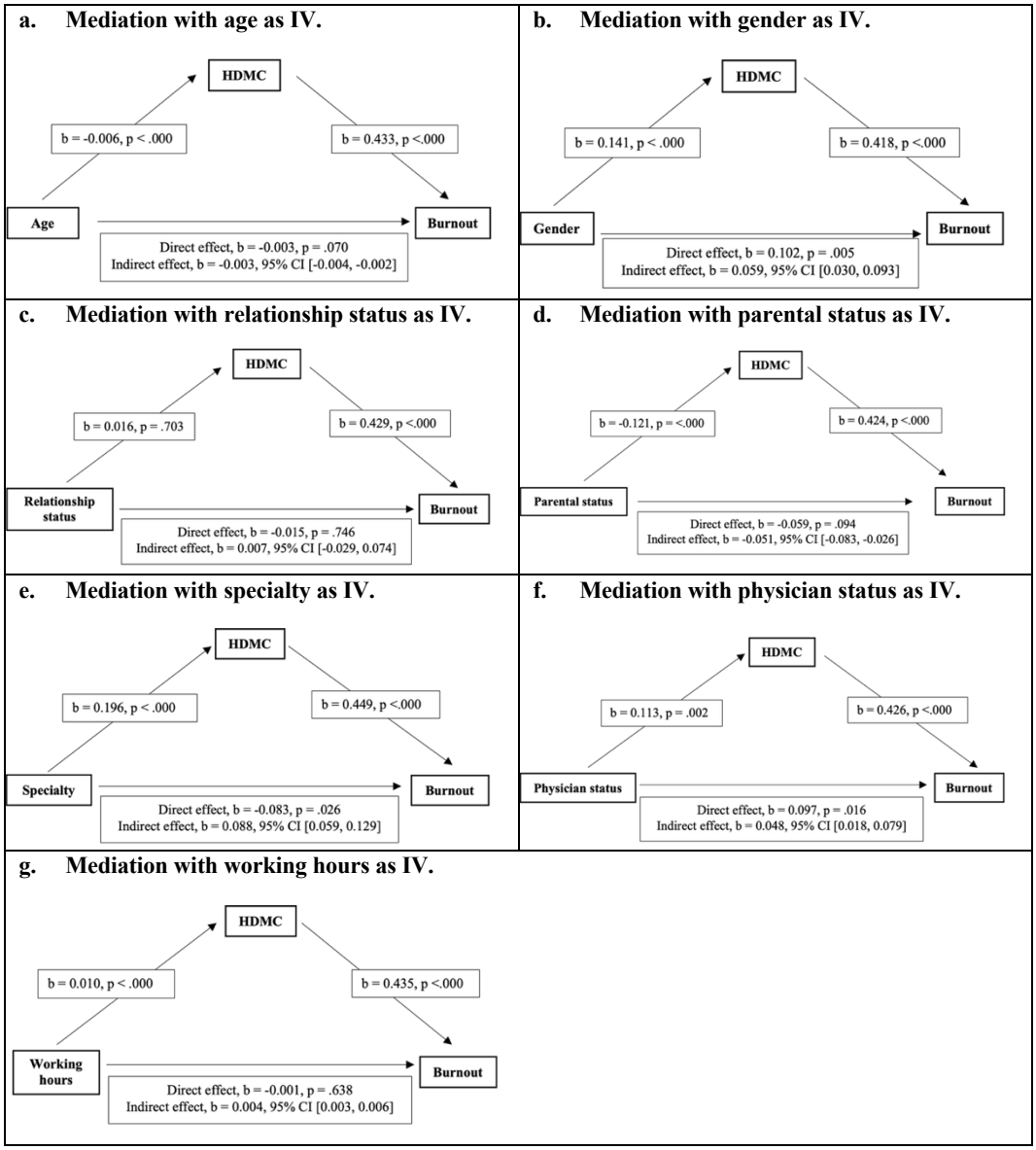
IV	Indirect effect (HDMC as MED)				Direct effect			Total effect		
	b	**Boot .SE**	**95% BCaCI [LLCI, ULCI]**	**Sig?**	***b***	**SE**	**p-value**	***b***	**SE**	**p-value**
Age	-0.00	0.00	[-0.00, -0.00]	Yes	-0.00	0.00	0.070	-0.01	0.00	<.001
Gender	0.06	0.02	[0.03, 0.09]	Yes	0.10	0.04	0.005	0.16	0.04	<.001
Relation. status	0.01	0.02	[-0.03, 0.04]	No	-0.02	0.05	0.746	-0.01	0.05	0.872
Parent. status	-0.05	0.01	[-0.08, -0.03]	Yes	-0.06	0.05	0.094	-0.11	0.04	0.003
Specialty	0.09	0.02	[0.06, 0.13]	Yes	-0.08	0.04	0.026	0.01	0.04	0.897
Physician status	0.05	0.02	[0.02, 0.08]	Yes	0.10	0.04	0.016	0.15	0.04	<.001
Working hours	0.00	0.00	[0.00, 0.01]	Yes	-0.00	0.00	0.638	0.00	0.00	0.013

Note. For all models, burnout score served as the dependent variable, and the respective physician characteristic was entered as the independent variable. The Harmful Dimensions of Medical Culture (HDMC) score was included as the mediating variable. Reference categories (coded as 0) for categorical predictors were as follows: gender (male), relationship status (single), parental status (no children), specialty (general medicine), and physician status (attending). Age, weekly working hours, burnout scores, and HDMC scores were treated as continuous variables. b = unstandardized regression coefficient; Boot.SE = bootstrapped standard error of *b*; BCaCI = bias-corrected accelerated bootstrap confidence intervals; LL = lower limit; UL = upper limit; Sig? = indicates whether the effect is statistically significant based on whether the 95% BCaCI crosses zero or not. Bootstrapping was conducted with 1000 samples.

Across the seven mediation models tested, endorsement of the HDMC significantly mediated the association between several physician characteristics and burnout. Specifically, significant indirect effects were observed for age, gender, parental status, specialty, physician status, and weekly working hours, as the 95% bias-corrected accelerated bootstrap confidence intervals for these effects did not include zero. In each of these cases, higher HDMC endorsement was associated with higher burnout, helping to explain the observed link between the characteristic and burnout. In contrast, relationship status showed no evidence of mediation, with the confidence interval for the indirect effect crossing zero. These findings suggest that harmful professional norms may be a meaningful explanatory pathway linking several known risk factors to physician burnout. However, given the cross-sectional nature of the

data, we cannot draw firm conclusions about the directionality of these effects, and the results should be interpreted with caution. Although the patterns observed suggest meaningful associations between HDMC endorsement, physician characteristics, and burnout, no causal pathways can be established at this point. Longitudinal research is needed to better understand the observed associations.

Additional Figure. Visual representation of the models of mediation.



Note. Each model depicts a separate mediation analysis in which a single characteristic predicts physician burnout, with endorsement of the HDMC global score as the mediator.

Chapter 7. « Medicine is a sacred duty»: a qualitative study of cultural expectations in medicine and the health of physicians

Physicians face elevated levels of psychological distress yet often engage in maladaptive health behaviours and underutilize mental health support. While individual and organizational risk factors are well-documented, the influence of medical professional culture, particularly from the perspective of physicians themselves, remains underexplored. This study offers an original contribution by examining how cultural norms within the medical profession shape physicians' health and self-care behaviours, and how these cultural forces interact with other levels of influence. We conducted a qualitative analysis of written responses from 224 physicians to an open-ended question within a broader online survey on physician well-being. Using an inductive thematic analysis followed by deductive mapping onto the socio-ecological model, we explored how medical culture operates in interaction with individual, interpersonal, organizational, and societal factors to influence physicians' well-being and health behaviours. Participants described a deeply internalized professional ideal that values selflessness, tirelessness, and emotional invulnerability as central to the medical culture. This ideal, instilled early in training and reinforced across the career span, significantly shapes physicians' attitudes toward vulnerability, help-seeking, and self-care. It also contributes to the normalization of silence, overwork, and, in some settings, experiences of violence. Cultural norms of endurance persist through interactions with systemic constraints, interpersonal expectations, societal demands, and individual traits. While some participants observed shifts in values, particularly across generations, such change was perceived as slow and uneven, often met with resistance. To improve physician well-being, cultural transformation must occur at multiple levels - educational, institutional, and societal. Addressing entrenched cultural norms is essential for building a medical profession that not only cares for others but also recognizes and supports the humanity and vulnerability of its own members.

Reference

Banse, E., Bayot, M., & Lenoir, A-L., (2025). *« Medicine is a sacred duty »: A qualitative study of cultural expectations in medicine and the health of physicians* [Paper submitted for publication in BMC Health Services Research]

« Medicine is a sacred duty »: a qualitative study of cultural expectations in medicine and the health of physicians

1. Introduction

1.1 Physicians' health and health behaviours

The well-being of physicians has long been a critical concern, with extensive evidence highlighting the significant distress experienced within the profession (Shanafelt, 2021; Wallace et al., 2009). Burnout, depression, and suicidal ideation are particularly prevalent among physicians, raising serious concerns about both individual and systemic health implications (Grassi et al., 2022). Burnout - a syndrome characterized by emotional exhaustion, depersonalization, and reduced personal efficacy - results from prolonged work-related stress (Maslach et al., 2001). Research indicates that burnout is pervasive across medical specialties (Dres et al., 2023; Rotenstein et al., 2018; Sexton et al., 2022; Shanafelt et al., 2016; Vandenbroeck et al., 2017) and poses a major threat to the sustainability of the medical workforce (Dyrbye & Shanafelt, 2011b). Similarly, depression is an all-encompassing mental health disorder that extends beyond the workplace and affects all aspects of physicians' lives (American Psychiatric Association, 2013). Compared to the general population and other professionals, physicians report higher rates of depression (Gerada, 2018; Outhoff, 2019) and are at greater risk of suicidal ideation (Shanafelt et al., 2021). Alarmingly, physician suicide rates are estimated to be twice that of the general population (Andrew & Brenner, 2018). The associations between burnout, depression, and suicidal ideation in physicians are well-documented (Bianchi et al., 2015a; Fox et al., 2009; Menon et al., 2020; Shanafelt et al., 2003; Shanafelt, 2011; van der Heijden et al., 2008; Wallace et al., 2009). Given the profound consequences of poor physician well-being on the sustainability of the medical workforce and the quality of patient care, physician mental health is increasingly recognized as a public health crisis.

Despite experiencing high levels of psychological distress, physicians often engage in maladaptive health behaviours, including presenteeism, substance use, self-diagnosis, self-treatment, and delay of professional medical care (Bazargan et al., 2009). Presenteeism is widespread among physicians (Aronsson, 2000) and has been associated to various negative outcomes for physicians, other staff members, and health organizations more broadly (Giæver et al., 2016; McKevitt et al., 1997; Misra-Hebert et al., 2004). Substance use is another concerning behaviour in the

profession, often accompanied by self-prescription (Dumitrascu et al., 2014; Montgomery et al., 2011). Many physicians defer seeking help, opting instead for self-diagnosis and self-treatment (Krall, 2008; Thompson et al., 2001). When physicians do seek care, they rely on informal consultations with colleagues rather than accessing formal healthcare services. Particularly concerning is the reluctance of physicians to seek mental health support, despite widespread awareness of its necessity (Elliot et al., 2010; Rosvold & Bjertness, 2002; Shanafelt et al., 2021; Tyssen et al., 2004). While physicians report a theoretical willingness to access psychological care, their actual help-seeking behaviours decline in times of distress (Shanafelt et al., 2021), suggesting unique barriers to care (Cohen et al., 2016).

Research demonstrates strong associations between psychological distress and negative personal health behaviours among physicians. However, despite the persistence of these behaviours and their associated distress, little progress has been made in mitigating these issues (Thun et al., 2014). While individual, occupational and organizational risk factors have been extensively studied (Brooks et al., 2011; Sibeoni et al., 2019; Zhou et al., 2020), an emerging body of literature suggests that these challenges may be symptomatic of the medical culture (Montgomery, 2014; Shanafelt et al., 2019).

1.2 The medical culture

Medical culture is defined as the shared set of beliefs, norms, values, and attitudes among physicians. This professional culture shapes behavioural expectations and cultivates a sense of identity within the medical profession (Schein & Schein, 2019a; Shanafelt et al., 2019). A culture defines a group, often becoming so deeply ingrained that it goes unrecognized by its members. Professional cultures, in particular, serve as powerful and often implicit forces that shape behaviours and attitudes within a specific professional field (Schein & Schein, 2019a). As with any culture, many of the central attributes of medical culture such as altruism, dedication, and commitment to excellence offer substantial benefits (Shanafelt et al., 2019). However, implicit norms and expectations may also contribute to physician distress and maladaptive health behaviours (Shanafelt et al., 2019; Shanafelt, 2021; Shanafelt, Dyrbye, et al., 2022). These norms form a hidden curriculum (G. Walsh et al., 2019) that may contradict explicit professional values, fostering cognitive and emotional dissonance among physicians. For instance, while physicians formally recognize the importance of self-care, they frequently prioritize professional obligations over personal well-being, neglecting fundamental health practices such as adequate sleep or preventive care (Shanafelt et al., 2019). Such behaviours likely partly stem from entrenched cultural norms that warrant further critical examination.

Recent quantitative research has begun to empirically characterize some of these harmful medical cultural norms, identifying aspects such as professional overcommitment or the myth of invulnerability in medicine. These norms are associated with increased risks of burnout, depression, and self-neglect in physicians (Banse et al., 2025a, 2025b). However, despite growing recognition of the role of medical culture in shaping physician distress, we still lack insight into how physicians themselves understand and experience these cultural influences.

1.3 Framework and objectives of the present study

Given the need for further qualitative inquiry (Kay et al., 2008; Sibeoni et al., 2019) and the importance of understanding medical culture from the perspectives of its members, our study aimed to address this gap through an open-ended qualitative analysis. The initial objective of the study was to explore which aspects of professional medical culture, as described by physicians themselves, influence their health and well-being. However, during the process of data familiarization, it became evident that participants also pointed to a range of additional factors extending beyond our initial definition of medical culture. Given their significance to physicians, and in accordance with the iterative nature of qualitative research, we included a secondary objective to the study: to apply the socio-ecological model (SEM; (Bronfenbrenner, 1977; Bronfenbrenner & Ceci, 1994; McLeroy et al., 1988)) as a guiding theoretical framework to examine how medical culture interacts with other levels of influence to understand physicians' health and self-care behaviours. This approach enabled us to model the complex, multi-level factors while highlighting the distinctive and underexplored role of the medical culture within this broader system, as described by physicians.

2. Methods

2.1 Participants and data collection

This study is part of a broader research project investigating the interplay between psychological distress, health behaviours, and medical culture, as detailed in a prior publication (Banse et al., 2025a). The research employed an online survey conducted between September and November 2023, targeting French-speaking physicians across multiple disciplines (general practitioners and specialists) and training levels (attending and resident physicians).

Participants were recruited through multiple channels to ensure broad reach and engagement. Recruitment avenues included social networks and word of mouth. General medicine associations and medical journals promoted the survey, while deans of medical faculties at French-speaking universities disseminated invitations

via mailing lists, reaching both residents and academic physicians within university hospitals. Hospital councils and medical directors facilitated survey distribution within their institutions. Participation was voluntary, with no financial incentives provided. To ensure participant confidentiality, all data were anonymized. Due to the recruitment strategy, it was not possible to estimate the net response rate for participation.

Prior to survey completion, all participants provided written informed consent. For this study, we analysed responses to the open-ended question included at the end of the survey: « We are interested in the potential impact of physicians' professional culture on their own health and health behaviours. Do you have any comments on your experience as a physician that you would like to share? ». This question was designed to elicit firsthand perspectives on how medical culture influences physicians' health and behaviours. Participants engaged with this question by interpreting it through the lens of their own professional and personal experiences, shaping responses that reflected their lived realities.

The study received ethical approval from the Institutional Review Board (Ethics Committee of the Cliniques Universitaires Saint-Luc, Brussels) prior to data collection. We adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007), following the elements applicable to a qualitative survey study.

2.2 Quality and Reflexivity Statement

Recognizing the potential influence of researcher positionality on data interpretation, we disclose relevant aspects of our backgrounds. EB is a female clinical psychologist and researcher with expertise in both qualitative and quantitative methodologies. Her research focuses on medical culture and physicians' health, and she has close family ties to the medical profession. These factors may inform her analytical perspective. ALL is a female general practitioner and lecturer with research expertise in physician well-being and the recruitment and retention of healthcare professionals. She also has clinical experience supporting distressed physicians and medical students. Her background similarly informs her interpretations. Both authors actively engaged in reflexivity throughout the research process, continuously reflecting on how their professional backgrounds and experiences shaped data analysis and interpretation.

2.3 Data analysis

All survey participants were invited to respond to the open-ended question; however, we acknowledge that responses were provided only by those motivated to

share their experiences. The aim was not to achieve a representative sample but rather to gain in-depth insights into physicians' perceptions of medical culture and its impact on their health. Prior to qualitative analysis, descriptive statistical analyses were performed using IBM SPSS 28.0 (IBM Corp., 2021) to characterize the demographic diversity of the sample (see Table 1).

A constructivist paradigm guided our qualitative analysis, which employed a dual methodological approach using NVivo software (Lumivero, 2023).

First, we conducted a thematic analysis (Braun & Clarke, 2006, 2012) to *inductively* identify themes within participants' responses in relation to the research question. Thematic analysis is a multi-step process used to detect and organize patterns in qualitative data (Willig, 2013) and follows a six-step process: (1) data familiarization, (2) initial coding, (3) theme generation, (4) theme review, (5) theme definition, and (6) reporting (Braun & Clarke, 2006, 2012). EB and ALL independently conducted initial readings of the data (ranging from brief comments to extensive paragraphs), making observational notes and preliminary interpretations. They then performed line-by-line coding on 10% of the dataset, generating initial descriptive codes. These codes were subsequently reviewed and discussed in team meetings, leading to the development of a preliminary codebook. This codebook was iteratively refined through the analysis of additional data subsets, before being applied to the full dataset. The coding process remained flexible and discussions between the authors ensured analytical rigor and consensus on coding.

To structure our thematization, we then *deductively* analysed physicians' experiences through the lens of the socio-ecological model (SEM). The SEM (Bronfenbrenner, 1977; Bronfenbrenner & Ceci, 1994; McLeroy et al., 1988) emphasizes that multiple levels of factors influence health and health behaviours. Guided by similar literature (King et al., 2023; Scarneo et al., 2019), we adapted the SEM as analytical framework to define six thematical levels:

1. **Societal:** Broader societal influences and changes.
2. **Cultural:** Elements of the professional culture of medicine as defined in the present study.
3. **Organizational:** Policies of medical institutions and organizations, including national policies, economic conditions, and work-related realities.
4. **Interpersonal:** Social interactions with family, friends, colleagues, supervisors, and patients.
5. **Individual:** Behaviours, beliefs, attitudes, and personal characteristics of physicians.
6. **Temporal evolutions**: Socio-historical conditions influencing physicians over

time.

A thematic map of the data was created based on these levels. Themes were iteratively refined through ongoing discussions until saturation was achieved. Team discussions clarified how to include the different codes within the framework. Relations between themes were evaluated to ensure a coherent interpretation aligned with the research focus. Key participant quotations were translated from French to English to illustrate the themes. Full data are available upon request from the first author.

3. Results

3.1 Description of the sample

Of the 1,232 physicians who began the survey, 224 (65.2% women) physicians provided a response to the open-ended question. The sociodemographic and work-related characteristics of the physicians are detailed in Table 1. Data are reported as number (percentage) or median (IQR).

Table 1. Sociodemographic and work-related characteristics of the sample (N = 224).

Characteristics [a]	**N (%)**
Gender	
Male	76 (33.9)
Female	146 (65.2)
Other	1 (0.4)
Missing	6 (0.6)
Age category	
< 35 years old	81 (36.2)
35 – 55 years old	85 (37.9)
> 55 years old	52 (23.2)
Missing	6 (2.7)
Relationship status	
Single	43 (19.2)
In a relationship	181 (80.8)
Missing	0 (0)
Parental status	
Yes	138 (61.6)
No	86 (38.4)
Missing	0 (0)
Country of residence	
Belgium	210 (93.8)
France	11 (4.9)
Switzerland	1 (0.4)
Other	1 (0.4)

Missing	0 (0)
Type of physician	
General practitioner	71 (31.7)
Attending general practitioner	10 (4.5)
Specialist physician	106 (47.3)
Attending specialist physician	30 (13.4)
Occupational medicine physicians / Insurance physicians / School physicians / Medical consultants	7 (3.1)
Missing	0 (0)
Work setting of the (resident) specialist (N = 136)	
Hospital setting	112 (82.4)
Private consultation	4 (2.9)
Both	(15 (11.0)
Missing	5 (3.7)
Type of hospital of the (resident) specialist (N = 136)	
Public hospital	35 (25.7)
Private hospital	24 (17.6)
University hospital	67 (49.3)
Missing	1 (0.8)
Specialty of the (resident) specialist (N = 136)	
Acute medicine	1 (0.7)
Anaesthesia and intensive care	13 (9.6)
Clinical pathology	4 (2.9)
Dermatology	3 (2.2)
Gynaecology and obstetrics	5 (3.7)
Internal medicine	30 (22.1)
Neurology	12 (8.8)
Nuclear medicine	1 (0.7)
Ophthalmology	2 (1.5)
Otorhinolaryngology (ENT)	3 (2.2)
Paediatrics and neonatology	10 (7.4)
Physical Medicine and Rehabilitation	2 (1.5)
Psychiatry	5 (3.7)
Radiology	2 (1.5)
Radiotherapy and Oncology	1 (0.7)
Surgery	21 (15.4)
Missing	4 (2.9)
Type of practice[b] **of the (resident) generalist** (N = 81)	
General medicine (consultations and home visits)	79 (97.5)
Hospital setting	3 (3.7)
Other institution (e.g. family planning centre, nursing home)	14 (17.3)
Non-conventional medicine	4 (4.9)
Work setting[b] **of the (resident) generalist** (N = 81)	
Work alone	23 (28.4)
Monodisciplinary group	32 (39.5)
Multidisciplinary group	29 (35.8)
Age, median (IQR), years	40.50 (31.00; 55.00)
Years in practice, median (IQR), years	15.00 (5.00; 29.75)
Hours worked per week, median (IQR), hours	50.00 (40; 60)

Note. N= 224. No = Number. IQR = Interquartile Range. [a] Data were missing for some characteristics.

3.2 Elements of the medical culture

We begin by presenting the elements of medical culture that, according to physicians' accounts, shape their health and health-related behaviours. Two defining cultural constructs emerged from this part of the analysis. The first is a deeply ingrained collective representation of the 'ideal' physician - a professional archetype that many strive to embody. This representation carries significant implications across three domains: how physicians attend to (or neglect) their own health; the normalization of silence and the non-disclosure of personal vulnerability; and the emergence of forms of violence in specific professional contexts (shaped by these cultural norms). The second cultural construct, which in some ways counterbalances the pressures of the collective representation of the ideal physician, is the perception of medicine as a noble and inherently meaningful vocation.

3.2.1 A well-established collective representation of the physician – and its implications

Physicians report that a crucial aspect of the medical culture is an implicit yet pervasive definition of the 'ideal' physician - an enduring and collective representation that carries significant consequences. This dominant image is reinforced by key actors (e.g. supervisors) and pivotal moments (e.g. residency) throughout physicians' professional trajectories, as will be explored in the second part of the results. In their responses, participants frequently referred to this deeply embedded representation of physicians that distinguishes them from other professions. This is based on normative characteristics that define how a physician should behave to be seen as competent and legitimate. Selected examples of key themes are presented below.

Physicians do not fall ill: A pervasive belief within medical culture is that physicians should be immune to illness or not vulnerable like other human beings: « The culture conveyed is that 'doctors are superheroes'». This perception of incompatibility between the roles of physician and patients promotes a reluctance to seek help, as reported by this participant: « [We have a] strong social image, which can undoubtedly hinder a call for help […] ». Many physicians reported feeling an implicit pressure to maintain an image of resilience, even when their health was compromised: « Society as a whole and the culture within the medical field create an unbearable pressure on doctors: they must always be superhumans, available, and able to help others without ever being fully seen as patients themselves […] ».

A physician is devoted: The view that medicine is more than just a profession, but should be considered a vocation, remains a dominant cultural ideal in medicine: « During our studies, we were told that entering medicine was like

entering a religious order ». One physician noted that « […] medicine is a sacred duty ». This assumption fosters an expectation of self-sacrifice, where many physicians expressed feeling pressured to prioritize work above all else. The difficulty of balancing personal life with this ideal often leads to dissatisfaction with work-life integration, as stated by this physician: « Medicine is too often seen as a vocation that takes the place of many things in a doctor's daily life ».

A physician does not complain and pushes beyond limits: Participants reported a cultural expectation that physicians should not express discomfort even when overwhelmed: « We are educated to position ourselves as saviours and not save ourselves ». This normalization of endurance further contributes to exhaustion and undermines personal well-being. Participants expressed how this can be emotionally and physically draining: « The medical professional culture considers that a doctor must be strong and cannot show weakness. To survive in such a system, the only way to cope is to detach oneself from one's feelings, which is harmful and leads to burnout […] ».

Other examples of referenced characteristics included the need to work long hours, endure fatigue and suffer to become a good physician, to always be available, and to consider medicine as being more than 'just a job'.

These cultural and often unrealistic expectations create significant pressures that lead to a range of consequences. Three key impacts were particularly evident in physicians' accounts.

First, these ideals affect **physicians' health and self-care behaviours**. A critical consequence often evoked was the profound tension experienced when physicians occupy the roles of both physician and patient. This dual role conflict often shapes physicians' health behaviours, as they grapple with the difficulty of self-identifying as patients and/or treating fellow physicians, as reported here:

> A patient during a consultation pointed out that I emphasized the importance of taking enough time before returning to work, while I had decided to return too quickly this winter and was sidelined again after a few days. For me, this illustrates both the difficulty doctors have in identifying themselves as patients, and the difficulty for doctors to see other doctors as legitimate patients.

The perception of help-seeking as weakness, coupled with concern about burdening already overstretched colleagues, further discourages physicians from accessing care: « It is important for a doctor to have their own family doctor whom they trust to act as a third party. However, sometimes we hesitate to go see them because we know they are probably just as overwhelmed as we are. »

Second, these ideals contribute to a **pervasive silence around personal difficulties** within the profession. This silence manifests through the absence of open discussions about physicians' struggles, the stigma associated with vulnerability, and a reluctance to share personal challenges*:* « Whether in a hospital setting or on the front lines, the doctor is often there to support their team or colleagues, and rare are the moments when their own difficulties are expressed ». This reflects a longstanding 'sink or swim' mentality embedded in training and professional norms:

> During my studies and the first years of work, there was little to no discussion about the difficulties faced by doctors. Gradually, things have developed, and access to information has improved. However, I believe there is a taboo in the doctor's mind, making it very difficult to verbalize burnout or psychological struggles.

Participants also highlighted structural barriers to disclosure, such as the lack of replacement coverage and pressure to remain at work despite illness or exhaustion.

Third, these ideals are internalized within professional environments marked by **violence and discrimination**. While some settings (e.g. multidisciplinary primary care teams) were seen as supportive, others - particularly hospital-based specialties like surgery - were described as fostering harmful subcultures. These include moral and sexual harassment, misogyny, and other forms of discrimination, especially during training and within rigid institutional hierarchies. As one participant recounted:

> As a general surgery intern, the environment I work in is even more unique than other areas of medicine. Misogyny, racism, and fatphobia are present. In addition to this, harassment is often part of the daily routine […]. Last year, I was harassed by my supervising physician throughout the year, and it was very difficult. We are adults who have completed studies and have significant responsibilities, yet it feels as if we are still in school with teachers, and we, the students, must accept all kinds of comments about our person, appearance, mood, and personality, knowing that responding would only make things worse.

Though not universally experienced, these localized manifestations of violence appear sustained by peer dynamics and institutional inaction. Despite increased advocacy for equity, several participants noted that some environments remained resistant to change. One physician illustrated the lasting impact of such dynamics:

> I was subjected to recurring moral harassment throughout my specialization. Unfortunately, my training journey was also marked by the announcement of my first pregnancy, a situation characterized by acts of rejection and exclusion, which were completely inappropriate and illegal. In conclusion, my journey can be summarized by numerous misogynistic elements, a deep sense of disappointment, and a feeling of

wasted time - factors that contributed to my decision to end my pursuit in this path.

3.2.2 The idealized vision of medicine as a meaningful profession

Despite the challenges posed by the previously outlined prevailing cultural norms, participants expressed **a deep sense of enthusiasm and idealism about their profession**. The view of medicine as a 'noble profession', rooted in altruism and positive values, remains a powerful narrative within medical culture, one that may counterbalance, for some, the pressure induced by the cultural norms of endurance outlined earlier.

Older physicians emphasized that medicine is a vocation driven by meaning. Yet, some questioned whether younger generations still adhere to this idealized vision, given the evolving realities of contemporary medical practice. One participant reflected:

> […] my training and career are more or less behind me. This puts some of my responses into perspective. […] but it's true that I often think about the weight of my profession and the investment I made to get here. That said, I remain positive and hope that future generations find the same sense of purpose in their work. The prominent place that personal life and well-being now occupy seems, paradoxically, to complicate their choices, increasing their frustration. A new balance in all areas seems urgent to find.

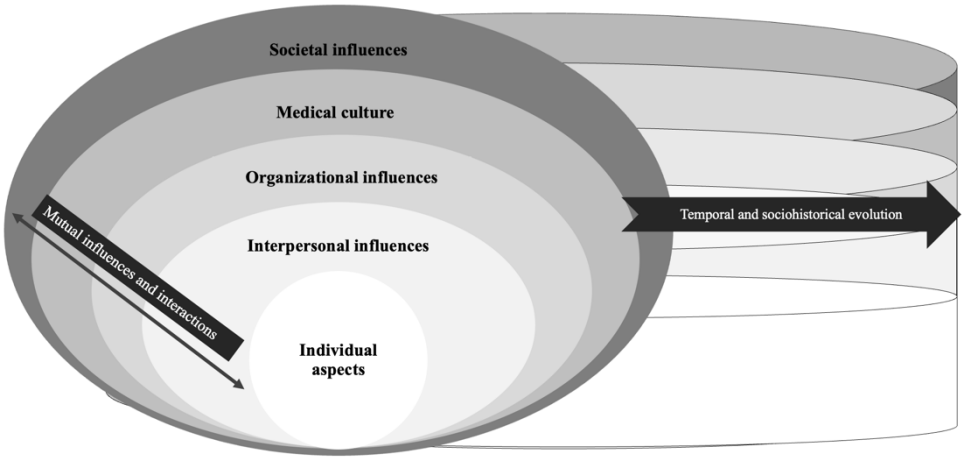
Others directly connected this loss of idealism to the current distress in the profession:

> I increasingly feel that young doctors feel less accountable for their patients due to an increasingly strong culture of protecting their working hours and personal life. This sense of disempowerment, in my opinion, leads to a loss of meaning in the profession, which then becomes a heavy burden without the rewarding feedback. Could this be one of the reasons for the current malaise in the profession?

3.3 SEM

In this phase of the analysis, we explore how medical cultural factors interact with other levels of influence as defined by the SEM framework (see Figure 1), moving beyond the inductive phase to place the identified themes within a broader framework.

Figure 1. Adapted SEM model.



Note. This model describes how the interplay between professional culture and other additional influencing factors shapes physicians' health and health behaviours.

3.3.1 Societal level: broader societal influences

At the societal level, participants emphasized how broader societal dynamics shape medical culture, sometimes reinforcing, but also challenging professional norms:

> […] It is indeed a [truly] unique culture among doctors, but you can feel that times are changing. [Now] both doctors, who now want to have 'a life outside of work', and patients, who no longer place them on a pedestal, are contributing to this shift. Gradually, this allows doctors to be a bit more 'normal' and to be treated like any other worker in society.

Among the most significant societal shifts are **evolving attitudes toward work-life balance and the broader feminization of the workforce**, trends particularly visible in highly educated professions like medicine. Participants highlighted generational tensions between older and younger physicians, which appear to reflect broader transformations in mentalities and attitudes towards work, parallel to changes in working conditions and medical practices. Those transformations are however not always understood: « […] patients and society fail to understand that 'young general practitioners' do not work as many hours as their predecessors - whose spouses often managed family responsibilities, who dealt with less complex patients, and who had fewer and simpler treatments to administer. »

While these changes may ultimately reshape medical culture, they clash with the traditional ideals of the profession. One participant noted:

> [There is an] influence of the generational clash between older doctors, whose practice

> tends to be more intrusive with little regard for personal life, and younger doctors, who strive to maintain a balance between private and professional life. One may feel inferior or less dedicated when choosing to preserve a good quality personal life compared to colleagues who devote everything to medicine.

In medicine, the shifts in attitudes towards work are thus not met without resistance. Many older physicians view the younger generation's push for work-life balance as a departure from medicine's traditional vocational ethos. Some describe feeling burdened by the need to compensate for the younger generation's so-called reduced availability: « [I observe] the following paradox: in our younger years, we were at everyone's disposal, working relentlessly; and now, to ease the burden on the younger generation, we remain just as available, while they are 'protected' by legal limits. »

3.3.2 The medical culture

We position medical culture within the SEM as a distinct level of influence. While it interacts with organizational and workplace dynamics, it also exists beyond the specific conditions of medical settings, as shared beliefs, norms, values, and attitudes specific within the profession.

3.3.3 Organizational influences

Organizational factors significantly shape physicians' health by reinforcing some norms of the medical culture. Different aspects were identified.

First, **medical education and training environments** play a central role in shaping how medical culture is transmitted and internalized by students and future physicians. Medical faculties and teaching hospitals foster a competitive, meritocratic, and high-pressure environment that reinforces ideals of perfectionism and resilience. As one participant described: « The pressure to succeed based on merit within medical studies is very high, leading students and future doctors to believe they must always be at their best, never falter, withstand accumulating hours, and feel lucky to graduate, regardless of the specialty that is ultimately assigned to them ». This pressure often neglects the psychological toll on students, cultivating harmful health habits that persist:

> I think the way medical studies are structured forces us to ignore our limits […]. I believe that after at least six years, we all retain this habit, which becomes a problem when we become residents. There's also a sort of 'suffering' culture, where we are deemed deserving only when we've endured hardship. These factors together push us not to set boundaries until they are inevitably crossed.

Participants also emphasized the lack of formal education around physicians'

well-being: « […] during our studies, we hardly ever talk about doctors' well-being. We're told that it's normal to be tired, that it's part of the profession ». Internships were also described as critical moments reinforcing these norms, as interns are expected to endure extreme workloads under supervisors shaped by the same culture: « During our internships, we work extremely long hours (86-hour shifts), and when I complained […] I was told these experiences were necessary to toughen us up. »

Second, the **structural characteristics of medical work**, such as long hours, on-call duties, and the pressure of continuity of care, were consistently described as detrimental to physicians' well-being. These issues are worsened by staff shortages and influenced by institutional realities:

> We are not allowed to be sick. I once had to do two 24-hour shifts in a row while feeling miserable: stuck in bed in my on-call room, getting up painfully to see patients coming to the emergency room. If I hadn't come to work sick, my colleagues would have had to do 5 or 6 consecutive 24-hour shifts, which was not an option.

Third, **medical institutions and organizations** themselves were viewed as active contributors to physician distress. As one doctor put it:

> I am convinced that the functioning of institutions in a broad sense (hospitals, medical centres, management committees, funding bodies, on-call roles, etc.) contributes far more to the malaise experienced by doctors (and thus impacts their health) than the professional culture and values of the doctors themselves.

Our analysis suggests that institutions perpetuate norms of the medical culture that encourage physicians to neglect their own well-being through unrealistic demands:

> I personally suffered from burnout. I realized that this situation is entirely driven by the unhealthy work habits instilled in us from the start of our residency. The number of patients we are required to see each day is staggering and negatively impacts not only the quality of care but also the doctor-patient relationship and the mental health of [specialists].

Participants also noted the lack of institutional support during periods of vulnerability, including health challenges. For example, a physician reflected on the harsh and isolating nature of working in a university hospital: « It's like being in a shark tank. There's no support or culture to rely on, leaving room for abuse. » Another physician shared a troubling experience with their employer's lack of understanding: « I requested medical part-time work due to health issues, but my employer refused, opting to replace me with someone who would take on extra shifts. I am now looking for a job elsewhere due to my health needs. »

Finally, participants highlighted **differences across medical specialties** in the

expression of cultural and organizational pressures. Some described choosing to leave hospital-based specialties in favour of general practice, seeking better work-life balance:

> I experienced burnout during my surgical residency. I felt like I was in a funnel where the further I went, the less I could change my path. I saw colleagues and senior doctors working more and more hours at the expense of their family lives. I loved surgery, but there was no way I was going to endure that kind of pressure. In general practice, with two young children and a partner who is also a general practitioner, it's difficult to work more than 30 hours a week.

3.3.4 Interpersonal influences

At the interpersonal level, the support (or lack thereof) from supervisors, patients, colleagues, and close relatives can either reinforce or challenge the deeply ingrained norms and values of medical culture, ultimately influencing physicians' health and well-being.

Mentors and supervisors are key figures in shaping the medical culture, serving both as role models and gatekeepers of traditional values. While some support residents' well-being, others perpetuate harmful norms:

> During my residency, I had conflicts with some supervising doctors who advocated values that I consider toxic: very few refusals to patients, forgetting oneself or one's needs, working even when in poor condition, not taking time to distance oneself and improve the work system, and an inability to question one's belief system or way of thinking. It's difficult because older doctors sometimes view new ones as lazy or indifferent, while we want to establish a framework for a pleasant and safe working environment. In my opinion, the older doctors never had the opportunity to consider these aspects when they were younger.

Medical trainees can feel powerless under these hierarchical structures: « According to the supervisors, it's normal to have gastric ulcers; if you don't have them, 'you're not a real [specialist]'. According to the supervisors, complaining after a 110-hour week proves that you're lazy, and no one will want you as a colleague. »

Colleagues also reinforce harmful norms through peer pressure and lack of empathy. One physician explained how burnout was minimized by colleagues: « In my professional environment, as a doctor, we are not allowed to be sick. Having suffered from burnout, it is sometimes painful to see how some colleagues minimize or fail to understand the time needed to recover. »

Some also described the lack of empathy within the profession:

> I am disappointed by the lack of compassion and humanity among colleagues in

> surgery, both residents and senior doctors. The motto of my […] year can be summed up by a sentence one of my supervisors told me at the beginning of my internship: 'We are colleagues, not friends.' […] there is no room for personal emotions.

Peer judgment can also discourage physicians from setting boundaries. One physician recounted feeling judged after reducing their weekly working hours. According to this physician, « […] The strongest pressure for me comes from fellow doctors. »

Patients contribute to the idealized image of the 'selfless' doctor, reinforcing the expectation that physicians should be constantly available. Participants reported frustration with these unrealistic demands:

> […] The daily demands of patients, the patient's view of the patient [according to which] 'a doctor must be available, or they should be doing another job', remains hurtful and frustrating daily. In the public imagination, a 'full-time' general practitioner is automatically available from 7 AM to 8 PM for patients, five days a week, plus on-call duties and administrative work […].

Some patients even question physicians' right to personal well-being: « Patients sometimes find it abnormal for the doctor to be sick... I've received comments after coughing or blowing my nose. These same patients wouldn't find it acceptable for me to take time off due to illness…»

Finally, **family members** play a significant, often ambivalent role in shaping physicians' professional values and perceptions of self-sacrifice. For some, closed ones provide crucial support, counterbalancing the expectations of medical culture: « I am 39 weeks pregnant, and it took complete exhaustion for me to decide to stop working. I am lucky to work with my husband, who convinced me to take a break. But I think if I were alone, I would have kept going. We are so conditioned to push our limits that we struggle to respect our own health ». However, some physicians described a lack of understanding from non-medical family members about the emotional and psychological demands of the profession:

> I recently shared with my parents that I felt exhausted in my work and that the mental and emotional load of general practice was weighing on me. I mentioned [that] sometimes, I had doubts about the longevity of my mental health in this field. My father's first response was, 'But reassure me, you're not planning to quit general medicine after all these years of study, are you? I think you're just overthinking things!' […]. And my mother's response was, 'But I don't understand, did something specific happen?' […] People who don't work in the medical field simply don't understand. They think that because we earn good money and are independent, we are free. In fact, we are trapped in a system with preconceived ideas about doctors, a system that demands a lot from doctors a system that assumes working 50 hours a

week is normal.

Conversely, physicians from medical families noted facing internalized pressures to live up to family expectations: « Having a father who is a doctor creates a certain pressure »; or « I was born into a family of doctors. I think that influences the pressure we put on ourselves to be good doctors. »

3.3.5 Individual influences

Finally, individual experiences and personal characteristics shape how physicians internalize medical culture and, in turn, how this affects their well-being. Several key factors emerged.

A strong **internalized sense of duty** - often described as a 'saviour complex' - leads many physicians to prioritize patient care at the expense of their own health. This results in excessive self-sacrifice and difficulty setting boundaries:

> […] Spending a day without eating or drinking because I don't have the time to take a break and I put the patients before myself, in resilience. Neglecting my own medical and psychological care, even though I know I should take care of myself. A sense of exhaustion that takes away all motivation to do things that could bring me joy outside of work.

Professional fulfillment is closely tied to **alignment between personal values and professional roles**. When institutional constraints conflict with these values, physicians report distress and increased risk of burnout: « It is essential that a doctor can practice their profession with integrity in relation to their own values and be supported by the institution where they work. If they don't feel like they're being used as a robot, they will be in a better position to respect their patients and maintain a high quality of care. »

Common **personality traits** such as perfectionism, high self-discipline, and altruism - often fostered or selected for in medical training - can reinforce self-imposed pressure and guilt, especially when physicians prioritize their own needs: « I downplayed serious health issues for months, attributing them to anxiety and fatigue, until I reached a point of no return. The hardest part was stopping the guilt about the workload imposed on my colleagues and the constant fear of losing my skills. »

For many physicians, their profession is deeply intertwined with their **identity**. While this strong identification provides purpose, it can also hinder work-life balance and self-reflection: « The way I view my work has evolved over the years. It used to be a strong element shaping my life and identity. However, this has changed, and now I sometimes feel a sense of emptiness and the need to redefine

myself. »

Personal crises, burnout, or major life events often prompt a **gradual deconstruction of ingrained medical cultural norms**. One participant reflected:

> It is 'obvious' that medical education plays a major role in the health and behaviour of doctors. Thank you very much for this study! When I was a medical trainee, I felt trapped, forced (to become a doctor) to work as I was told, at that exhausting pace, and having the evaluation hanging over my head like the sword of Damocles. This coercion left a deep mark on me and affected the image I felt I had to uphold as a doctor - and thankfully, I am gradually deconstructing that image.

Life experiences such as illness or parenthood often shift physicians' perspectives on boundaries and well-being. For some, these events encourage self-care; for others, they add further strain.

Importantly, some physicians noted that they actively engaged in redefining medical norms. This process of **personal agency** includes challenging internalized beliefs and reshaping how values are transmitted to peers and trainees. One physician described this process of change:

> At the beginning, the medical culture I was taught was that we always had to be present, working even when sick. Now, I advocate for taking care of oneself to be better able to care for patients. This shift became possible through training in helping relationships, mindfulness meditation, and non-violent communication.

Finally, **coping strategies** varied. While some employed adaptive practices such as mindfulness or physical activity, others described relying on maladaptive mechanisms, including emotional suppression and overwork, to manage professional stress and the pressure imposed by aspects of the medical culture.

3.4 Changes over time and reciprocal influences

Physicians' accounts underscore that medical culture is not fixed but shaped by ongoing interactions between individual, interpersonal, organizational, and societal forces *over time*. For example, evolving medical practices are beginning to challenge longstanding norms. As one physician reflected: « I started practicing in a time of physician oversupply and within a patriarchal medical system. It wasn't easy, and as a result, I had to sacrifice a lot… and work a great deal. Things are changing, but perhaps too much in the other direction ». Shifts in mentality occur as working conditions once tolerated become unacceptable today. Yet, change remains slow compared to broader societal shifts. Our analysis suggests that this inertia may stem from the fact that entrenched norms still serve other levels of influence, such as patient expectations and healthcare structures, which have little incentive to drive

reform.

Some physicians find themselves caught in this gradual transition. Those deeply rooted in traditional medical culture may struggle to reconcile past sacrifices with evolving expectations, sometimes perceiving self-care as at odds with professional commitment: « It seems that there are changes in medical culture, and these changes sometimes create a gap and misunderstanding between doctors of different generations, especially regarding their professional lifestyle (notably working hours) […] ». Meanwhile, those advocating for change face resistance, whether from colleagues or systemic barriers, making the path to change challenging.

4. Discussion

This study explored physicians' lived experiences of how medical culture shapes their health and self-care. Using a dual-stage qualitative approach combining inductive thematic analysis with an adaptation of the socio-ecological model, we identified two central findings: (1) the persistence of a professional culture that discourages vulnerability, and (2) the embedding of this culture within a broader, multi-level system of influence.

4.1 Medical culture and its influence on physicians' health and health behaviours

Participants described a medical culture that idealizes the tireless, invulnerable physician - an identity internalized early in training and reinforced throughout their career. This ideal discourages expressions of personal difficulty and inhibits help-seeking, reinforcing silence as a normative coping strategy. These patterns echo existing research documenting low self-compassion, imposter syndrome, mental health stigma, and poor work-life balance among physicians (Clough, March, et al., 2019; Dyrbye et al., 2015; Favre et al., 2023; Shanafelt, Dyrbye, et al., 2022; Shanafelt, West, Sinsky, et al., 2022; Trockel et al., 2019, 2021; Wijeratne et al., 2021; Zaman et al., 2022). Qualitative studies have similarly emphasized the perception of vulnerability as professional weakness and the stigmatization of support-seeking in medicine (Geuijen et al., 2022; LaDonna et al., 2022). Participants also reported experiences of mistreatment and discrimination, particularly in hospital-based training settings where hierarchical power structures prevail. These accounts do not suggest a uniformly violent professional culture, but rather that such behaviours remain normalized in some contexts as a consequence of specific aspects of the medical culture, particularly during internships and in some specialties like surgery. These findings are consistent with literature on hierarchical abuse in medical training environments (King et al., 2023; Rainey-Clay & Smith-

Coggins, 2019). While not universal, these accounts are impactful enough to merit concern. The normalization of distress, and the continued silencing of those experiencing it, reinforces the belief that psychological suffering is incompatible with professional competence in medicine.

Medicine was also described as a deeply meaningful and identity-defining profession. This strong identification can serve as a source of resilience but may also perpetuate self-imposed pressure to meet unrealistic ideals. This paradox, where meaning sustains yet burdens, has been noted in prior studies examining the tensions between physicians' professional identity and personal health (Gerada, 2022; Klitzman, 2008; Mckevitt & Morgan, 1997; Onyura et al., 2015).

What distinguishes our study is its direct interrogation of medical culture itself. Rather than emerging as a background theme, specific norms of the medical culture were rendered explicit and foregrounded as central to understanding physician well-being.

4.2 Medical culture as part of a broader system of influences

While medical culture was a dominant theme, participants naturally located it within a broader system of interacting influences. Early socialization in training environments, institutional structures, interpersonal dynamics, and societal expectations intersect to shape health behaviours.

Many described how medical education instilled values of perfectionism and emotional detachment - aligning with previous research describing medical training as a key site of cultural transmission (Dyrbye, 2025; Mahood, 2011; Song, 2020; Veal, 2021). External pressures further reinforced this culture. Expectations from patients, families, and the public sustained the image of the selfless, always-available physician. Simultaneously, internal factors (such as personality traits and personal history) also shaped how physicians internalized and enacted these norms. These findings support the idea that medical identity is co-constructed through both internal and external forces (Cruess et al., 2014; Miller & McGowen, 2000).

Although some participants noted cultural shifts, evolution remains uneven and slow. Many reported feeling caught between traditional norms and emerging societal values that promote balance and self-care. This tension relates to what Shanafelt and colleagues have described as 'learning anxiety' (Shanafelt et al., 2019). Medical identity must evolve to reflect changing realities, though this transition can generate uncertainty (Cruess et al., 2014).

4.3 Perspectives

This study adds to a growing body of literature - including editorials, reviews, personal narratives, and qualitative research - that highlights the harmful impact of specific medical cultural norms on physician well-being (Gerada & Al-Naijar, 2020; Gupta, 2018; Kay et al., 2008; Ward & Outram, 2016). Collectively, these works call for a re-evaluation of professional expectations and advocate for a shift toward a more compassionate culture in medicine (Shanafelt et al., 2019; Sinskey et al., 2022).

We argue that meaningful cultural change must begin by centering physicians' voices. In this study, participants (unprompted) offered ideas for reform. One recurring theme was the need for dialogue between junior and senior physicians to reconcile evolving values with traditional expectations. Focus groups across training levels may help identify concrete strategies to support this transition.

Numerous authors have already proposed multilevel interventions (Dyrbye et al., 2017; Montgomery, 2014; Shanafelt, 2021; C. P. West et al., 2016). At the individual level, physicians must be supported and encouraged to take ownership for their own well-being and to critically reflect on how they may perpetuate harmful norms (LaDonna et al., 2022; Ward & Outram, 2016). Further research should examine individual risk factors that heighten susceptibility to cultural pressures in medicine. At the professional and institutional level, systemic interventions are needed to reduce stigma, encourage help-seeking, and shift entrenched cultural values (Clough, March, et al., 2019). This includes expanding resources, shortening work hours, and fostering environments that support vulnerability and balance (Ward & Outram, 2016). Medical education is a key leverage point. Integrating self-care into curricula and providing mentorship that models both competence and vulnerability can help cultivate a more resilient medical identity (Beckman, 2015; A. Martin, 2022a). Peer support is also vital: sharing recovery narratives can help destigmatize distress and foster more compassion in the profession (G. Walsh et al., 2019). Future research should continue exploring the persistence of mistreatment and violence in specific specialties and training environments, including their impact on career choices (Kaur et al., 2025), like the growing shift toward general practice, which is often perceived as less hostile than hospital-based specialties (Kaur et al., 2025). Finally, public expectations must evolve. Research should explore strategies to educate the public about the human limits of physicians and the expectations placed upon them.

In short, cultural change in medicine is a collective responsibility. Both individual and structural solutions are needed to create a sustainable, healthier profession (Panagioti, Panagopoulou, Bower, et al., 2017).

4.4 Limitations

This study has several limitations. The main question posed to participants implicitly linked medical culture to physician health, potentially guiding the focus of their responses. Voluntary participation may have introduced selection bias. For instance, physicians having experienced or currently experiencing distress may have been more likely to respond. However, their perspectives remain highly relevant and their voices need to be heard. The sample also lacked diversity in roles and specialties, which may limit generalizability. Additionally, the survey format constrained opportunities for deeper probing, and differences in coding interpretation may have arisen from the authors' professional backgrounds. Despite these limitations, the study offers valuable insights into the cultural dynamics that shape physicians' health behaviours.

5. Conclusions

This study sheds light on how deeply embedded cultural norms in medicine influence physicians' well-being. By centering the lived experiences of physicians, we offer a nuanced understanding of how professional expectations shape health behaviours and help-seeking in medicine. Importantly, medical culture does not exist in isolation. It is continuously co-constructed through individual, institutional, and societal dynamics. Meaningful change, therefore, requires a multi-level approach. Embedding wellness into the core of medical education, practice, and policy is essential to building a culture that not only values clinical excellence but also safeguards the health of those who provide care.

Part 3. General Discussion and Conclusion

General Discussion

The aim of the present thesis was to better understand the link between medical culture and physician burnout, by addressing four overarching research questions, each building on the previous one:

1. **Chapter 4: Conceptualization and measurement.** Can some of the tacit assumptions of medical culture be integrated into a coherent model, and operationalized in a way that allows their association with physician burnout to be tested?
2. **Chapter 5: Extension to broader health outcomes.** Beyond burnout, how do cultural norms relate to other dimensions of physicians' health and health-related behaviours?
3. **Chapter 6: Variability and subgroup differences.** Do physicians endorse cultural norms uniformly, or do patterns vary across physician profiles ?
4. **Chapter 7: Lived experiences.** How do physicians themselves articulate cultural expectations in relation to their health and well-being ?

Table 1 provides an overview of the four research questions and a synthesis of the corresponding key findings from each empirical chapter. Together, these findings contribute to addressing some of the gaps identified in previous literature on medical culture and physician burnout - namely, that it was fragmented, lacked measurement tools, and remained largely descriptive rather than empirical.

The discussion that follows is organized around these key findings. Each section begins with a brief summary of the findings, followed by an examination of their theoretical, practical, and research implications[18]. In this discussion, **we made selective choices**. The aim is to engage with the findings in an overarching and integrative way: rather than repeating what has already been discussed in the empirical chapters, we highlight elements that had not yet been addressed, or deepen aspects that warranted further elaboration.

Finally, we will turn to the transversal limitations of the thesis, some final considerations, and an overall conclusion to this thesis.

[18] Some conceptual overlap between sections is inevitable (because all seven findings concern medical culture and its links to physician well-being) yet we have tried for each discussion to principally focus on the specific contribution of the finding in question.

Table 1. *Overview of the research questions and findings of the empirical chapters*

Empirical chapter		Research question	Key finding(s)
4	**Conceptualization and measurement**	Can some of the tacit assumptions of medical culture be integrated into a coherent model, and operationalized in a way that allows their association with physician burnout to be tested?	**1.** A model of Harmful Dimensions of the Medical Culture (HDMC) **2.** The HDMC are associated to PB and account for a substantial share of PB variance **3.** Existential Significance is a distinct factor negatively associated to PB
5	**Health outcomes**	Beyond burnout, how are cultural norms related to other dimensions of physicians' health and health-related behaviours?	**4.** The HDMC are associated to depression and maladaptive health behaviours in physicians
6	**Subgroup differences**	Do physicians endorse cultural norms uniformly, or do patterns vary across physician profiles ?	**5.** The HDMC endorsement varies by physician profile (higher among residents, younger physicians, women), and partially mediates the link between physician profile and burnout
7	**Lived experiences**	How do physicians themselves articulate cultural expectations in relation to their health and well-being ?	**6.** Medical education and training are central in transmitting medical culture **7.** Medical culture matters, but it does not exist in isolation

Note. Associated to the empirical chapter is the central theme of each empirical chapter (2nd column).

1. Key *quantitative* findings and their implications

1.1 A model of Harmful Dimensions of Medical Culture

Finding 1

In Chapter 4, factor analyses on items reflecting various norms of medical culture revealed a multidimensional model of **Harmful Dimensions of Medical Culture** (HDMC). The model comprised seven related first-order factors (Work Priority Strain, Self-Sacrificing Nature of Medical Practice, Physician's Central Identity Role, Physician's Discomfort with Patient Role, Physician's Moral Obligation to Patients and Colleagues, Colleagues' Stigma towards PB, Personal Stigma towards PB). These factors then clustered into three overarching, interdependent dimensions: Physicians' Professional Commitment, the Myth of the Invulnerable Physician, and Physician Stigma towards Burnout.

Theoretical implications for finding 1

The HDMC model represents, to our knowledge, the **first empirical attempt to model aspects of medical culture**. It integrates previously fragmented constructs into a structured representation of medical culture as a *multidimensional* system of professional norms. As discussed in Chapter 3, qualitative and conceptual contributions have long suggested the existence of specific professional norms in medicine, while also emphasizing that these norms are experienced not in isolation but as interconnected expectations. In the HDMC model, the clustering of first-order factors into broader dimensions that are significantly and positively associated indicates that the investigated cultural norms operate as *interdependent* elements. For instance, the association between commitment and invulnerability suggests that physicians' sense of duty may reinforce expectations of endurance (and possibly the reverse). Although analytically distinct, the three HDMC dimensions reflect partially overlapping aspects of medical culture. Professional Commitment captures norms of dedication, prioritisation of work, and self-sacrifice; the Myth of the Invulnerable Physician combines expectations of invulnerability and discomfort with adopting the patient role; and Physician Stigma Toward Burnout reflects negative judgments (internalised or perceived from colleagues) towards physicians who struggle at work. These dimensions seem to converge around a common cultural ideal of the physician as selfless, resilient, and unwaveringly devoted to medicine. The consistently high median HDMC scores and narrow interquartile ranges in our sample further indicate that these expectations are widely shared within the medical community.

The model's validity was supported by satisfactory psychometric indicators, including adequate internal consistency and an overall good model fit. This suggests that the proposed dimensions form a stable and interpretable structure for an initial exploratory model, and that the professional culture of medicine could be meaningfully examined through quantitative methods. By **operationalizing cultural assumptions** that had previously been explored through qualitative or narrative work (Clough, March, et al., 2019; Kay et al., 2008), the HDMC provides a basis to integrate conceptual and empirical research on medical culture. This approach parallels developments in other fields where culture has been assessed quantitatively. For example, numerous validated instruments exist to measure organizational culture in healthcare (for a review, see Scott et al., 2018). In another domain, Hofstede (Hofstede & Minkov, 2013) identified national cultural dimensions by analysing large-scale survey data from IBM employees across multiple countries. Using factor analysis, he examined how items co-varied and found stable clusters that reflected underlying value dimensions such as individualism-collectivism. This framework has been widely used in cross-cultural

research and practice and illustrates how quantitative models can provide a useful (though necessarily simplified) way to capture broad cultural patterns of interest. The HDMC applies a similar logic to the professional culture of medicine: by examining correlations among items reflecting professional norms, factor analyses revealed latent dimensions that structure these shared cultural expectations.

Lastly, though the HDMC focuses specifically on harmful cultural norms, it is important to note already at this stage that the term *harmful* mainly refers to their association with burnout and other negative health-related outcomes in physicians (cf. discussion of finding 2 and 4). However, some elements, such as aspects of professional commitment, may also play a positive or motivating role in relation to other outcomes or when supported by adequate organizational conditions. This will be discussed in more detail in the transversal limitations of this thesis.

Clinical and practical implications for finding 1

By identifying and measuring the shared yet often implicit norms that shape physicians' professional identity and daily behaviour, the HDMC helps make more visible what usually remains taken for granted in medicine (Hafferty, 2008). This visibility can serve as a **starting point for dialogue and reflection**, both individually and collectively, on how ideals and expectations are transmitted and sustained in medicine. In other words, it gives physicians a **shared language** to talk about their culture, helps reveal aspects they may not have noticed before, and highlights elements that could be detrimental to their wellbeing.

In practical terms, the HDMC and its measure can be used as a **reflective framework**[19] to help physicians and trainees examine how they perceive and endorse cultural expectations (Mahood, 2011). Since its publication, the HDMC has already been applied in several hospital settings. For example, in one French ICU, completion of the HDMC scale by residents sparked open discussion about self-sacrifice expectations among staff (Personal Communication, October 2025). Such conversations can act as preventive interventions in education and practice: when learners are encouraged early to identify and question unhealthy norms (such as equating dedication with self-neglect); they become better equipped to resist them later (Dyrbye et al., 2015; Shanafelt, 2021). A more clinical use of the HDMC (e.g. to help burnt-out physicians examine their relationship to work and develop metacognitive distance) is discussed later, in relation to finding 2 and 4. Over time,

[19] Its structure offers both granularity (through distinct subfactors allowing targeted discussion of specific domains, more adapted for clinical application), and broader clarity (through a concise higher-order organization, more suitable for communication and research purpose).

using the HDMC model in this way may help transform tacit cultural expectations into explicit topics for reflection and change (cf. discussion of finding 6 and 7).

Future research for finding 1

As an **initial attempt to modelize harmful aspects of medical culture**, the HDMC represents a promising but exploratory framework. Future research should consolidate, refine, and extend this model. Below, we outline a selection of the most relevant directions among the many possible avenues for further work.

A first priority concerns the **psychometric refinement** of the instrument. While the HDMC model showed satisfactory properties for an exploratory framework, its measurement precision can be improved. At each stage of the factor analyses to construct the HDMC model, methodological choices were made. Different guidelines exist, and different choices could have led to alternative, yet equally defensible solutions. We tested several solutions and retained the model that provided the best balance between conceptual coherence and statistical fit, but there is potential for further refinement. For instance, the model's total explained variance (59%) is acceptable for attitudinal constructs in the social and behavioural sciences (particularly at an exploratory stage and when using self-reported data (Hair, 2018)), yet it also suggests that certain facets of the harmful medical culture may not have been fully captured. This likely reflects the methodological thresholds used for item retention, which (though psychometrically sound) may have led to the exclusion of conceptually meaningful items[20] (Watkins, 2021). Refining the item pool and testing alternative retention thresholds could improve both conceptual coverage and reliability. Particular attention should be given to the stigma-related items, which displayed lower internal consistency. Though this is a limitation often observed in stigma research (e.g. Favre et al., 2023), improving its measurement appears particularly important given the role of stigma in physicians' reluctance to seek help (cf. Chapter 3).

In addition to this, future research should also aim to **broaden the conceptual scope** of the HDMC framework (see also the transversal limitations of this thesis). The current model captures a core set of harmful norms but not the full range of

[20] Several items that were not retained further explored the incompatibility of physician and patient role. For instance: 'In the collective imagination, it is patients and not physicians who fall ill '(original item in French: 'Dans l'imaginaire collectif, ce sont les patients, et non les médecins qui tombent malades'). If more solid items had been included to represent its associated factor (i.e. discomfort with patient role), this could have enhanced its associated alpha score. In total, 11 items out of the initial pool of 35 items were excluded.

cultural assumptions that may shape physicians' identity and practice. Future studies could examine additional elements (such as imposter feelings, self-valuation, stoicism, power and social dominance, medical exceptionalism) to achieve a more comprehensive representation of harmful medical culture. Further research should also focus on **confirming and extending the model's validity** across diverse samples. In our sample, preliminary tests of measurement invariance[21] across gender and seniority showed configural and metric invariance (this means that the HDMC structure is relatively stable within the studied sample) but not scalar invariance, suggesting possible group-specific response patterns. Replication in new and more diverse samples is needed to determine the generalizability of the model.

Beyond psychometric and conceptual refinement, it is also important to **understand cultural endorsement over time.** Longitudinal designs (with HDMC measurement over time) could reveal when and how medical students and physicians internalize or resist these norms throughout their studies and careers. Qualitative work suggests that enculturation unfolds gradually as professional values become integrated into identity (Gordon et al., 2012; Johnston & Peacock, 2008; Phillips & Clarke, 2012). Quantitative evidence on *when* and *how* this process occurs could help identify critical periods of socialization (e.g. during medical school, residency, or early career) when cultural norms are most strongly absorbed and where prevention might be most useful (see also the discussion of finding 5 and 6).

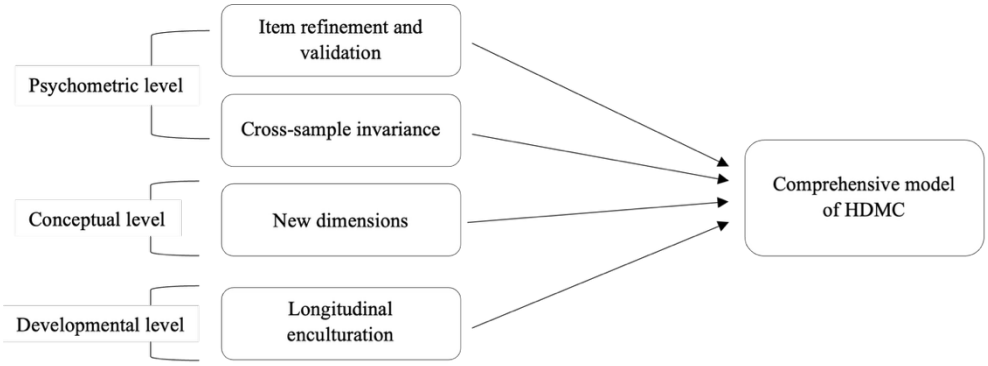
Figure 1 visualises these directions to strengthen the robustness and applicability of the HDMC framework.

In sum, finding 1 provides an empirical modelling of harmful dimensions of medical culture, showing that these norms form a coherent and interrelated system. The three HDMC dimensions capture widely shared expectations in medicine around commitment, invulnerability, and stigma, making visible tacit cultural assumptions that shape physicians' identity and practice. This model provides a foundation for integrating medical culture into empirical research.

The next section examines how the HDMC relate to physician burnout.

[21] Measurement invariance refers to whether a scale measures the same underlying construct in the same way across different groups (e.g. gender, seniority). Configural invariance means that the overall structure of the model is the same across groups; metric invariance means that the strength of the links between items and their dimensions is comparable. Both were supported, indicating that the HDMC structure is broadly similar across groups in our sample. Scalar invariance, however, was not supported, meaning that group differences in mean scores may partly reflect differences in how groups interpret or endorse certain items (cf. finding 5).

Figure 1. *Future research directions for the HDMC model*



Note. Conceptual map of recommended next steps for refining and extending the HDMC framework, including psychometric, conceptual, and longitudinal research priorities.

1.2 The HDMC account for a substantial share of PB variance

Finding 2

In Chapter 4, we examined the associations between HDMC and PB. Regression analyses showed that the HDMC significantly predicted PB scores after adjusting for covariates, accounting for 21% of the variance in PB. Professional Commitment emerged as the strongest predictor, followed by the Myth of the Invulnerability and Stigma toward PB. These results indicate that shared cultural expectations of commitment, endurance, and stigma jointly contribute to PB. Below, we focus on the **broader implications** of these associations, but will not revisit the specific content of each HDMC dimension, nor their individual associations with burnout, as these elements have already been addressed (cf. Chapter 3 and 4).

Theoretical implications for finding 2

First, because the HDMC collectively explained a greater share of variance in burnout when considered together than when examined separately, finding 2 provides empirical support for viewing PB as **shaped by the combined weight of multiple, interdependent cultural norms** rather than by any single norm in isolation. This highlights the importance of viewing them as parts of an integrated cultural system. It is the cumulative effect of norms such as ‘physicians should be impervious to limits’, ‘work must come first’, or ‘help-seeking equals weakness’ that erodes well-being (Shanafelt, Dyrbye, et al., 2022). Although our cross-sectional data do not establish causality, this suggests that PB could reflect the convergence of coexisting professional expectations rather than the impact of a single attitude (Lenoir et al., 2021). Such a perspective was largely overlooked in previous quantitative research.

Second, finding 2 supports the view that **medical culture operates as a macro-level correlate of physician well-being** beyond individual or organizational boundaries. Indeed, the HDMC explained a meaningful share of burnout variance after controlling for demographic and work-related factors. This suggests that at the macro level, cultural expectations operate throughout the profession and *across* specialties and work settings[22]. This aligns with prior similar studies (Shanafelt, Dyrbye, et al., 2022; Trockel et al., 2019, 2021) and with the distinction drawn in Chapter 3 between professional and organizational cultures. While the two likely interact, they represent distinct layers of influence at Bronfenbrenner's macrosystem level.

Figure 2 provides an updated overview of the PB correlates initially proposed in Chapter 1[23]. To date, medical culture had received limited empirical attention compared to the other PB correlates (Jenkins, 2023). **At the macrosystem level, the model now explicitly includes the HDMC identified in this thesis**. In our understanding[24], medical culture indeed functions as a macro-level influence overarching individual and organizational boundaries, while shaping physicians' attitudes and behaviours (Schulte et al., 2024).

In the figure, the bidirectional arrow across levels indicates that the different levels of influence are not isolated, but mutually reinforcing. For instance, individual tendencies such as delayed gratification or reluctance to seek help (ontosystem) may reflect internalized professional norms such as the myth of invulnerability (macrosystem) (cf. finding 7).

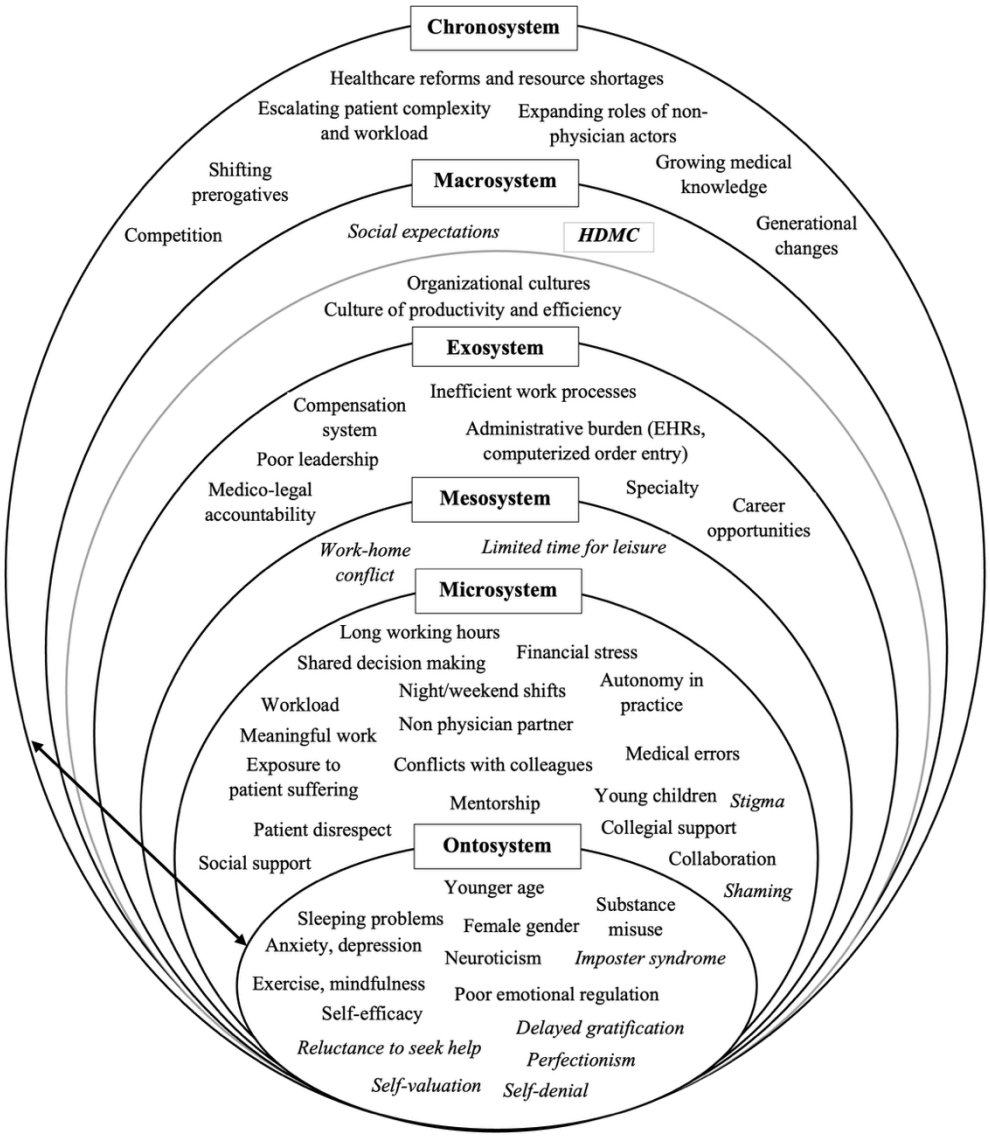
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[22] The interpretation of medical culture as a profession-wide phenomenon is supported by converging observations, including the perspectives developed in Chapters 2 and 3, feedback received from physicians of different specialties and training levels when presenting these results, and resonance with physicians from diverse countries and healthcare systems when we presented our findings at international meetings.

[23] As before, we use the term *correlates* to describe factors associated with burnout, acknowledging that most available evidence - including the present results - is cross-sectional and does not establish causality.

[24] While reviewing the literature to prepare this discussion, we encountered a reference in medical sociology that also analyzed PB using a socioecological framework and situated medical culture as a separate 'professional' level overarching organizational influences (Jenkins, 2023) but interacting with other levels. Though we can not infer this from our data, our intuition is that both levels (professional and organizational cultures) are distinct yet intertwined: institutions rely on the image of the dedicated and selfless doctor to sustain their functioning, while professional values make such institutional demands appear legitimate. This reciprocal influence might help explain why cultural change in medicine is slow and why medical culture remains a powerful determinant of physicians' health.

Figure 2. *PB correlates across the Ecological Systems Theory – updated*



Note. The grey horizontal line at the macrosystem level distinguishes two interconnected but conceptually distinct sublayers of this system: organizational cultures (e.g. cultures of efficiency, productivity, or hierarchy within institutions) and the professional culture (i.e. shared assumptions and values across the medical profession, including the HDMC), which we distinguished in Chapter 2.

Clinical and practical implications for finding 2

The observed link between the HDMC and burnout implies that **prevention and intervention efforts targeting PB must reach beyond individual and organizational levels** (cf. Chapter 1). Approaches limited to strengthening personal

resilience or adjusting workload will remain incomplete if they ignore the cultural assumptions that shape physicians' attitudes toward vulnerability, endurance, and self-care (LaDonna et al., 2022; Shanafelt et al., 2019; Shanafelt, Dyrbye, et al., 2022; Sinskey et al., 2022; Trockel et al., 2019). Although direct longitudinal and causal evidence is limited, converging evidence from qualitative and theoretical work suggests that shared cultural norms may heighten physicians' susceptibility to burnout (Favre et al., 2023; Montgomery, 2014; Shanafelt et al., 2019; Shanafelt, Dyrbye, et al., 2022). Conversely, burnout itself may amplify perceptions of cultural pressure; for example, physicians experiencing exhaustion often perceive stronger stigma around help-seeking (Weiss et al., 2021).

At the individual level, the HDMC framework can enrich clinical work with physicians who suffer from burnout. Exploring how internalized professional ideals (such as the belief that vulnerability signals weakness) shape coping patterns and self-concept can help physicians recognise the cultural roots of their distress (Lenoir et al., 2021; Shanafelt et al., 2019; Shanafelt, Dyrbye, et al., 2022)[25]. Because professional identity often occupies a central place in physicians' self-concept (Klitzman, 2008), what is referred to as the '*medical self*' (Gerada, 2022; Gerada & Al-Naijar, 2020; Wessely & Gerada, 2013) can blur the boundaries between personal and professional life, especially during training. As such, **burnout may be experienced as an identity threat for physicians**, similar to how academic physicians' retirement has been described likewise in qualitative research (Onyura et al., 2015). In therapy or supervision, working through these internalised ideals might help restore sustainable boundaries and reduce guilt, shame, and isolation - emotions that are often present as distress clashes with the very profession's ideal of invulnerability (Gerada, 2016, 2020c; M. Henderson et al., 2012; Ronan, 2025; Thompson et al., 2001). At the collective level, these results call for **raising awareness** among teachers and supervisors about the role of training (Beckman, 2015) and daily (organizational) practices (Shanafelt et al., 2019) in perpetuating harmful norms. Encouraging explicit reflection on what 'professionalism' means can support a healthier understanding of competence and dedication - one where commitment and competence are no longer equated with self-denial (Shanafelt, 2021; Trockel et al., 2019, 2021). Concretely, this may involve **challenging common misperceptions** such as the idea that constantly staying late, skipping breaks, or never disclosing difficulties are signs of being a 'good doctor'. Using concrete examples can help make explicit how such deeply ingrained norms, which

[25] As those norms appear detrimental under contemporary working conditions (though they may have been adaptive in previous historical contexts in medicine, cf. Chapter 2 and 3).

can appear legitimate or even admirable, can become counterproductive when taken to excess and contribute to burnout and distress in the long term.

Future research for finding 2

Future research on the link between the HDMC and burnout can take many directions. Here, we focus on three complementary priorities which will then be summarized in **Figure 3**, while other promising avenues are briefly outlined at the end of this section, but not discussed in detail.

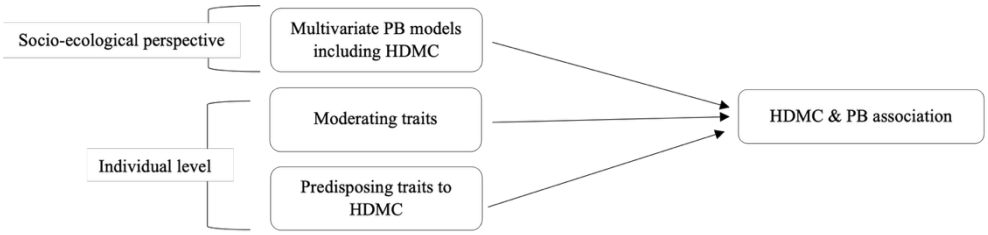
First, future studies should **clarify the specific contribution of HDMC relative to other well-established predictors of PB** (cf. Chapter 1). In our analyses, cultural norms remained significantly associated with burnout even after controlling for several individual and work-related factors. However, many other known correlates - such as personality traits (e.g. perfectionism), coping styles, workload, emotional demands, organizational resources, or broader systemic influences - were not included in our data. Integrating HDMC dimensions into multivariate models that incorporate these additional variables would allow researchers to determine the *relative weight* of cultural norms in comparison to these other contributors. Doing so would help position medical culture more precisely as a macrosystemic factor within an ecological framework of PB (Carmack, 2019).

Second, not all doctors suffer equally from the culture of medicine (Ward & Outram, 2016). While our results indicate that the HDMC are associated with burnout *at the group level*, future research should **explore why their impact varies across individuals**. This raises questions about the psychological factors that may shape how physicians respond to cultural norms. For instance, could traits such as perfectionism (Gerada, 2020c; S. R. Martin et al., 2022), neuroticism (Brown et al., 2019), self-consciousness (Bynum & Artino, 2018; Jaimovich, 1999), self-compassion (Bayot et al., 2024; Pereira et al., 2022) or emotional intelligence (Jackson-Koku & Grime, 2019), including emotional contagion (Bakker et al., 2001) *moderate* the association between the HDMC and PB? Identifying these dynamics would clarify why certain physicians are more affected than others, and thus help target prevention and intervention efforts.

Third, given the association between the HDMC and burnout, future research should examine **what predicts greater endorsement of cultural norms.** As will be further discussed in finding 5, physicians do not internalize medical culture uniformly. Among many others, factors such as personality (Gerada, 2020c; Wessely & Gerada, 2013), family and personal history (Gerada, 2020b, 2022), motivation for studying medicine (Goel et al., 2018; Pagnin et al., 2013; Trimble, 2022), personal values (Cleland & Johnston, 2012) or the tendency to conform to prevailing group

norms (Horsburgh & Ippolito, 2018; Jarvis-Selinger et al., 2012)[26] may influence how individuals adopt and reproduce professional expectations. Professional identity formation is not identical for every physician. It is reframed through personal factors (Cruess et al., 2015; Sawatsky et al., 2023), as the medical profession is conceived differently by every physician (Bourquin et al., 2023). Understanding the determinants of cultural endorsement in medicine will help clarify mechanisms of enculturation (Gordon et al., 2012) and explain why physicians within the same profession differ in their endorsement of medical culture (cf. finding 5).

Figure 3. *Future research directions for finding 2*



Note. Conceptual map of recommended next steps to further understand associations between HDMC and PB.

Other research questions also warrant attention but are not further developed here, i.e. (1) what is the direction and mechanism linking HDMC and burnout over time (e.g. mediators, cf. key finding 5)? (2) how do organizational cultures interact with professional culture to reinforce or counter harmful norms? and (3) how do the HDMC relate to outcomes at the levels of patients (e.g. continuity of care, safety), teams (e.g. workplace climate), and institutions (e.g. productivity)? These questions matter because knowing how medical culture not only affects physicians but also patients, teams and organizations could help physicians recognise why and when certain norms become counterproductive, and thus prompt reflection on the need to adjust them.

In sum, finding 2 provides empirical evidence that PB is linked to the combined influence of multiple, interrelated cultural norms. Medical culture emerges as a macrosystemic influence that shapes physician burnout beyond other well-known covariates. The next section examines the protective role of existential meaning in physicians' experience of burnout and in relation to medical culture.

[26] The social-psychological mechanisms underlying conformity and internalization are developed further in the discussion of finding 5, where variability in HDMC endorsement across physician profiles is examined through the lenses of social identity and self-determination theories.

1.3 Existential Significance as a distinct factor

Finding 3

During the factor analyses, a distinct factor, Existential Significance of Being a Physician (ES); emerged. Its items captured how much meaning and purpose physicians derive from their work (e.g. 'My work gives my life meaning', 'My existence would be much less meaningful if I were not a doctor'). We had initially hypothesized that this sense of vocation might increase vulnerability, thinking about the potential *weight* of vocation and the identity threat that could follow burnout for physicians. However, ES showed only modest correlations with the HDMC factors and reduced overall model fit when included. Furthermore, ES was negatively associated with burnout and remained an independent predictor when controlling for all covariates, including the HDMC.

Theoretical implications for finding 3

The weak overall correlations and poorer model fit indicate that **ES does not belong to the HDMC model**, as it did not share sufficient common variance with the other factors captured by the overarching HDMC structure. Conceptually, this makes sense: while the HDMC represent internalized professional norms with a 'prescriptive' nature (e.g. what physicians *should* be or do), the ES items reflect more of a personally integrated sense of meaning derived from being a physician. In this sense, ES captures not cultural expectations, but rather the existential fulfillment that physicians personally experience through their work. Still, ES is likely partly rooted in medical culture, since the ideals that give meaning to physicians' work are themselves embedded in the medical culture[27].

That said, a closer examination of the specific correlations of ES with the HDMC dimensions and subfactors shows that some cultural expectations relate more strongly to ES than others (cf. **Table 2**). ES displayed its strongest associations with the identity-related factor of Central Identity Role and its associated dimension of Professional Commitment, but also with Moral Obligation toward Patients and Colleagues (a sub-factor of the Invulnerability Myth). This suggests that existential

[27] ES is likely shaped by both sides ('positive' and 'negative') of the medical culture. On one side, expectations regarding the place that medicine should occupy in one's life are influenced by cultural ideals of sacrifice, identity centrality, and work priority strain - elements that define the HDMC of Professional Commitment and are reflected in ES's associations with these factors and this dimension. On the other side, although our data do not provide direct evidence for it, literature notes that the positive values of medicine such as service or altruism (cf. Chapter 2) are central to the existential meaning physicians derive from their work (Pearl, 2021; Shanafelt et al., 2019), consistent with viewing medicine as a vocation (Trimble, 2022).

meaning is closely tied to how central the professional role is in physicians' identity, but also to their sense of responsibility towards patients and peers. By contrast, dimensions reflecting invulnerability or stigma showed little to no association with ES, indicating that these expectations are less connected to the personal meaning physicians derive from their work.

Turning to the regression analyses to predict PB, ES remained a robust negative correlate of PB when controlling for demographic, professional, and cultural (HDMC) covariates. This indicates that **deriving meaning from medicine is inversely related to PB,** consistent with prior findings linking meaning to lower burnout (Ben-Itzhak et al., 2015; Hooker et al., 2020 ; Delroisse et al., 2023) and with the existential view of burnout as a crisis of meaning, especially for those who invest work as a principal source of existential meaning (Delroisse, 2020; Pines, 2002). Causality cannot be inferred from our cross-sectional data. It is plausible that meaning sustains well-being, while burnout erodes meaning, because exhaustion undermines the very professional identity through which purpose is constructed (Berardelli et al., 2022; Gerada, 2020d; M. Henderson et al., 2012). Both directions are supported in the literature (e.g. Maunz & Glaser, 2024). Regardless of directionality, ES explained an additional 9 % of variance in burnout *beyond* the HDMC, showing that meaning plays a **non-negligible and independent role in physicians' experience of burnout**. While overall endorsement of the HDMC was positively associated with PB, ES showed an inverse association when controlling for the HDMC. This indicates that the two constructs reflect distinct but coexisting processes in the experience of PB.

In terms of associations (cf. **Table 2**), Professional Commitment, Central Identity Role, and Moral Responsibility were all positively associated with PB, yet they also correlated positively with ES - which itself was negatively related to PB. This suggests that these dimensions of the HDMC may require a more nuanced interpretation. Identity- and responsibility-related expectations in medicine could serve as sources of meaning and motivation, but contribute to strain when they become too demanding, difficult to meet, or amplified by other unrealistic or less meaningful expectations[28]. Interpreting the observed correlations in this way nuances the characterization of all HDMC-related norms as uniformly 'harmful' (cf. further discussed in transversal limitations) and highlights the importance of considering the conditions under which these expectations could support well-being versus contribute to vulnerability (in terms of exhaustion).

[28] Such as the expectation of invulnerability or the stigmatization of burnout.

Table 2. *Correlations between ES and HDMC dimensions and sub-factors.*

Correlation with → Variables↓	**ES**	**PB**
ES		-.14**
HDMC first-order subfactors		
Work Priority Strain	.10**	.40**
Self-Sacrificing Nature of Medical Practice	.04	.37**
Physicians' Central Identity Role	.44**	.16**
Physicians' Moral Obligation to Patients and Colleagues	.20**	.34**
Physician's Discomfort with Patient Role	.03	.24**
Colleagues' Stigma Toward Professional Burnout	-.00	.23**
Personal Stigma Toward Professional Burnout	.09*	.05
HDMC second-order dimensions		
Professional Commitment	.28**	.38**
Myth of the Invulnerable Physician	.17**	.35**
Physician Stigma Toward Burnout	.04	.22**
HDMC global score	.26**	.42**

Note. Correlations are Spearman's rho (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). If no asterisk, correlation is non significant. ES = Existential Significance of Being a Physician. PB = Physician Burnout. HDMC = Harmful Dimensions of Medical Culture.

Clinical and practical implications for finding 3

Finding 3 first emphasises the need to **approach the question of meaning *with nuance* when supporting physicians experiencing burnout**. For many, medicine provides deep existential significance; but when that meaning collapses, burnout feels like a profound personal loss (Pines, 2002). Therapy or supervision should include, at an appropriate stage - typically when recovering from burnout or preparing to return to work - an explicit exploration of what gives the physician's work meaning. How and through which activities (i.e. healing others, teaching, research, or developing expertise) does meaning arise for this specific physician (Shanafelt, 2005, 2009; Shanafelt et al., 2006)? And how do these sources align with his or her personal values (Funk et al., 2024; Shanafelt et al., 2009) ? Clarifying these questions can help physicians **reconnect with purpose** and rebuild coherence between personal values and professional roles (Daloz, 2007; C. P. West et al., 2014). Second and as discussed above, identity- and responsibility-related expectations in the medical culture can carry a certain ambivalence, as they are linked both with meaning and with vulnerability to PB. Clinically, this means it is important to help physicians explore how they perceive these expectations in

medicine, if and how they support meaning for them, and under which circumstances they begin to feel excessive or rigid (such as a burnt-out physician who initially found purpose in being constantly available to patients, but later recognises in therapy that this expectation of constant availability leaves no room for rest or personal life).

However, reconnecting with meaning inside medicine is only one dimension of clinical work with physicians experiencing burnout. It is equally important to support physicians in finding balance by diversifying the ways in which they derive existential meaning and by **nurturing aspects of identity *beyond* the professional role** (Klitzman, 2008; Shanafelt et al., 2017; G. Walsh et al., 2019). Indeed, when professional identity occupies all space, the psychological impact of burnout is likely amplified (Stelling et al., 2022). Encouraging physicians (as well as residents and students) to cultivate activities and relationships outside medicine - essentially, to avoid 'putting all their eggs in the same basket' - is key for recovery (e.g. Sonnentag et al., 2022) but also for prevention. For further perspectives on therapy related to ES and PB, see Delroisse (2020), including the author's description of the Meaning-Centered Counseling and Therapy (Wong, 2010; as cited in Delroisse, 2020) which appears particularly interesting here.

Finally and more practically, finding 3 also underscores the value of fostering reflection and awareness on meaning *throughout* **medical training and practice** (Hooker et al., 2020). Supervisors and role models play a pivotal role in shaping how meaning is transmitted and can be embodied in medicine (Koh et al., 2023; Toubassi et al., 2023). Training programs can integrate structured opportunities for reflection (such as Balint groups or Schwartz Rounds; Beckman, 2015; Gerada et al., 2018) to help (future) physicians articulate what makes their work meaningful and how this evolves over time (Sharpless et al., 2015). Supervisors can also promote balance by ensuring that at least part of physicians' workload involves activities they personally find rewarding, which has been linked to lower burnout risk[29] (Amano et al., 2024).

Future research for finding 3

While numerous research questions and perspectives emerge from finding 3, we focus here on those most directly related to the thesis's central thematic.

Among physicians, we noted that longitudinal data examining the **directionality of the link between existential meaning and burnout** remain scarce. Such designs are needed to determine whether a loss of meaning precedes

[29] One benchmark suggests that physicians should devote at least 20% of their professional time to activities they personally find meaningful to reduce burnout risk (Shanafelt, 2009).

burnout, results from it, or whether both processes influence each other over time. It will also be important to explore how **ES and the HDMC interact longitudinally** in predicting burnout. Several complementary hypotheses could be tested:

1. ES could moderate the effects of the HDMC on PB, such that higher meaning could buffer the effect of certain cultural expectations;
2. Sustained exposure to the HDMC (especially during training or in high-pressure contexts such as academic hospitals) could erode ES and contribute to greater vulnerability to PB;
3. When meaning is disrupted by burnout, the resulting loss of identity or identity threat could lead to 'an even greater fall' (i.e. important associated distress) for physicians (Berardelli et al., 2022; Gerada, 2020d; M. Henderson et al., 2012) (similarly as for other 'vocational' professions, e.g. army members, teachers)
4. The experience of burnout itself may reshape physicians' sense of ES as well as their perception of medical cultural norms.

Over and above these hypotheses, the observed associations between Central Identity Role, Professional Commitment, Moral Obligation, ES and PB warrant deeper investigation. The fact that these dimensions are positively associated with both meaning and burnout suggests that identity- and responsibility-related expectations may not be inherently detrimental to physicians' well-being, but become so when coupled with perceptions of self-sacrifice, work priority strain, or expectations of invulnerability or stigma. Future research should therefore examine more precisely how these expectations interact with ES and PB over time, using both statistical modeling and qualitative or mixed-methods designs to capture physicians' experience and meaning-making processes over time.

In sum, ES reflects the personally integrated meaning physicians derive from their profession - a dimension distinct from, yet related to, cultural expectations of endurance, overcommitment, or stigmatization of burnout. Its negative association with burnout underscores that reconnecting with purpose can mitigate distress even within a demanding professional culture. The next section examines whether the influence of the HDMC extend beyond burnout to broader health and behavioural outcomes.

1.4 The HDMC are associated to depression and maladaptive health behaviours in physicians

Finding 4

In Chapter 5, we found that higher endorsement of the HDMC - particularly Professional Commitment and the Myth of the Invulnerable Physician - was

associated with greater burnout, more depressive symptoms, and more maladaptive coping behaviours (presenteeism, self-treatment, and reduced help-seeking). These associations remained significant after controlling for demographic and professional variables.

Theoretical implications for finding 4

While finding 2 established that the HDMC are a macro-level correlate of PB in the SEM, finding 4 suggest that **the influence of the HDMC could extend to physicians' broader mental health and self-care**. The same cultural expectations associated to PB appear linked to depression and health behaviours that may exacerbate or mitigate distress.

In separate regression models, the HDMC were associated with, and explained a meaningful share of variance in PB, which manifests in the professional sphere (Maslach et al., 2001) - and depression, which extends to all areas of life (American Psychiatric Association, 2013). Depression is highly prevalent among physicians, who experience higher rates than the general population (Guille & Sen, 2024; Mata et al., 2015; Obeng Nkrumah et al., 2025). In our sample, burnout and depression were strongly correlated (ρ = .72), consistent with prior literature describing substantial overlap between the two (Bianchi et al., 2015a, 2015b) and with findings that burnout correlates with and can precede depression (Hao, 2023; Koutsimani et al., 2019; E. Ryan et al., 2023). It is therefore not surprising that medical culture would relate to both burnout and depression. However, in our analyses, the overall effect of the HDMC remained significant on both PB and depression (with the largest effect size observed for depression) when we accounted for the interrelations between both. This indicates that the HDMC relate not only to work-related exhaustion but also to broader mental-health distress (Ryan et al., 2023; Ward & Outram, 2016; Moniz et al., 2021). Beyond psychological outcomes, the HDMC were also linked (more modestly) to maladaptive health behaviours like presenteeism, self-treatment, and reduced help-seeking. This supports the view that cultural (Clough, March, et al., 2019; Kay et al., 2008) and identity-related (Schulte et al., 2024) expectations in medicine influence how physicians manage their own health.

The smaller explained variances for health behaviours compared with PB and depression likely reflect both measurement and conceptual factors. *Psychometrically*, burnout and depression were assessed with validated scales, whereas health behaviours relied on brief, self-developed items. *Conceptually*, **different psychological mechanisms** could underlie the associations of the HDMC with 'behavioural' versus 'emotional' outcomes. To illustrate this, we choose to refer

to two frameworks in psychology.

Regarding behavioural outcomes, the Theory of Planned Behaviour (TPB; Ajzen, 1991) posits that actual behaviour results from behavioural intentions, which are shaped by three sociocognitive determinants: attitudes, subjective norms, and perceived behavioural control. Applied to the present thesis, the HDMC could be understood as subjective norms that, together with physicians' attitudes toward self-care and their perceived control over engaging in it, could shape behavioural intentions and ultimately influence self-care behaviours.

In contrast, the Self-Discrepancy Theory (SDT; Higgins, 1987) describes how distress can arise when individuals perceive a mismatch between their actual and ideal (professional) selves. In medicine, the HDMC foster an idealized physician self[30]. When physicians perceive a gap between this internalized ideal and their actual experience, they experience self-evaluative distress, which can manifest as burnout (cf. our complementary investigation presented in **Appendix F,** where associations between discrepancies, the distress associated to these discrepancies, and PB were observed in a sample of physicians (Aharon, 2024)), and possibly depression (though not investigated here, this remains a hypothesis).

Thus, the association of harmful cultural norms with physicians' behaviours and emotional experience *could* be understood through two complementary psychological processes:

1. **A motivational-behavioural process**, in which internalised norms influence coping and self-care through socio-cognitive variables (as described in the TPB framework)[31]
2. **An affective-evaluative process**, in which internalised professional ideals contribute to distress when physicians perceive a gap between these ideals and their experience (as described in the SDT).

Clinical and practical implications for finding 4

In clinical work, recognizing how cultural norms influence both mental health and behaviour can improve assessment and treatment of physicians presenting

[30] The qualitative investigation (cf. Chapter 7 and the discussion of finding 7) suggests that medical culture fosters a strong collective representation of the 'ideal' physician.

[31] Another interesting perspective has recently been developed by Schulte et al. (2024) who investigated via a qualitative study and through a psychosocial perspective how the collective professional identity in medicine might contribute to poor self-care. We refer to the conceptual model developed by the authors for the interested reader (Schulte et al., 2024).

with depression, exhaustion, or self-neglect (Braquehais et al., 2014). Exploring the degree to which physicians identify with ideals of invulnerability, stigma or excessive commitment can help contextualize their symptoms and resistance to care (Gerada, 2016; Myers, 2020). Although we did not directly measure self-evaluative mechanisms here, frameworks such as the Self-Discrepancy Theory (Aharon, 2024; Higgins, 1987) suggest that recognising and challenging internalised professional ideals can reduce guilt or inadequacy when these ideals are not met. At the **educational** level, finding 4 highlights the need to explicitly address self-care, self-compassion, and help-seeking in medical curricula. Encouraging reflection on the tension between caring for others and caring for oneself can normalize vulnerability and make self-care a legitimate - and indeed essential professional behaviour (Dyrbye & Shanafelt, 2016; Eckleberry-Hunt & Lick, 2015; Westfall, 2020), since the ability to care for others is difficult to sustain if physicians are unable to care for themselves. At the **institutional** level, preventive strategies should challenge norms that glorify overwork or stigmatise vulnerability (Shanafelt, Dyrbye, et al., 2022; Sinskey et al., 2022; G. Walsh et al., 2019). Senior physicians play a key role: when leaders model self-care, they redefine professionalism (Martin, Chilton, Paasche, et al., 2020; Martin, 2022a), as will further be discussed in finding 6. Providing accessible, confidential support services (Zaman et al., 2022) and developing peer-support systems (‘*pair-aidance’*) also offer promising ways to build cultural change (Shapiro & Galowitz, 2016).

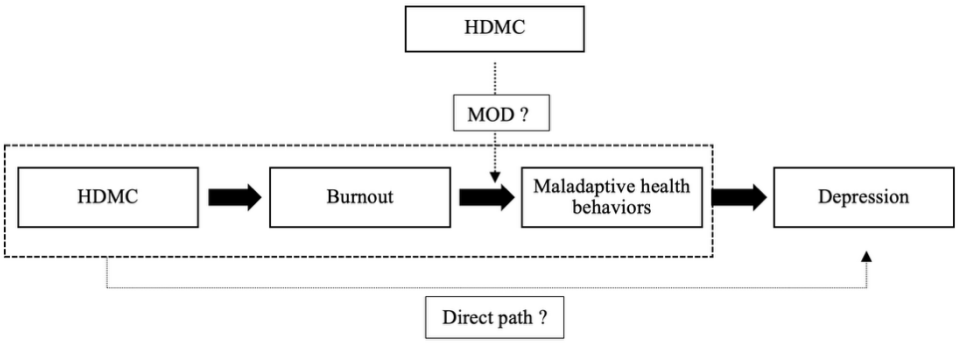
Future research for finding 4

Future studies should clarify the **causal structure** linking HDMC, burnout, depression, and health behaviours. Longitudinal and multivariate designs should test whether stronger endorsement of HDMC prospectively predicts psychological distress and maladaptive coping - or whether distress, in turn, reinforces perceptions of cultural pressure. Structural equation modeling would be particularly suited to help determine directionality and mediation (for instance whether burnout mediates the link between HDMC and depression) while considering shared variance between outcomes (Nguyen et al., 2025; Ryan et al., 2023). To complement this, future research should examine the **behavioural dynamics** through which the HDMC could amplify vulnerability to PB and depression. Internalized ideals in medicine likely promote presenteeism, social withdrawal, or reduced physical activity - patterns related to heightened PB and depression (Bittner et al., 2011; Lemaire & Wallace, 2010; McKinley et al., 2020). In exploratory mediation analyses[32], we

[32] Exploratory mediation analyses (PROCESS model 4, 1,000 bootstraps) showed that burnout partially mediated the associations between HDMC and presenteeism (indirect effect = 0.21, 95% CI [-0.16, 0.27]),

tested whether burnout might mediate the associations between the HDMC and the health-related behaviours tested in our data. These analyses suggested potentially meaningful patterns linking cultural norms, burnout, and behaviours such as presenteeism or self-care, although these findings are preliminary and should be interpreted with caution. It is also possible that neglect of self-care could be a pathway through which burnout spills over into depression under the influence of medical culture (Kuhn & Flanagan, 2017) – a hypothesis that warrants future longitudinal investigation (cf. **Figure 4**).

Figure 4. *Conceptual model linking HDMC, PB, health behaviours, and depression.*

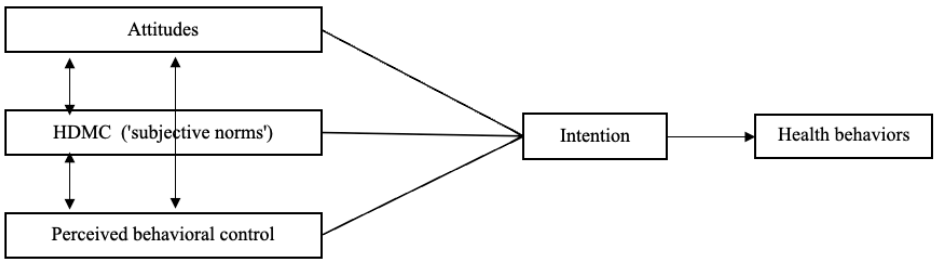


Note. Conceptual model illustrating the proposed moderating (MOD) role of the HDMC in the pathway linking burnout, maladaptive health behaviours, and depression. The dashed box represents the part of the model empirically tested in exploratory mediation analyses, but these results should be interpreted with caution given the cross-sectional nature of our data. The remaining pathways (HDMC moderation and the link with depression) are theoretical extensions proposed for future research.

Finally, future studies could test the **two complementary processes** which we suggested previously. Drawing on the TPB (C. Adams et al., 2022; Ajzen, 1985; Wang et al., 2024), the motivational-behavioural process could be examined by assessing perceived behavioural control, attitudes, and intentions alongside the HDMC to understand their link to self-care in physicians, as visualised in **Figure 5.**

self-diagnosis (indirect effect = 0.13, 95% CI [-0.08, 0.18]), and self-treatment (indirect effect = 0.11, 95% CI [-0.05, 0.16]). Burnout fully mediated the link with psychoactive medication use (indirect effect = 0.11, 95% CI [0.08, 0.16]). However, several confidence intervals crossed zero and, given the cross-sectional nature of the data, these analyses cannot be interpreted as evidence of causal mediation. Help-seeking showed no significant indirect effect and was directly associated with HDMC.

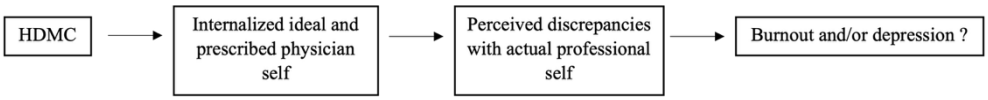
Figure 5. *Proposed motivational-behavioural process based on the Theory of Planned Behaviour*



Note. The HDMC are conceptualized here as internalized subjective norms influencing physicians' self-care behaviours via attitudes towards such behaviours, perceived behavioural control, and behavioural intention.

In parallel, following the SDT (Daloz, 2007; Higgins, 1987; Mason et al., 2019), the affective-evaluative process could be investigated by testing the associations between the HDMC and perceived self-discrepancies, and whether these discrepancies mediate the associations between the HDMC, burnout (see **Appendix F**; Aharon, 2024; Erschens et al., 2024), but also depression (Mason et al., 2019) in physicians (cf. **Figure 6**).

Figure 6. *Proposed affective-evaluative process based on the Self-Discrepancy Theory*



Note. We hypothesize that internalized ideals derived from medical culture (HDMC) contribute to shape physicians' ideal and ought professional selves. Perceived discrepancies between these and the actual self could then generate emotional distress (burnout, depression).

In sum, finding 4 suggests that the HDMC extend beyond burnout to affect physicians' mental health and self-care behaviours. Thus, medical culture functions as a macro-level determinant of physician well-being and shapes not only emotional outcomes, but also behavioural responses to distress. Building on this, the next section explores whether endorsement of the HDMC varies across physician profiles, and how such variability may mediate their impact on burnout.

1.5 The HDMC endorsement varies by physician profile (and mediates associations with burnout)

Finding 5

Chapter 6 examined whether the endorsement of harmful norms varies across physician profiles. Group comparisons revealed differences across several demographic and professional characteristics, with higher HDMC scores among

younger physicians, women, residents, specialists, and those working longer hours. Multivariate regressions indicated that age, gender, specialty, and workload[33] independently predicted HDMC endorsement when considered together. Mediation analyses further suggested that the HDMC partially explain the links between some of these characteristics (particularly age, gender, and specialty) and PB.

Theoretical implications for finding 5

Finding 5 **refines our central argument** by showing that, although the HDMC represent shared professional assumptions operating at the macrosystem level, **their endorsement is not uniform across physicians**. This finding challenges the notion of a monolithic culture and addresses a gap identified in Chapter 3, where previous research often treated physicians as a homogeneous group, overlooking potential variations in cultural endorsement. Using the terminology of the SEM, this variability reflects the interplay between ontosystemic (age, gender), microsystemic (parental status, working hours), and exosystemic (specialty) factors.

To take a broader view of what may underlie these differences, **theories from social psychology and medical education can help clarify how belonging and conformity influence the way physicians internalize professional norms**. The Social Identity Theory (Tajfel & Turner, 2004) suggests that individuals seeking belonging align with group norms to be recognized as 'real' physicians. The Self-Determination Theory (R. M. Ryan & Deci, 2000) adds a motivational perspective and distinguishes introjected (pressure-driven) from integrated (authentic) forms of internalization. When conformity is strong, internalization tends to be more pressure-driven, which could make physicians more vulnerable to burnout or identity tension. In parallel, the Professional Socialization Model in medical education (Cruess et al., 2015) frames Professional Identity Formation (PIF)[34] as a balance between shared norms and personal values: too much conformity risks loss of autonomy, while too little impedes belonging. Varpio and colleagues (2025) have argued that framing PIF as 'fitting into a mold' risks reinforcing conformity and marginalizing those whose identities diverge from dominant ideals. Instead, PIF may better be understood as a form of 'functional crafting', where physicians adapt and reshape professional

[33] While working hours emerged as a consistent correlate of HDMC endorsement, this aspect was discussed in detail in Chapter 6 and we choose to not revisit it here.

[34] Although this thesis (in the domain of psychology) was not framed within the professional identity formation (PIF) paradigm (in the domain of medical education), we acknowledge that many of our findings converge with questions explored in that field. We cannot provide an exhaustive account of PIF theory here, but highlight that this literature could further inform and extend the understanding of medical culture and physician well-being, beyond the theories mobilized in psychology (see discussion of finding 7 and transversal limitations for further development).

expectations. These perspectives converge on the idea that **physicians do not passively absorb medical culture**. Rather, they actively negotiate which parts to adopt or resist throughout their careers (Cruess et al., 2015; Stelling et al., 2022; Wald, 2015), which aligns with the distinction made in Chapter 2 between passive absorption and active assimilation in the process of enculturation to medicine (Gordon et al., 2012). As the literature further suggests, this negotiation may be particularly complex for physicians whose identities or experiences diverge from dominant professional norms and ideals. These individuals often experience identity formation as more demanding and sometimes distressing (Sawatsky et al., 2023). Similarly, LaDonna et al.'s recent 'Intruder Paradox' describes how such individuals may be subtly undermined or made to feel like outsiders within the medical community (LaDonna et al., 2025).

In our data, younger, early-career physicians and women (groups sometimes perceived as challenging dominant norms in medicine, or whose identities 'fit less' with traditional expectations of the profession) showed higher HDMC scores. **At first sight, this may seem contradictory: those who challenge medical culture also appear to endorse it more strongly.** However, this can be understood if we consider that feeling marginal or less secure in one's professional identity may make it harder to question dominant expectations. In such cases, conformity with established norms may reflect a need to feel legitimate or accepted, rather than genuine agreement (Stelling et al., 2022). Thus, **when belonging feels 'less secure' in medicine** (whether due to early-career status, persistent gendered dynamics, or the competitive and hierarchical nature of certain specialties) **stronger alignment with dominant norms may be more likely**. Importantly however, higher HDMC scores do not necessarily reflect wholehearted adherence to harmful norms. They may instead reflect conformity under social pressure rather than genuine belief - what Self-Determination Theory would describe as introjected rather than integrated internalization. We cannot determine from our data whether physicians' agreement with HDMC items reflects conviction or pressure, so this interpretation remains cautious.

Beyond documenting subgroup differences, **exploratory mediation analyses suggest that cultural endorsement itself may represent a *missing link* in long-observed disparities in PB** (younger age, female gender, residency, long working hours; cf. Chapter 1). It is likely that macro-level norms act through internalisation processes such as conformity and the need for belonging: physicians' position within the professional ecosystem shapes how strongly these norms are absorbed and, in turn, how vulnerable they become to burnout. For physicians whose identities diverge from dominant norms (or who have fewer opportunities to shape norms

through functional crafting) aligning with expectations they do not fully share can create internal value conflicts that intensify emotional strain. From a Self-Determination Theory perspective, this resembles introjected motivation: doing something because one 'should', rather than because it aligns with personal values or meaning. And in this sense, the association between HDMC endorsement and PB could reflect not only the weight of professional norms, but also the psychological cost of trying to meet expectations that feel harder to attain (or harder to distance oneself from) for some physicians. This interpretation aligns with the frameworks discussed above and is consistent with recent applications of Social Identity Theory (S. A. Haslam et al., 2009; Kerins et al., 2022; Tajfel & Turner, 2004) and Self-Determination Theory (R. M. Ryan & Deci, 2000; Stelling et al., 2022) in medical education.

Clinical and practical implications for finding 5

The variability in HDMC endorsement across physician profiles highlights that culture is *not* experienced uniformly**. Clinically, this means that prevention and support strategies should take into account where physicians stand within the professional system and how this position shapes the way they take on cultural expectations.** Although our study did not directly measure conformity or belonging, the hypothesis that some groups in medicine (especially early-career physicians, women, and those working in hierarchical or high-pressure specialties) may feel stronger pressure to prove their legitimacy or fit in (Bates et al., 2018; Castillo et al., 2020; Johnston & Peacock, 2008; Kouloumberis, 2020), or may simply not yet feel sufficiently settled in their profession to question excessive expectations, offers useful clues to adapt support provided in clinical work or supervision. Therapists or supervisors could invite physicians to reflect on which professional values feel authentic to them, and which ones seem imposed by their environment (Gordon et al., 2012). Helping physicians make this distinction could relieve feelings of guilt or failure when they struggle to meet unrealistic standards or ideals to which they do not aspire to personally.

At a broader level, recognizing that HDMC endorsement may act as a modifiable link between physician characteristics and PB **opens new possibilities for addressing and preventing burnout in medicine**. Our discussion of finding 5 suggests that vulnerability is not tied to personal characteristics, but more to how physicians relate to the culture around them. In practice, this would mean that physicians who feel less secure in their place in the profession may need extra space and support to question dominant norms without fearing negative judgment or loss of credibility. During medical training, guided discussions about belonging and legitimacy could help residents recognize these pressures early and develop a

professional identity that feels more self-chosen than imposed (Dyrbye & Shanafelt, 2011a). Later in their careers, mentoring and leadership programs could encourage senior physicians to model other ways of 'being a good doctor' - ones that value balance and openness rather than overwork or invulnerability (A. Martin, 2022a; A. Martin, Chilton, Gothelf, et al., 2020), as will further be developed when discussing finding 6.

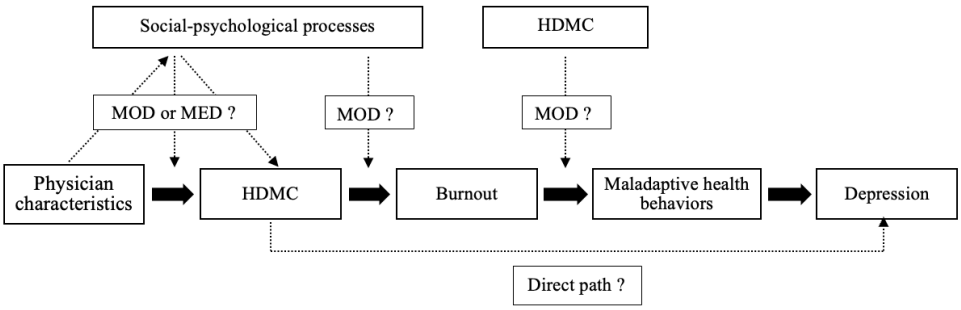
Future research for finding 5

As mentioned when discussing finding 1, future studies should clarify **how physicians come to adopt** (or, in some cases, resist) **the HDMC**, and how this process unfolds across the medical career. Longitudinal designs could follow physicians from medical school (or even before, cf. 'anticipatory socialization'; Sinclair, 1997; Varpio et al., 2025) through professional practice to identify when internalization starts and what factors shape it. For example, training in hierarchical hospital settings, long working hours, or demanding supervision (settings that virtually all residents experience at some point during their training in Belgium) may speed up the adoption of harmful norms, whereas greater autonomy later on may allow physicians to question or distance themselves from these expectations (Gordon et al., 2012). Tracing these trajectories could offer a clearer picture of medical enculturation and help identify key moments where prevention or reflection would be most effective, as discussed earlier.

Future work should also **examine the social-psychological processes** proposed here (such as the roles of belonging and conformity) to test whether they explain why some physicians internalize harmful norms more strongly than others (Toubassi et al., 2023; Wald, 2015). These processes likely act as relational pathways connecting demographic and professional factors (e.g. gender, career stage, specialty) with HDMC endorsement. Such hypotheses could be tested using existing instruments measuring conformity (e.g. Mehrabian & Stefl, 1995), social belonging in medicine (e.g. Brügger et al., 2019; Daniels et al., 2024) or professional identity (e.g. Tagawa, 2019; Toben et al., 2021). Mediation or moderated-mediation models could then explore whether conformity-driven, pressure-based internalization helps explain how belonging pressures translate cultural endorsement into psychological strain.

Figure 7 updates Figure 4 to illustrate these extensions.

Figure 7. *Updated conceptual model highlighting social-psychological processes in the pathway linking physician characteristics, HDMC, PB and depression.*



Note. The model integrates finding 5 with finding 4. Social-psychological processes (belonging, conformity, and internalization style - introjected vs. integrated) may mediate or moderate the link between physician characteristics and HDMC, and (via introjected internalization) may also strengthen the HDMC → Burnout pathway. Solid arrows represent associations supported by current data (correlations and regressions), not causal effects; dashed arrows represent exploratory or theoretical paths for future testing.

So far, our analyses have been variable-centered, focusing on associations between individual characteristics and cultural endorsement. Future research could also add a **person-centered perspective** (such as latent profile analysis) to identify distinct configurations combining physician characteristics, cultural endorsement, conformity processes and distress. This approach could reveal different ways physicians relate to medical culture (e.g. those who conform without distress, those who resist at a psychological cost, or those who integrate norms more flexibly).

In sum, finding 5 shows that while the HDMC reflect shared professional assumptions, their endorsement differs across physician groups. This finding refines our argument by demonstrating that medical culture is not experienced uniformly. One possibility is that some groups of physicians may face stronger conformity pressures, which in turn could heighten their burnout risk. Thus, vulnerability may partly arise from the psychological cost of trying to maintain belonging within a demanding professional culture.

We now turn to the discussion of findings 6 and 7 related to Chapter 7, which presented a qualitative investigation on medical culture and physician well-being.

2. Key *qualitative* findings and their implications

2.1 Preliminary discussion

Before turning to the discussion of the specific findings, several clarifications

regarding the qualitative component (Chapter 7) of this thesis are warranted[35].

Reflexive clarifications. First, it is important to situate the qualitative chapter within the broader research design of the present thesis. This thesis adopts a multi-method approach, rather than a fully integrated mixed methods design. The quantitative and qualitative studies were conceived, conducted, and analyzed as distinct but complementary investigations of the same overarching phenomenon. While their findings are brought into dialogue in the present discussion, the datasets were not formally integrated. Instead, integration occurs at the level of interpretation, and the qualitative findings are used to extend and contextualize the quantitative results. Second, the qualitative analysis followed the approach of reflexive thematic analysis as outlined by Braun and Clarke (2006, 2012). The process was iterative and reflexive. However, the nature of the dataset (i.e. responses to a single open-ended survey question) necessarily shaped the scope of interpretation. Survey free-text responses allow access to a broad range of perspectives, but they do not provide the depth typically achieved through interviews or other qualitative approaches (LaDonna et al., 2018). As a result, while reflexive thematic analysis informed the analytic process, the nature of the dataset inevitably oriented the findings toward a more descriptive-interpretive level of analysis than a fully developed constructivist account[36].

Methodological considerations. It is possible that physicians who chose to respond to the open-ended question were those particularly attuned to, or personally affected by, medical culture and distress. While this may limit representativeness, qualitative research prioritizes the meaning of experiences over statistical generalization (Willig, 2013). At the same time, the format of the data necessarily shapes what can be interpreted. Free-text survey responses (as used in the qualitative empirical chapter) can provide valuable insights, yet they rarely capture the full

[35] Note that the qualitative empirical chapter was written and submitted as a standalone manuscript prior to the final version of this thesis. The reflections developed here build on subsequent discussions held during the thesis examination process and aim to clarify the methodological positioning and scope of the qualitative component.

[36] Throughout this thesis, the research was primarily conducted within a post-positivist framework, particularly in its quantitative components, where medical culture was operationalized as a measurable construct associated with physician burnout and related outcomes. The qualitative component was conducted using reflexive thematic analysis, informed by constructivist principles. However, given the nature of the dataset and the broader design of the thesis, the interpretive scope remained closer to a descriptive-interpretive orientation. With hindsight, and through the process of completing this doctoral work, my understanding of medical culture has increasingly aligned with a constructivist perspective, as I recognized more and more medical culture as socially produced, negotiated, and contextually situated (cf. transversal limitations of this thesis). This evolution reflects the natural development of my epistemological positioning as a researcher over time and does not negate the coherence of the methodological choices made within this project.

complexity of lived experience (LaDonna, Taylor, et al., 2018). The qualitative findings presented here therefore complement and nuance the quantitative results rather than stand alone as a fully independent qualitative contribution. Moreover, we acknowledge that participants' reflections may have been influenced by their prior exposure to survey items addressing cultural norms, burnout, and health behaviours. This framing may have oriented responses toward familiar conceptual categories. Finally, the term 'medical culture' was intentionally left undefined. This allowed respondents to interpret the concept in personally meaningful ways, generating diverse - though variably elaborated - accounts.

Contribution to existing literature. The qualitative component of this thesis contributes to existing literature in a complementary and primarily descriptive manner. While prior qualitative studies have often addressed medical culture indirectly (cf. Chapter 3), our analysis explicitly invited physicians to reflect on it as a focal concept. The findings largely reinforce patterns already described in the literature - such as the idealized image of the physician, tensions between professional expectations and well-being, variation across specialties, and the interaction between cultural and organizational influences. Within the broader thesis, the qualitative chapter complements the quantitative findings by illustrating how cultural norms are experienced as embedded within interconnected levels of influence - a perspective that aligns with the socio-ecological framing adopted throughout the thesis.

Discussion of two findings. We now turn to a more detailed discussion of the qualitative findings. Given the density and richness of Chapter 7, it is not possible to comment on all themes here. We prefer to concentrate on **two key findings** that offer the greatest insight and that best complete the thesis's central argument, while providing a complementary perspective to our quantitative findings:

- **Finding 6:** the central role of medical education and training in transmitting medical culture
- **Finding 7:** medical culture is important to understand physicians' health and self-care, but it does not exist in isolation (is embedded into other interdependent levels of influence)

Finally, we wish to acknowledge that the reflections developed in the discussion of findings 6 and 7 are also broadly informed by numerous exchanges held throughout this PhD with medical students, residents, attending physicians, and supervisors (cf. **Appendix H** and **I** to which we will refer below).

2.2 Medical training plays a central role

Finding 6

Our qualitative analysis suggests that physicians perceive medical education and training as pivotal in transmitting the values and assumptions of medical culture. The strong collective representation of the 'ideal doctor' described in Chapter 7 seems to be reinforced by key actors (notably supervisors), key moments (residency), and key institutions (faculties, hospitals). Together, these elements likely shape how professional norms are internalized and sustained over time.

Theoretical implications for finding 6

Finding 6 reinforces and further illustrates a longstanding claim in the literature: **medical education and training are the primary vectors through which medical culture is transmitted and reproduced in medicine** (Dyrbye, 2025; Mahood, 2011; Song, 2020; Veal, 2021). This is logical given the broader function of medical education, which is not only to impart scientific knowledge and technical skills, but also to transmit the profession's values, attitudes, and ways of being to future physicians - often referred to as 'professionalism'[37] (Cruess et al., 2015; Hafferty, 2008; Wald et al., 2015). As discussed in Chapter 2, medical culture is an adaptive system that passes on the shared beliefs, norms, and assumptions that define the medical profession and guide both behaviour and identity (Shanafelt et al., 2019). Within this framework, **enculturation into medicine** is a process of socialization that unfolds through the formal, informal, and hidden curricula; that is, through explicit teaching as well as observation, imitation, and institutional routines (Cleland & Johnston, 2012; Hafferty, 1998; Mahood, 2011). The present qualitative findings support this view and indicate that enculturation transmits both adaptive values *and* more problematic ones[38]. Ideals of perfectionism, self-sacrifice, and neglect of self-care are learned less from lectures than from everyday interactions with supervisors and peers, and from the broader organization of training itself. Thus, these accounts suggest that part of physicians' distress may originate in how medical training conveys and normalizes harmful aspects of the medical culture, which echoes concerns raised in the literature described in Chapter 3.

Finding 6 also helps to **contextualize and extend our quantitative findings**. Physicians described medical school and residency (notably in highly competitive

[37] In French,we talk about l' « *art de guérir* ».

[38] In this thesis, we focus on the cultural values relevant to physicians' health. Medical culture also transmits many humanistic and prosocial values, whose valence cannot be reduced to their impact on health alone.

and hierarchical environments like academic hospitals) as formative periods when professional ideals are most powerfully absorbed through observation, imitation, and desire to belong (Gordon et al., 2012; Mahood, 2011). **Teachers and supervisors** act as both role models and gatekeepers of traditional norms (Brower, 2021; Cleland & Johnston, 2012; Gofton & Regehr, 2006; Karnieli-Miller et al., 2010; Paice, 2002). Through their daily behaviours and exchanges, they demonstrate what dedication and competence are expected to look like in the medical world. Physicians in our study vividly illustrated this, describing how endurance and self-neglect were implicitly rewarded during training (« We're told that it's normal to be tired - that it's part of the profession ») or that emotional restraint was presented as a professional ideal (« The medical professional culture considers that a doctor must be strong and cannot show weakness. To survive […] the only way to cope is to detach oneself from one's feelings, which is harmful and leads to burnout […] »). Such accounts illustrate how medical training environments equate self-sacrifice and emotional control with professionalism (Gaufberg et al., 2010; Kuhn & Flanagan, 2017; Ward & Outram, 2016).

Clinical and practical implications for finding 6

Throughout this thesis, we have shown that certain aspects of the medical culture (HDMC) are associated with poorer physician well-being and maladaptive health behaviours. In light of our findings and of previous literature, it becomes clear that **cultural change appears necessary for medicine to sustain both the profession and those who practise it** (Ward & Outram, 2016). Though it will take time, specific directions can support this change. Finding 6 suggests that the **medical education and the residency training process may constitute one of the most powerful levers for initiating such change** (Dyrbye, 2025; Eckleberry-Hunt & Lick, 2015; Kalmoe et al., 2019; Shanafelt, Dyrbye, et al., 2022). Physicians in our study repeatedly emphasized that the attitudes shaping their well-being were acquired at the earliest stages of training, indicating that reform must begin there. Faculties and teaching hospitals are central actors, as they both transmit - and can modify - aspects of medical culture (Brower, 2021; Montgomery, 2014).

Building on our data and literature in medical education, we outline five concrete avenues.

First, **modules on physician health, self-care, medical culture and professional identity** could be integrated into the formal curriculum at both undergraduate and postgraduate levels (Dyrbye & Shanafelt, 2016; M. Henderson et al., 2012; Mahood, 2011; Shanafelt et al., 2017, 2019a). Raising awareness about the different facets of medical culture could also help students make more informed

choices about their future careers. Understanding that some cultural norms may be more present in certain specialties or work settings can help them anticipate what they might face and choose paths that best fit their values and needs. Importantly, these courses should be mandatory rather than optional, because voluntary programs tend to reach mainly those already interested. Including these courses in the core curriculum would ensure that every student is exposed to these topics (Dyrbye & Shanafelt, 2011a). We proposed such a course at our medical faculty - of which a detailed description is proposed in the report that we sent to and discussed with the Dean of the Faculty of Medicine of our University (cf. **Appendix G**).

Second, **inviting physicians who have personally experienced burnout to share their stories during training sessions** could help normalize vulnerability and promote early help-seeking among medical learners as a form of primary prevention against distress (A. Martin, Chilton, Gothelf, et al., 2020; A. Martin, Chilton, Paasche, et al., 2020; A. Martin et al., 2021). Reflections on how these interventions should be organized to be most effective are discussed below in future research perspectives associated to this finding.

Third, medical schools and residency hospitals could **create regular, protected discussion spaces** (for instance, Balint groups, Schwartz Rounds, or other small peer meetings) where both physicians and trainees can talk openly about their experiences, doubts, and emotional challenges in a supportive environment (Beckman, 2015; Gerada, 2019; Morgan, 2024; Shanafelt et al., 2019). These settings could offer peer support, reduce feelings of isolation and shame, and help physicians integrate self-reflection into their daily practice (Feist et al., 2020). Yet, such initiatives must be carefully designed to address barriers frequently cited by physicians, including psychological (like fear of breaches of confidentiality and of professional judgement by peers) and structural barriers (lack of time or excessive workload limiting engagement in those initiatives) (Adams et al., 2010; Gerada, 2022; Wessely & Gerada, 2013; Zaman et al., 2022). To overcome them, institutions could collaborate with independent facilitators (i.e. external psychologists or inter-hospital networks) and ensure that such discussion spaces are scheduled within working hours (Clough, March, et al., 2019; Zaman et al., 2022). Similar support structures should also be made available to physicians in independent practice. Professional associations or local medical circles could coordinate such confidential reflection spaces[39] (Jonckheer et al., 2011).

[39] While initiatives such as *Médecins en difficulté* in Belgium already provide crucial assistance, they are often accessed only in moments of crisis ('tertiary intervention'). More proactive and easily accessible forms of support are also (in complementarity) needed for earlier prevention.

Fourth, medical faculties and hospitals could establish **structured mentorship or supervision programs** to support medical learners and physicians. These programs would train supervisors to discuss the challenges that (future) physicians may face in their learning environment or practice, to help them recognize personal limits, develop coping strategies, and maintain a balance between work and life (Beckman, 2015; Gérin-Lajoie et al., 2021; Wainwright et al., 2017). We argue that every student, intern, resident, and practising physician should have access to an independent physician-mentor (separate from evaluation). For such programs to be effective, they must also operate within a climate of psychological safety (Torralba et al., 2020) and include explicit safeguards to protect confidentiality.

Finally, **raising awareness among supervisors and faculty members** about medical culture appears essential, as they play a central role in transmitting professional norms. Throughout this PhD, we had several opportunities to present the findings of this thesis to physician supervisors (of different specialties and practice settings). The exchanges following these presentations were instructive because they revealed both the resistance that naturally arises when long-standing values are questioned (cf. final considerations below), but also the genuine recognition, among many supervisors, of the cultural patterns described throughout our work. Such initiatives represent an important starting point to sensitize those who shape medical culture from within training, even if broader structural change ultimately extends beyond their individual reach (cf. discussion of finding 7). Additional insights drawn from these exchanges are summarized in **Appendix H and I.** Note that raising awareness among supervisors and faculty may need to come first. As will be further argued below, without change at this level, the four previous initiatives will be difficult to implement effectively.

We visualise the precedent suggestions of clinical and practical implications associated to finding 6 in **Figure 8**.

Figure 8. *Initiatives to foster cultural change in medical education and training*



Note. These are only some of the many other initiatives which could be proposed in medical education and training to, over time, support cultural change in medicine.

While the initiatives outlined above directly respond to concerns voiced by

participants and represent important first steps, **such measures will remain limited** (or fail to produce lasting change, and even lead to unintended harmful consequences) **if they are not supported by organizational and institutional structures moving in the same direction** (Dyrbye & Shanafelt, 2011a; LaDonna et al., 2022; Wainwright et al., 2017). Though physicians have a personal and professional duty to care for their own health, this is only truly possible within environments that acknowledge and support that effort (Eckleberry-Hunt & Lick, 2015; Shanafelt, 2021; Shanafelt et al., 2017; Trockel et al., 2019)[40]. As we argued in Chapter 2, medical culture is transmitted via the formal, informal, and hidden curriculum. Curricular reforms (targeting the formal) or peer-support initiatives (targeting the informal) will have limited impact if the hidden curriculum in medical faculties continues to reward competition, perfectionism, and self-sacrifice, or if the very physicians who teach medical learners embody harmful or unbalanced ideals (Hafferty, 1998, 2008; Phillips & Clarke, 2012; Stern, 1998). This reflection must also extend to hospitals, where residents and interns complete much of their training. Hospital institutions also have their own organizational cultures and tacit assumptions (cf. Chapter 3). When hospitals depend on interns and residents to absorb workload and maintain service continuity, learning objectives can easily become secondary. **As long as medical learners are required to 'keep the system running' instead of the system being designed to support their learning, harmful practices will likely persist** (cf. discussion of finding 7). In the end, addressing medical culture in training requires targeting all levels of the curriculum in medicine (formal, informal, but also hidden[41]).

Future research for finding 6

Applied research is essential to determine whether the initiatives proposed earlier effectively improve well-being in the profession.

One promising avenue would be to **adapt and evaluate interventions similar to those developed by Martin et al.** (A. Martin, Chilton, Gothelf, et al., 2020; A. Martin, Chilton, Paasche, et al., 2020; A. Martin et al., 2021). In Martin et al.'s work,

[40] It is also important to address a common concern in the medical community: that prioritizing physicians' well-being could jeopardize patient care. In reality, the opposite is true. Physicians cannot sustainably care for patients when their own health is compromised.

[41] To directly question the hidden curriculum, Hafferty suggests that medical faculties could, for example, reassess study programs and evaluation systems (i.e. considering whether some courses remain necessary in light of the evolution of medicine's landscape and the inclusion of new tools such as AI), how entry and grading practices foster competition, or how faculty promotion criteria privilege certain profiles more than others. Each of these dimensions communicates what the institution truly values (Hafferty, 1998, 2008).

physicians who had experienced mental ill-health[42] shared their stories with medical students, helping to normalize vulnerability and encourage help-seeking. A comparable intervention could focus specifically on burnout, where the role of professional culture is particularly salient. Such an approach would thus complement Martin et al.'s work while addressing a different dimension of physician distress and further respond to the lack of empirical resarch on interventions to promote attitudinal change in medicine (Clough, March, et al., 2019; A. L. Walsh et al., 2019). For such an intervention to be effective, several key conditions need to be met. *First*, because the impact of testimonies depends largely on who delivers them and how they are shared, attitudinal change works best when messages come from credible and charismatic members of one's own professional group - people seen as competent, experienced, and representative of the profession (Schulte et al., 2024; Tajfel & Turner, 2004). Therefore, physicians invited to share their stories should be carefully chosen, ideally including both specialists and general practitioners from academic and non-academic settings, so that learners with different career aspirations can identify with them. *Second,* physicians who share their personal experience should feel psychologically 'ready' to do so and speak in a setting that ensures psychological safety for both speakers and participants (Henderson et al., 2014)[43]. This requires establishing clear rules of confidentiality, so that students understand the importance of respecting personal privacy from the outset. *Finally*, programs should preferentially include direct interpersonal contact (for example, facilitated small-group discussions following the lived-experience testimonies where interaction with the physicians who shared their stories is possible) and access to ressources and confidential support for participants who may need help after the session (A. Martin, Chilton, Gothelf, et al., 2020; A. Martin, Chilton, Paasche, et al., 2020; Thornicroft et al., 2016).

A second line of inquiry could involve **testing new educational modules** on medical culture, physician health, and self-care (Dyrbye & Shanafelt, 2011a, 2016; Rich et al., 2024) such as the one we proposed in **Appendix G.** Implementing pilot courses at different stages of medical training would allow exploration of when such forms of primary prevention are most beneficial (whether early in medical school,

[42] Which, upon exchange with the original author, mainly talked about mood disorders, medical errors, and 'any other sense of fallibility' in medicine.

[43] At the 2025 Canadian Conference on Physician Health which I attended while preparing this Discussion, a session on digital storytelling (a creative way of sharing personal experiences through short multimedia stories that mix images, sound, and narrative ; CCPH 2025, 'Reclaiming Voice in Medicine' session) showed how such an approach can help people share experiences of burnout, depression, or suicidal thoughts in a more supportive and safe way - without having to relive the distress each time they tell their story.

before or after internships, during residency, or at multiple points throughout training with 'reminders')[44]. Combining the two types of initiatives (shared testimonies and dedicated courses) within a single, structured teaching unit could further reinforce their impact and send a strong institutional message, i.e. signaling to students that physician well-being and self-care are genuinely valued by the medical faculty as components of medical professionalism (Eckleberry-Hunt & Lick, 2015; Shanafelt, 2021; G. Walsh et al., 2019). Future applied research should similarly examine the effectiveness of peer-support and mentorship interventions proposed earlier, though we will not further develop this here.

Importantly, **any new curricular or institutional initiative should be rigorously evaluated and meet the same standards of evidence used elsewhere in medicine** (Dyrbye & Shanafelt, 2011a, 2016). Their effectiveness must be demonstrated through tangible outcomes (i.e. clinically significant changes in attitudes, reductions in burnout scores, or improvement in overall well-being) explored for instance through randomized (controlled) designs with pre-post HDMC measures.

In sum, finding 6 indicates that medical training is a key channel through which medical culture is passed on and reinforced. (Harmful) ideals of the medical culture seem to be learned less from formal teaching than through everyday observation and role-modelling by supervisors. Because many of these expectations are internalized early, education and residency represent decisive stages for prevention and change. We now turn to the final finding (finding 7) we will discuss in the general discussion of this thesis - which contextualizes medical culture in a broader web of influence.

2.3 Medical culture matters, but it does not exist in isolation

Finding 7

Physicians described medical culture as strongly shaping their health and behaviour, but not as an isolated system. Instead, they situated it within a broader web of influences that both shape and sustain its impact. While professional expectations of commitment, endurance, and self-sacrifice were central in physicians' accounts, these norms seem to be continuously reinforced (or at times challenged) by other factors operating at different levels of their environment, from

[44] Although this section focuses on medical training, similar interventions may also be beneficial for established physicians. Some may only recognise patterns of excessive involvement or unhealthy norms later in their career, and targeted educational modules (of continuous training) at that stage could support reflection and adjustment.

personal traits and relationships to institutional structures and broader societal expectations.

Theoretical implications for finding 7

Finding 7 refines our understanding of medical culture by suggesting that its influence on physicians' health and self-care cannot be understood in isolation. Consistent with the socio-ecological framework outlined in Chapter 1, medical culture seems not to be an isolated determinant of physicians' health, but a **dynamic macrosystemic force** negotiated across ecological levels (Jenkins, 2023; Schulte et al., 2024). This interpretation is also consistent with what we first proposed when discussing finding 2 (see also Figure 2), while our qualitative analysis makes it more tangible: physicians across specialties, practice settings, and career stages described how medical culture promotes an idealized image of the physician as devoted, tireless, and self-sacrificing, which in turn influenced their own health and self-care practices. At the same time, this ideal was described as being reinforced by surrounding influences including personal traits such as perfectionism or guilt (ontosystem), expectations from patients, colleagues, or supervisors (microsystem), limited space for identities outside medicine (mesosystem), or institutional pressures linked to workload and administrative demands (exosystem).

Yet, some influences also appeared to challenge dominant ideals of the medical culture, of which we discuss two examples here. *First*, at the ontosystemic level, a few physicians described personal forms of resistance (through personal agency, self-valuation, or certain coping strategies) that helped them take distance from dominant cultural norms (Gordon et al., 2012; Moniz et al., 2021; Trockel et al., 2019). *Second*, at the chronosystemic level, broader generational and societal changes (such as shifting views on work-life balance and the reduced stigma surrounding vulnerability) were seen as questioning long-standing norms of endurance, sacrifice, and self-denial in medicine. These shifts can create tensions across generations: 'younger' physicians try to reconcile evolving societal values with persistent expectations in the profession (cf. aligning with the conformity processes we hypothesized in finding 5 and with the notion of assimilation described by Gordon et al. (2012)); while 'older' physicians sometimes (but not always[45]) experience frustration, ambivalence, or a sense of inequity as the norms and ideals that shaped their own training and sacrifices are increasingly being questioned. For both 'generational' groups, these shifts likely generate dissonance and additional

[45] From what we have heard in our field exchanges, some more 'senior' physicians also find the changes which accompany the priorities emitted by the 'new generations' as both necessary and positive.

distress (Johnston & Peacock, 2008; Shanafelt et al., 2019; Varpio et al., 2025).

Within the thesis as a whole, finding 7 integrates earlier findings - on harmful cultural norms (finding 1), their links to behaviour and distress (findings 2 to 4) and their transmission and variability across groups (findings 5 and 6) - within a single socio-ecological framework. Seen through such a multi-level perspective, medical culture appears neither static nor self-contained. It appears to evolve through its interactions with other layers of the system (Pearl, 2021; Shanafelt et al., 2019). This nuances earlier literature that can sometimes give the impression that medical culture as a stable background factor influencing physicians' attitudes and well-being (cf. Chapter 2). Finding 7 is consistent with a more **dynamic and situated view** of medical culture and its influence: for each physician, how cultural norms are perceived and enacted likely depends on their specific and unique socio-ecological environment (Carmack, 2019; De Lisser et al., 2024).

Clinical and practical implications for finding 7

While a socio-ecological understanding of physician distress is not new in the literature (e.g. Carmack, 2019; De Lisser et al., 2024), finding 7 adds nuance by illustrating that among the many multi-level factors contributing to physician distress, medical culture plays a central role (which echoes our quantitative findings). Second, it suggests that medical culture remains persistent because it is interdependent with other forces that sustain it (Jenkins, 2023).

In clinical work, helping physicians recognize these elements can support reflection on both the origin of the distress they experience and the ways they respond to it (Delbrouck, 2017). This may help reduce the self-blame that is often present among physicians (M. Henderson et al., 2012; Wilson et al., 2019), validate physicians' experiences, and encourage a more compassionate view of their suffering as a response to multiple, interrelated pressures (Bayot, 2020; Trockel, 2019) including professional cultural expectations (Montgomery, 2014; Shanafelt et al., 2019). We refer to the discussion of clinical implications of the earlier findings for further reflection on clinical work with physicians experiencing distress.

Finding 7 also underlines that **meaningful cultural change in medicine cannot occur at a single level**. if medical culture interacts with individual, organizational, structural, and societal factors, efforts to improve physician well-being must be coordinated across these interconnected layers (Carmack, 2019; Jenkins, 2023). In earlier findings, we highlighted the importance of initiatives for change within training and institutional contexts. Finding 7 adds that such initiatives will remain limited unless they are supported by other broader systemic change such as reducing structural barriers (administrative overload, unrealistic productivity

goals) (Shanafelt, 2021; Sinskey et al., 2022; C. P. West et al., 2018) and changing public and societal narratives that portray physicians as invincible, tireless and constantly available (Bourquin et al., 2023; Goranson et al., 2020). These reflections were also echoed in feedback from physicians during the presentation of the qualitative findings who emphasized that economic, political, societal, and legal structures (i.e. remuneration systems, regulatory constraints, patient expectations) further shape how medical culture is experienced in practice (we summarized this feedback in **Appendix I**). In these discussions, the generational differences in attitudes toward work and professional identity resonated with the experiences of many. These differences sometimes make collaboration harder, but they can *and should* also create opportunities for dialogue and gradual cultural change (cf. below).

While cultural change will take time and require coordination across all levels of the system (Sawatsky et al., 2023) including some of which physicians have no control on, it is important to communicate to physicians that they are nonetheless key actors in this process (Moniz et al., 2021; Shanafelt, 2021). Many of the cultural expectations that contribute to distress are reproduced in everyday professional interactions, through what physicians model to students, value in colleagues, or tolerate in their workplaces. As Brower (2021) suggests, « The good news is that our professional culture is ours [physicians] to change ». We complement this perspective by noting that **cultural change in medicine is a shared responsibility** (Eckleberry-Hunt & Lick, 2015; Panagioti et al., 2018). Encouraging physicians to reflect on their own role in sustaining or transforming harmful norms is an important first step toward collective change (cf. final considerations below).

Future research for finding 7

Future research should continue to explore how individual, interpersonal, work-related, institutional, and societal forces interact to shape medical culture and physician well-being - and, importantly, how these forces can be changed.

Physicians should be actively involved in this process (Bynum et al., 2021). When presenting the qualitative findings of Chapter 7, discussions that followed with physicians always generated rich reflections and concrete ideas for improvement. This suggests the potential of developing **focus groups or co-reflection workshops** where physicians can collectively examine medical culture and identify practical, multi-level ways to foster change in line with the evolving realities of medical practice (Shanafelt et al., 2019; Shanafelt, 2021). Such initiatives should include participants from different generations, not to deepen generational divides but instead to foster dialogue around shared professional values and experiences - and to reflect together on what a desired or more sustainable medical culture could look

like (Johnston & Peacock, 2008; Jonckheer et al., 2011; Jovic et al., 2006). To encourage open exchange, this should be facilitated by neutral yet experienced mediators outside the medical profession (Shanafelt et al., 2019). Qualitative analyses of such intergenerational dialogue could then provide insight to support cultural evolution in medicine. Physicians, researchers and policymakers need to co-design practical roadmaps for (short, mid and long-term) change that might later inform hospital structures, medical faculties, and regulatory bodies (see Dyrbye et al. (2017); Moutier (2018) or Underdahl et al. (2024) for examples of such roadmaps).

Since broader cultural change will take time, in the meantime, we could argue that every physician should be encouraged to resist the most harmful aspects of medical culture for them (i.e. by setting boundaries with patients, institutional demands), while recognizing that doing so is essential not only for their own well-being but also for the sustainability of the medical system and for the quality of the care given to patients. To support this, research can help us learn from physicians who, at the individual level, manage to resist or reinterpret dominant cultural norms. The 'Intruder paradox' described by LaDonna et al. (2025) depicts how those who challenge prevailing expectations are often marginalized[46], though their experiences can offer important lessons. Qualitative research needs to continue exploring how physicians navigate medical culture and deliberately engage in a process of assimilation to make conscious choices about which norms they adopt or resist (Gordon et al., 2012).

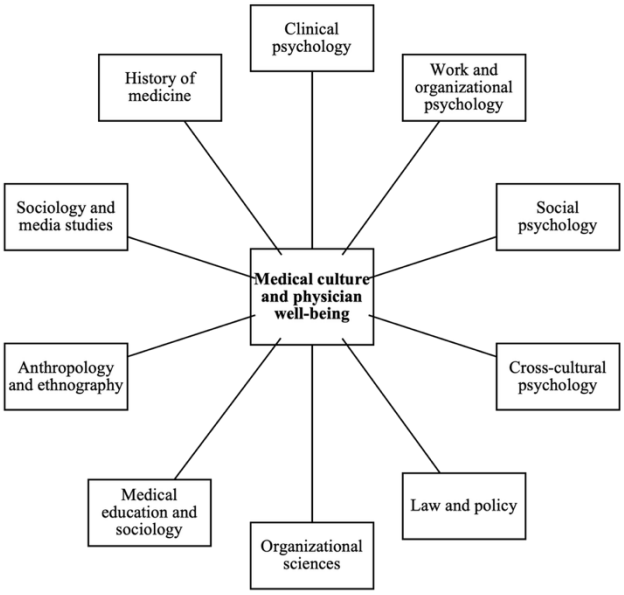
Finally, while reflecting on the complexity revealed in finding 7 together with the other findings of this thesis - it becomes clear that future research on medical culture and physician well-being requires an **interdisciplinary approach**. While we do not claim to know the full extent of work already carried out across disciplines, collaboration among them will be essential to deepen the themes identified here and to develop meaningful strategies for change. Although this work is grounded in health psychology (see General Introduction), it has been continuously informed and enriched by insights from other fields. This underscores both the complexity of the topic and the diversity of perspectives needed to study it. Approaches from different disciplines could further advance the line of work developed throughout this thesis by connecting psychology, sociology, organizational sciences, law, history, and the

[46] This form of resistance is not surprising, as culture by definition provides stability and continuity (Schein & Schein, 2019a). Those who question it are therefore often met with opposition. Sustainable change requires identifying the gaps between the current and the desired culture, drawing on existing cultural strengths to support the transition, and creating psychological safety for those who must unlearn old habits and adopt new ways of working (see Shanafelt et al., 2019 for further discussion of cultural change in medicine).

humanities to examine medical culture as a dynamic, multi-level phenomenon (cf. **Figure 9**). Such collaboration would not only refine our understanding of how medical culture shapes physician well-being, but also inform the development of evidence-based interventions that address its multiple interacting determinants.

For an overview of potential disciplinary contributions, see **Appendix J**.

Figure 9. *Interdisciplinary perspectives to further understand medical culture and its relation to physician well-being*



This concludes our discussion of the seven key findings identified across the four empirical chapters of this thesis.

Taken together, these findings contribute to addressing some of the gaps outlined in the theoretical section of this thesis. The HDMC model brings together and measures cultural assumptions that had previously been examined separately; its links with physician well-being were demonstrated across several outcomes; differences in endorsement show for whom medical culture likely exerts the greatest influence; and the qualitative analyses gave voice to physicians' own experiences of how these norms are learned, reinforced, and sometimes challenged. Together, these contributions provide both conceptual and empirical foundations for a more systematic understanding of medical culture as a macrosystemic determinant of physician well-being.

We now turn to the transversal limitations and conceptual reflections that frame these findings and inform their interpretation.

3. Transversal limitations and conceptual reflections

While this thesis offers new insights into how medical culture relates to physician burnout and health, it also has several limitations that must be acknowledged. Beyond the limitations discussed in each empirical chapter, the following section reviews transversal limitations including considerations about study design, generalisability, measurement, scope of focus, and the theoretical and epistemological positioning of our work.

3.1 Considerations regarding the study designs

This thesis adopted a cross-sectional and largely exploratory design for its quantitative studies. While this approach inevitably limits causal inference, it was a deliberate and necessary choice given the absence of prior empirical models of medical culture and the need to first define, explore, and test new constructs. As a result, **the direction of effects between cultural norms and physician distress cannot be disentangled based on our data**. Although the findings and their interpretation (supported by literature and exchanges with physicians) suggest that certain aspects of medical culture contribute to physician burnout and distress, causality cannot be inferred. Without longitudinal or experimental designs, it remains uncertain at this point whether changes in medical culture would translate into improved well-being - both at the individual level (e.g. whether physicians who shift their relationship to cultural norms experience better health and lower distress) and at the collective level (e.g. whether broader cultural change within the medical profession would lead to improvements in indicators such as burnout rates, workforce retention, or even quality of care). The qualitative part of this thesis was also shaped by specific methodological limitations such as self-selection and analysis of brief responses (cf. discussion of qualitative findings), which again reflects the exploratory nature of our work.

With hindsight, **starting the project with an inductive qualitative exploration** might have helped to develop a conceptual model of the harmful aspects of the medical culture *before* its quantitative application (following a bottom-up approach)[47]. Such a study could have involved focus groups with physicians from different specialties, levels of training, and practice settings to explore how they

[47] Although we did not conduct an initial qualitative investigation of medical culture per se, the development of the HDMC items was indirectly informed by a bottom-up approach. Indeed, we drew on exchanges with physicians who had experienced burnout, which helped orient our research focus, as well as on the extensive narrative and conceptual literature reviewed in Chapter 2. Together, these sources helped us form an understanding of the assumptions that shape physicians' work and thus guided the items of the scale.

define and experience medical culture in their daily work. Or, it might have consisted in semi-structured interviews with physicians who experienced burnout where we could have explored how they perceived medical culture in relation to their experience. Conducting an inductive thematic analysis of these narratives could have provided a more grounded understanding of the key dimensions and mechanisms of medical culture, to then inform the later development of the HDMC model. This offers interesting perspectives for future research. In the case of this thesis, the sequence of studies was primarily shaped by pragmatic considerations, including publication constraints, the greater feasibility of publishing quantitative work at the time, and a more limited expertise on qualitative research within the research team.

Overall, the design choices of this thesis were well suited to an exploratory first step in studying medical culture, but they also point to the next stages needed to build on this work.

3.2 Generalisability of the findings ?

The results of this thesis should also be interpreted within the context of the sample and setting in which they were obtained. Importantly, all findings are grounded in a shared data collection conducted among French-speaking, mainly Belgian physicians. This choice was both pragmatic and ethical. From a practical point of view, collecting a large and coherent dataset in a single recruitment effort made it possible for us to reach enough participants in a population that is hard to access and often has limited time to participate in research (Davin, 2022). From an ethical standpoint, this approach also reflected a commitment to respect physicians' time and contributions. I considered it important to make full and meaningful use of the data I had collected, rather than repeatedly soliciting new participants for separate studies. Nevertheless, though this approach ensured consistency across the empirical chapters, it also means that the findings rest on a single source of data, which importantly limits their generalizability. Replication in other, independent samples is needed to confirm whether the observed patterns (and the HDMC model itself) hold true in different contexts (including different healthcare and social contexts, but also different nationalities and cultural values, e.g. individualistic vs collectivistic countries (Hofstede & Minkov, 2013); as the strong emphasis on autonomy and individual fulfillment in Western societies likely shapes medical culture or how it is experienced - cf. a cross-psychological perspective as suggested in **Appendix I**).

Our data also reflect the perspectives of physicians who *chose* to participate, which may not represent the broader profession. Those already interested or concerned about physician well-being or medical culture may have been more likely to respond, while others (perhaps more disengaged or resistant to the topic) may have

been underrepresented. Such **participation bias**, in which individuals more attuned to the subject are likely overrepresented (Elston, 2021) is a known challenge in research in psychology, and specifically in research including physicians (Davin, 2022). It remains unclear how physicians who did not participate would position themselves in relation to the cultural assumptions explored here. Considerable effort was made to reach a diverse pool of participants through multiple recruitment channels. Despite these efforts, participation bias cannot be fully avoided, because physicians' availability and motivation to take part in psychological research are necessarily limited by different reasons, including time constraints and motivation (Davin, 2022).

3.3 Measurement and construct considerations

Next, I reflect on two limitations that relate to measurement and construct validity.

First, the exclusive reliance on **self-reported data** represents a transversal limitation across all quantitative studies of this thesis. Physicians' responses may have been influenced by social desirability[48] (Latkin et al., 2017), subjective interpretation of items, or temporary factors such as mood or survey fatigue (Jeong et al., 2023) - which we sought to minimize by designing a survey that could be completed in under 20 minutes. Future research could combine self-reports with complementary data sources - such as hetero-evaluations by peers or closed ones, behavioural indicators (e.g. observed presenteeism), or more objective health measures to reduce this bias and strengthen validity.

Second, some considerations concern the HDMC scale that underpinned three of the four empirical studies. The HDMC represents a promising yet still preliminary attempt to operationalize harmful aspects of medical culture, as several conceptual and psychometric limitations remain (cf. discussion of finding 1). More fundamentally, it is important to recognize at this point that **culture itself is a complex and multilayered phenomenon, and that research inevitably simplifies reality**. Each HDMC item was developed from literature describing the shared norms of the medical profession and reviewed by both psychologists and physicians. These items were designed to capture tacit assumptions that physicians encounter throughout training and practice - such as self-sacrifice, endurance, identity centrality, or stigma toward vulnerability. We interpreted higher Likert scores on the HDMC items as the degree to which physicians identify with, endorse, or internalize

[48] In Chapter 4, we statistically controlled for social desirability. These analyses, reported in the related supplemental material, showed that controlling for this variable did not meaningfully alter the main results.

these shared cultural norms and expectations. However, as Schein & Schein (2019b) remind us, much of culture operates at a tacit level through shared assumptions that are difficult to access or quantify. According to these authors, surveys can capture explicit perceptions and espoused values, but they rarely reach the deeper, largely unconscious assumptions that shape behaviour within professional groups. In this sense, quantitative measures such as the HDMC may reflect physicians' perceived professional expectations, or their pre-existing dispositions (since not everyone chooses to enter medicine) rather than the deeper internalization of norms that solely occurs through medical education and professional socialization. I argue that these **processes are necessarily intertwined:** the medical culture has historically evolved in dialogue with the characteristics and values of those who are drawn to the profession. Professional cultures, including that of medicine, are embodied by their members and cannot be separated from the individuals who live and reproduce them. Medical culture is not a fixed code external to physicians but a dynamic process that evolves through their identities, histories, and values, as well as through their interactions with institutions, peers, and patients. Keeping this in mind, the HDMC should be understood less as a measure of culture 'in itself' (one that is externally or objectively defined) than as a reflection of how physicians perceive and internalize the norms that shape their professional world. Interpreted in this way, it remains a useful and relevant tool for studying medical culture. It also is valuable because it makes visible and discussable aspects of culture that are often taken for granted and go unnoticed in the profession (as discussed in finding 1).

Finally, with hindsight, the choice to use the term 'Harmful Dimensions of Medical Culture' brought useful conceptual clarity for this research, **but it also risks oversimplification**. As discussed, certain norms described as detrimental in specific contexts (particlarly here for physician well-being) can, in relation to other outcomes, serve adaptive or protective functions. For example, values such as commitment and self-sacrifice may strengthen solidarity within teams or provide meaning and purpose in physicians' work. Moreover, the findings on existential meaning add an important nuance. Although ES is not part of the HDMC, it relates positively to some of its dimensions (particularly those linked to commitment, identity centrality, and moral responsibility). This suggests that these cultural expectations may hold a dual potential: they can become burdensome when taken to extremes, but they may also support meaning, motivation, or resilience when they remain balanced and are reinforced by supportive working conditions. Recognizing this interplay helps to adopt a more nuanced view of medical culture, in which certain expectations may function as risk or protective factors depending on how they are experienced and on the outcomes under consideration. In light of this, a more

balanced terminology[49] may have better captured this nuance and encouraged, at times, a more open and constructive discussion about cultural change in medicine.

3.4 Limitations regarding the scope and focus of this thesis

3.4.1 Narrowing culture to its harmful dimensions

As discussed above, while some cultural expectations can be associated with meaning under certain conditions, the present thesis focused specifically on those that may relate to physician distress (potentially *harmful* for physicians). **While this focus was necessary to address a clear gap in the literature, it also narrows the overall perspective.** By investigating medical culture as a risk factor for physician well-being, we have 1) contributed to the existing imbalance in the literature, which has historically emphasized vulnerabilities and risk factors over the sources of fulfillment and meaning that sustain and protect physicians (R. Woodward et al., 2022) - and 2) not examined how medical culture can also act as a positive and protective force among physicians and for the profession. Many longstanding values in medicine such as vocation, commitment, and dedication to patients are central to professional identity and can foster resilience as well as personal and professional fulfilment (Shanafelt et al., 2019). These values help explain why so many young people are drawn to medical studies (Goel et al., 2018, see also Chapter 2) and why, despite increasingly difficult working conditions, many physicians continue to find meaning and purpose in their work (Gielissen et al., 2021; R. Woodward et al., 2022). Moreover, cultural expectations identified in this thesis as harmful may not be inherently negative; their effects likely depend on how strongly they are endorsed and on the context in which they operate. For instance, commitment and identity centrality can be powerful sources of meaning and motivation when kept in balance, but may lead to exhaustion or guilt when taken to extremes or unsupported by institutional conditions (Shanafelt et al., 2019; Shanafelt, 2021). And while these norms and expectations could have negative consequences for physicians' health (which was the focus of this thesis), they may also be experienced as deeply positive because they shape the vocation and sense of purpose that motivate the choice to enter and remain in the profession[50].

Thus, while it remains essential to understand and empirically test how certain cultural expectations contribute to physician distress, future research is needed to

[49] For instance : 'Cultural norms with potential negative effects'.

[50] This ambivalence is vividly expressed in the memoir « Chienne de vie, je t'aime » (written by Monique Brossard Le Grand in 1981), whose title itself captures the oxymoronic way in which the medical profession can be experienced as both harsh and deeply cherished.

nuance this picture in several ways. *First*, research should examine how the very expectations identified here as potentially harmful for physicians' health may also hold positive or adaptive functions - whether because they reflect valued aspects of the profession (such as commitment or responsibility), or because they support other outcomes beyond physicians' health (such as meaning, team cohesion, or the quality of care). *Second*, future work should explore how physicians navigate these expectations in practice, for instance how they find a balance between dedication and overinvestment, or between caring for others and caring for oneself. To investigate how physicians experience such tensions, qualitative research would be particularly suited. *Third*, research should also investigate other aspects of medical culture that may be adaptive or protective whether for well-being or for other important outcomes. Bringing these perspectives together would help build a more complete and nuanced understanding of medical culture and how it shapes physicians' experiences and health.

3.4.2 Focusing on the cultural layer only

Beyond the focus on medical culture, it is also important to acknowledge that physician well-being results from a complex interplay of multiple influences that form a unique configuration for each individual. By nature, research can only capture a simplified version of complex realities, and this thesis chose to concentrate on the cultural layer in particular. **Other determinants** (individual, interpersonal, organizational, systemic, and societal) **were acknowledged throughout this thesis but not directly analyzed.** These layers are essential parts of the broader ecosystem in which medical culture operates (Jenkins, 2023; Schulte et al., 2024) and future research should examine how cultural expectations intersect with these other factors, as noted throughout the discussion of our findings.

3.5 Epistemological and theoretical considerations

Since its conception, this research project has been situated within the field of health psychology, but it was designed as an exploratory research rather than one anchored in a specific theoretical framework. From the outset, our goal was not to test existing models but to explore an understudied yet complex construct: medical culture. This work was guided by a socio-ecological understanding of physician burnout as a multidetermined phenomenon and by the conviction - outlined in the general introduction - that medical culture plays a key yet insufficiently examined role within this system. **At that stage of the research, adopting an open and exploratory approach seemed both appropriate and necessary given the state of the literature and my understanding of the field at the time.**

It was only later, when integrating and discussing the findings within this thesis, that I began to connect our results to established theories from health, clinical and social psychology such as the Theory of Planned Behaviour, Self-Determination Theory, Self-Discrepancy Theory and Social Identity Theory. These frameworks, which I drew upon from my background in psychology (as this is a thesis in psychology after all), were useful to interpret how physicians internalize professional norms and how these relate to their well-being. Yet, as I delved deeper into the literature while writing this discussion, I also realized that other disciplines - particularly medical education and medical sociology - could have provided a valuable framing from the outset. For instance, research on Professional Identity Formation (Cruess et al., 2015), which I referred to at times when discussing the findings, describes medicine as guided by a shared 'ideology' (Sawatsky et al., 2023), a notion that closely parallels what we conceptualized as medical culture. Both perspectives explore how physicians are socialized into shared ideals and behaviours that shape who they become as professionals.

In this discussion, we made efforts to connect our work to complementary perspectives (cf. discussion of finding 7). While some might view the absence of a single disciplinary anchor as a limitation, we see it as one of this project's strengths. Trying to look at physician well-being through multiple perspectives (including psychological but also, sociological, historical, or educational perspectives) allowed us to situate medical culture within the broader ecosystem in which physicians work. Drawing from them was essential to capture the richness and complexity of the phenomenon we were studying. **The insights offered by this thesis, grounded in health psychology, are important because they shed light on how cultural norms relate to physician well-being. However, these findings now need to be developed further and anchored within more specific theoretical and disciplinary frameworks.** As Bynum et al. (2021) note, there is no single, universally correct way to define and address physician wellness. Understanding it requires perspectives that cross disciplinary boundaries and build on insights from psychology, medical education, and anthropology alike. I hope that this thesis lays the groundwork for future research that continues this necessary conversation.

4. Some final considerations to keep in mind

In the following section, I share personal reflections that emerged not only from the research itself, but also from the books, articles, documentaries, conferences, and encounters that accompanied this work. These reflections do not aim to provide additional evidence, but to convey broader thoughts that have taken shape over time and may contribute to ongoing dialogue on the themes explored in this thesis. Writing this manuscript is also one of the only moments where I can step

back and reflect on my PhD as a whole, and it seemed important to make space for these considerations here.

4.1 Changing medical culture

The main practical implication that stands out from this thesis is that something must be done to address the harmful aspects of medical culture, given their consequences for physicians. If the profession is to remain sustainable (for physicians themselves, for healthcare systems, and ultimately for patients), **medical culture must evolve**. In that sense, it should be considered a public health issue: we have indirect evidence that certain parts of the medical culture affect the attractiveness and retention of the profession, contribute to exhaustion and suicide among physicians, and may even bear on the safety and quality of care. Medical culture is not the sole cause of these issues, but it undeniably plays a part in them.

When discussing the implications of this research, I am often asked a simple yet challenging question: « So, how can we change this ? ». By choosing to investigate medical culture as a macrosystemic influence, I did not tackle a simple or 'easily modifiable' variable. Nothing related to human behaviour ever is. Cultural change is, by nature, a long and complex process. As I heard while attending the Canadian Conference on Physician Health (October 2025), it is often said that cultural change takes at least a decade. In medicine, such change will necessarily be gradual and require the involvement of multiple actors - from individual physicians to students, supervisors, institutions, patients, healthcare organizations, student unions and resident associations, and politics. There is no quick fix (Montgomery, 2014). Changing medical culture ultimately means adapting a whole system that has been in place for generations - one that may once have been adaptive, but (partly) no longer is. Real and lasting change will require sustained, collective effort.

Yet, encouragingly, **cultural change in medicine is already under way**. The collective mobilizations for fair compensation and respect of legal working hours advocated by student unions and residents' associations (in Belgium, such representatives importantly improved working conditions and contributed to positive, significant changes), the breaking of silence around mental health, and the growing attention given to medical culture in research and training for supervisors are all examples of shifts that would have been difficult to imagine until recently. Such shifts represent concrete manifestations of this cultural change that is continuously negotiated in parallel with broader societal change - and, importantly, one that seems irreversible. In daily practice, these transformations are also increasingly visible. The senior physician who once stayed silent but now denounces inappropriate behaviours among colleagues, the resident who dares to report

harassment publicly, the patient who accepts that their doctor may not be reachable at all hours, the supervisor who listens when trainees express fatigue and helps them find solutions, or the colleagues who genuinely ask one another how they are doing (and do not look away when one seems unwell) - all these gestures are small but concrete signals of an evolving professional culture. Resistance to change will of course persist and there will always be persons who refuse to (or fear) change (cf. below). However, as Moscovici's theory of minority influence shows, it is often a small, consistent minority that initiates change. When a few individuals persistently challenge established norms, they can gradually influence the broader group and transform long-standing practices (Moscovici, 1980, 2024). What medicine needs today are leaders of that change.

Ultimately, cultural change in medicine cannot be imposed from the outside without generating misunderstanding or resistance (cf. following point). It has to come from within, through both individual and collective reflection. Every physician has a role to play in this process, sometimes prompted by difficult moments such as repeated burnout in a team, interpersonal conflict, or, unfortunately, the loss of a colleague. Change often begins with these experiences - when they lead to recognizing that 'the way things have always been' can, and must, evolve.

At my own level, I hope that contributing as an external observer to **making the implicit more explicit** is a way of supporting this change. Beyond academic publications, I have made consistent efforts to share and discuss the findings of this research with different audiences. I was invited on numerous occasions (21 out of 30 oral communications in total) to present and exchange with medical students, supervisors, and healthcare professionals across institutions, as well as with the broader public through conferences, training sessions, and podcasts. The growing interest in the topic of medical culture and physician well-being is in itself telling. When presenting this research, many physicians express a sense of recognition. They describe the HDMC framework as 'finally putting words' to experiences they have long struggled to articulate. For many, this act of naming is both validating and thought-provoking. Recognizing that a distinct professional culture exists in medicine and that it shapes attitudes, behaviours, and expectations, is already a crucial first step toward change. This awareness can then open space for questioning, and eventually, for change.

Still, when presenting this research, I have also sometimes encountered a certain resistance - reactions of discomfort or defensiveness that are, in many ways, part of the process of change itself. I discuss this in the following point.

4.2 Resistance as a window into culture and change

Resistance is not an obstacle to cultural change - it is one of its most important signs.

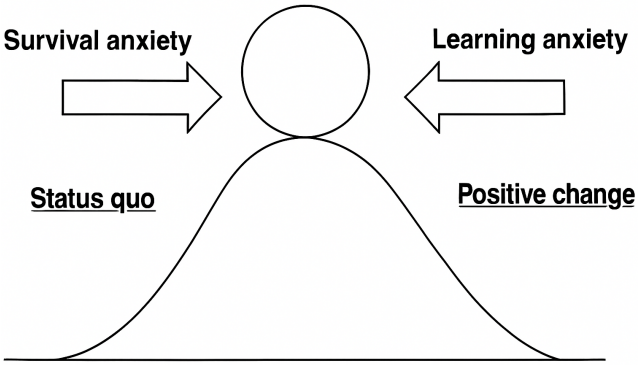
I encountered resistance to my thematic very directly and early in my PhD, when first presenting my research to groups of medical supervisors. What I expected to be constructive discussions following these presentations sometimes turned into heated exchanges. Some participants reacted with visible discomfort or irritation, arguing that my work stigmatized their profession or undermined its legitimacy. Others expressed frustration toward universities, claiming that « we now talk too much about well-being », that « students are less clinically competent because faculties focus too much on relational skills » or that « I was defending the rights of residents and forgot they also have duties ». Such remarks were sometimes met with applause by others in the audience. I left those early sessions discouraged, convinced I would never present the topic again. Some reactions felt personal and overwhelming.

Debriefing with members of my research team helped me understand this resistance as a manifestation of the very culture I was studying. Such reactions revealed how strongly professional identity and power are intertwined with cultural norms, and how threatening it can feel when those norms are questioned. It was no coincidence that the strongest reactions often came from those which I was told were in strong positions of authority, and whose professional legitimacy was likely partly built on the very norms I explored and made explicit. What initially felt like an aggression was, in hindsight, an expression of fear of change.

Schein & Schein (2019a), whose principles on culture are adapted in Shanafelt et al. specifically regarding medical culture (2019), offer a useful lens to understand these dynamics. They describe two competing forces that determine whether cultural change occurs: *survival anxiety*, the awareness that harm will follow if the culture does not adapt, and *learning anxiety*, the fear that change will be too difficult or destabilizing (both forces are represented in **Figure 10**, adapted from Shanafelt et al. (2019). Burnout and broader distress in medicine represent a clear trigger of survival anxiety in medicine, while the reactions I encountered reflect learning anxiety - expressed, among others, through defending tradition (« It's always been this way »), using andecotes (« It worked for me »), or believing virtues and vice cannot be separated (« If we acknowledge human limitations, we cannot uphold high standards ») (Shanafelt et al., 2019). Shanafelt et al. (2019) argue that real change cannot be achieved by amplifying pressure or guilt, which only increases resistance. Instead, learning anxiety must be reduced - by identifying feasible areas for change that

would not jeopardize the healthcare system, involving those concerned, and fostering dialogue rather than blame. This perspective helped me reframe my experience and inspired several of the reflections developed throughout the discussion of the findings of this thesis.

Figure 10. *Competing forces influencing cultural change in medicine (adapted from Shanafelt et al., 2019)*



Note. In practice, fostering cultural change means reducing *learning anxiety* (visually represented by decreasing the size of the right arrow in the figure) rather than further amplifying *survival anxiety*, which would only heighten resistance (Shanafelt et al., 2019).
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4.3 Medical culture as a source of strength

Finally, although this thesis has mainly examined the more harmful or constraining aspects of medical culture (in relation to burnout and health), it is also a powerful source of strength. As discussed in Chapter 2 and mentioned again in the transversal limitations, many of its core values are deeply rooted in the identity of the profession and sustain physicians' commitment when circumstances are difficult. Acknowledging this does not contradict the findings of this thesis; rather, it complements them. Some expectations that may contribute to distress in terms of physicians' health could also support meaning, team cohesion, or even the quality of care, depending on how strongly they are endorsed and the context in which they operate.

Cultural change does not mean rejecting medical culture altogether, but rethinking the norms that have become too rigid, too demanding, or out of step with today's practice. As Shanafelt et al. (2019) suggest, many elements of this culture

can also serve as resources for renewal. In this sense, **culture is both part of the problem and part of the solution**: when professional norms create distress, they contradict some of the very values they aim to uphold. Meaningful change will come not from abandoning medicine's culture, but from reconnecting with its core values, while adjusting the norms that have become counterproductive.

This concludes the discussion of this thesis.

General Conclusion

Medicine is a profoundly meaningful profession seen by many as a calling - even a sacred duty - to care for others. Yet this same devotion can also become a source of suffering for many who have chosen this profession. Worldwide, physicians report high levels of burnout, exhaustion, and disillusionment. The persistence of this reality, despite years of research and numerous initiatives, suggests that something deeper is at play - something rooted in the very way medicine defines itself and those who practice it. The stories shared by physicians who have experienced distress in the profession make this particularly clear. From their earliest years of training, many implicitly learn that a 'good doctor' does not rest, does not falter, and certainly does not ask for help. They describe an unspoken expectation to be endlessly dedicated, to endure doubt and distress in silence, and to measure their worth by their capacity for sacrifice. These accounts reveal more than individual experiences. They point to a shared professional culture - a set of values and norms that quietly shapes what physicians believe they must be, and that contributes both to their vulnerability to distress and to how they respond to it. In many ways, medical culture has long been the 'elephant in the room': a powerful influence that is widely sensed, occasionally acknowledged, yet rarely confronted directly. Although physicians consistently describe it as central to their experience, its relationship to physician well-being has remained underexplored in empirical research.

This thesis set out to address this gap by examining medical culture more directly. By exploring the norms, beliefs and expectations that underpin the medical profession, it sought to better understand how they shape physicians' experience of burnout and health. The findings show that certain cultural dimensions such as excessive professional commitment, the ideal of invulnerability, and stigma toward burnout are closely linked to burnout, but also depression and self-neglecting behaviours such as working while ill or avoiding care. These associations remain even when individual and professional factors are considered, indicating that medical culture contributes independently to physician well-being as a macrosystemic force. At the same time, our research underscores that the personal meaning that physicians derive from their work is protective upon burnout. Importantly, this work also reveals that medical culture is not experienced uniformly. Endorsement of its harmful dimensions varies across generations, genders, specialties, and career stages. Belonging and legitimacy pressures likely influence

how physicians internalize professional ideals. The qualitative analyses deepen these insights by showing, through physicians' own perspectives, how cultural expectations are transmitted, reinforced, and at times resisted in training and practice.

Our research offers a broader lens through which to understand physician burnout. It suggests that burnout may not only stem from workload or personal vulnerability, but also reflect what the profession rewards, expects, and silently tolerates. Physician burnout can be seen, at least in part, as the cost of belonging to a culture that teaches physicians to give everything of themselves while rarely granting permission to pause or repair - a pattern that has become increasingly difficult to sustain in today's healthcare and societal contexts, where contradictory expectations of both performance and balance are higher than ever. These evolving conditions are already reshaping the profession and will inevitably prompt reflection on how medical culture can adapt to new realities. In that sense, addressing physician burnout may also mean rethinking what medicine values and how it cares for those who care for others.

Medical culture *can* change, because it is created and sustained by those who live within it. Culture, while deeply rooted, is not fixed; it begins to evolve the moment its members start to recognize its influence and question it. Every conversation that names what was once unspoken, every mentor who models self-care without guilt, every institution that chooses to value well-being alongside performance contributes in meaningful ways to reshaping the story of what it means to be an ideal physician. Change is already underway, but must now be sustained.

This thesis does not offer definitive answers, nor does it claim to capture the full complexity of physician burnout or medical culture. Rather, it hopes to encourage reflection among medical students, physicians, supervisors, faculty members, health systems and politics on how medical culture can better support those who work within it. The way forward is not to reject medical culture, but to engage with it more critically - both individually and collectively - by preserving the shared values and narratives that sustain the profession while rethinking those that no longer serve physicians, patients, or healthcare systems. Only by doing so can medicine foster a culture that allows physicians to be both competent and human, dedicated and cared for.

As the familiar metaphor in aviation reminds us: *always put on your own oxygen mask before helping others.* For medicine to keep caring for others, it must allow its physicians to care for themselves.

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Thesis Appendices

Overview of the appendices:

- **Appendix A:** Summarizes the personal, professional, and systemic consequences of PB, including its effects on mental and physical health, patient care, team dynamics, and healthcare costs.
- **Appendix B:** Outlines six complementary theoretical models that provide conceptual depth to understanding the multiple determinants of PB: the Areas of Worklife model, the Existential Perspective on loss of meaning, burnout as a 'disease of civilization', the Self-Discrepancy theory, the Socio-Ecological model, and the Job Demands-Resources model.
- **Appendix C:** Synthesizes the main correlates of PB identified in the literature, structured across the socio-ecological levels (onto-, micro-, meso-, exo-, macro- and chrono-systems), and supported by meta-analyses and reviews.
- **Appendix D :** Presents a list of editorials, testimonies, conceptual articles, and books that offer reflective insights into medical culture, professionalism, and physician well-being.
- **Appendix E:** Provides examples of qualitative studies on medical culture that were identified and reviewed in the course of this thesis and that mention medical culture, either in physicians' responses or in the discussion of results by authors.
- **Appendix F:** Includes the scientific paper of a master's project examining the role of professional self-discrepancies in physician burnout, which provides a psychological perspective on how professional ideals are internalized and experienced as personal tension.
- **Appendix G:** Reports on an educational initiative translating the findings of this research into a first-year medical course on medical culture and self-care. The report was sent to the Dean of the Faculty of Medicine of the UCLouvain.
- **Appendix H:** Summarizes notes and reflections gathered from exchanges with supervisors, educators, and medical leaders regarding the influence of training and institutional culture on physician well-being, used to contextualize and nuance the thesis findings.
- **Appendix I:** Summarizes insights from informal discussions with physicians and academic supervisors following the presentation of study results. These perspectives highlight how political, economic, and social factors shape physicians' daily experience of medical culture and contribute to their distress.
- **Appendix J:** Presents reflections on how different disciplines including psychology, sociology, organizational sciences, and the humanities could complement our research.
- **Appendix H** : Declaration of AI assistance and artistic contribution.

1. Appendix A: Consequences of PB with references

For the physician suffering from burnout, **PB has consistently been associated with a range of negative personal and professional outcomes**. On a personal level, PB is linked to adverse health outcomes including depression and anxiety (Bianchi et al., 2015b; Crudden et al., 2023; Johnson et al., 2020; E. Ryan et al., 2023; Shanafelt et al., 2003). It has also been associated with a twofold increase in suicidal ideation (Shanafelt, 2011), although more recent findings suggest that burnout in the absence of depression may not elevate suicide risk in physicians (Menon et al., 2020). PB is further related to poor self-care behaviours (Alexandrova-Karamanova et al., 2016), such as substance use (E. Ryan et al., 2023), alcohol consumption (Oreskovich et al., 2015), presenteeism (Pei et al., 2020; Thun et al., 2014) and reduced help-seeking behaviours (Clough, March, et al., 2019). Physicians experiencing burnout are also at greater risk of motor vehicle accidents or near-miss incidents, even after adjusting for fatigue (C. P. West, Tan, et al., 2012). On a professional level, PB has been associated with decreased productivity (Dewa, Loong, et al., 2014), job dissatisfaction (Jenkins, 2023; Shanafelt et al., 2009), intention to leave practice, and turnover (Chênevert et al., 2021; Shanafelt et al., 2014). These professional consequences have implications not only for the affected physician but also for **their direct colleagues**. Because of the logic of continuity of care, the workload that cannot be assumed by one physician (i.e. due to burnout) inevitably falls on others, increasing their own risk of strain. Moreover, studies suggest that burnout may spread within teams through 'emotional contagion', whereby the exhaustion and disengagement of one physician can foster similar experiences among peers (Bakker et al., 2001; Hodkinson et al., 2022; May et al., 2020). **PB also carries significant consequences for patient care.** Research has linked burnout to a range of adverse patient outcomes (Mangory et al., 2021) including longer recovery times (Halbesleben & Rathert, 2008 ; as cited by West et al., 2018), diminished quality of care (Hodkinson et al., 2022), increased risk of self-reported medical errors (Menon et al., 2020; Shanafelt et al., 2010) and lower patient satisfaction (Drummond, 2015; as cited by Patel et al., 2018). Finally, the impact of PB extends to **healthcare institutions and systems**. Burnout contributes to substantial financial costs. For example, a 2019 study estimated that physician turnover and reduced working hours in the U.S. cost approximately 4.6 billion dollars annually (Han et al., 2019) (comparable cost estimates for Europe are, to our knowledge, not yet available). PB also diminishes overall productivity, limits patient access, and further strains healthcare systems that are already struggling to meet the growing healthcare needs of the population (Dyrbye & Shanafelt, 2011b; C. P. West et al., 2018).

2. Appendix B : Details on the conceptual frameworks

The following overview outlines six models that we believe are particularly relevant and complementary for understanding why and how physicians experience burnout. For each, we briefly describe the core concepts and highlight how the framework has been or can be applied to the context of PB. Some of these models can be tested empirically and have produced measurable evidence, while others are more conceptual, offering valuable ways of looking at PB even if they cannot be tested directly.

2.1 The Areas Of Worklife model

The **Areas of Worklife (AW) model** (Leiter & Maslach, 2003), developed within occupational and organizational psychology, proposes that burnout stems from chronic mismatches between individuals and their work environment across six domains: workload, control, reward, community, fairness, and values. Central to the AW model is the notion of *job-person fit*, meaning the degree to which organizational structures and processes align with employees' skills, needs, and aspirations. Poor alignment creates tensions that can increase vulnerability to burnout. This model (measured via the Areas of Worklife Scale or AWS) emphasizes the importance of looking at workers in context, rather than just looking at individual or situational factors (Demerouti et al., 2021; Maslach et al., 2001).

The AW model has been applied to PB[51]. Verret and colleagues (2021) studied orthopaedic surgeons (N = 148) and found that poor fit across the six domains was linked to higher burnout. Emotional exhaustion showed the strongest associations with greater workload (r = -0.50) and reduced job control (r = -0.50). Interestingly, when analyzed by career stage, exhaustion was most strongly tied to workload and diminished control among residents and attendings, whereas for fellows it was more closely related to lower fairness and weaker sense of community. Similarly, in a longitudinal study of primary care physicians (N = 153), Gregory and Menser (2015) also found that workload (B = 1.29) and values (B = -0.61) exerted the strongest direct effects on emotional exhaustion. However, while the authors reported an acceptable fit for model, the SEM indices (RMSEA = 0.06; $\chi^2/df = 2.39$; CFI = 0.84; TLI = 0.83) fall below commonly recommended thresholds (CFI ≥ 0.95, TLI ≥ 0.95, RMSEA ≤ 0.05) (Hu & Bentler, 1995). Nonetheless, the AW model offers a valuable lens for examining how features of the medical work environment shape PB.

[51] For conciseness, only results on emotional exhaustion - the core symptom of burnout - are reported here. Both reported studies used the full MBI. Complete findings are available in the original publications.

2.2 Burnout and the loss of existential meaning

From an existential perspective, burnout is seen less as the result of workload and more as a crisis of meaning (Delroisse, 2020). Work can protect against exhaustion when it feels fulfilling, valuable, and aligned with personal values (Längle, 2003). When this sense of meaning is lost, people generally continue working out of obligation or external motives, which over time creates emptiness, disillusionment, and eventually burnout. Frankl described this state as an **'existential vacuum'** (Frankl, 1983; as cited in Längle, 2003). Similarly, Pines (2002) argued that people often invest heavily in work as a source of existential significance. When this investment fails to deliver purpose, burnout may follow.

In medicine, this perspective suggests that physicians (who often view their profession as a vocation; Trimble, 2022) may be particularly exposed to PB when their daily work no longer provides existential fulfillment. Empirical studies support this idea. Ben-Itzhak and colleagues (2015) found that existential meaning (β = -3.14) was an independent protective factor against burnout in emergency physicians (N = 70). Hooker and colleagues (2020) reported similar findings among 268 family medicine residency program directors, where greater meaning awareness predicted less burnout (β = -0.40) and fatigue (β = -0.38). Qualitative work with surgeons likewise highlights how activities seen as personally meaningful (such as teaching or research) sustain professional fulfillment (Walker et al., 2022). Thus, this perspective highlights how the loss of meaning in medical work can be a critical driver of PB.

2.3 Burnout as a disease of civilization

Philosopher Pascal Chabot (2013, 2017) describes burnout as a '**disease of civilization'**, reflecting the exhaustion of individuals in societies dominated by speed, productivity, and constant demands of performance. From this perspective, burnout is less an individual problem than a symptom of a society that values efficiency above human fulfillment[52].

Applied to healthcare, Chabot draws on Freud's notion of the 'impossible professions' of modernity - healing, educating, and governing - fields that confront human fragility and uncertainty, where outcomes can never be fully guaranteed. Such professions, inherently relational, are increasingly devalued in current

[52] Chabot notes that it is not insignificant that burnout is discussed far more in Western societies, and discusses how Freudenberger once called burnout the 'disease of the good American'. This indicates that cultural context itself may play a role in shaping the experience of burnout.

societies[53], whether financially or symbolically (Chabot, 2013). *For physicians specifically,* the dynamic that Chabot describes creates a profound dissonance: institutional demands for productivity and efficiency reduce the time available for meaningful patient care. This leaves many physicians caught between the values that drew them to the profession (i.e. helping others) and the demands of the systems in which they currently work

2.4 Burnout and the Self-Discrepancy Theory

Originating in social psychology, the **self-discrepancy theory** (SDT, Higgins, 1987) distinguishes between the *actual self* (how one sees oneself), the *ideal self* (how one would like to be), and the *ought self* (how one believes others expect one to be). Discrepancies between these domains elicit negative emotions and have been linked to burnout across contexts, including parenting (Roskam et al., 2022), teaching, general work (Tang, 2022) and counseling (D. Lee, 2018). Findings of these studies suggest that the inability to reach internal ideals or external prescriptions can erode motivation and increase exhaustion (Maslach et al., 1997; van den Bosch et al., 2019).

For physicians, whose professional identity is strongly tied to ideals of competence, compassion, and responsibility (Cruess & Cruess, 2008; Mavor et al., 2014; Sawatsky et al., 2023), the SDT highlights their vulnerability when gaps emerge between who they are and who they feel they should or wish to be. In a recent study of 230 physicians (Aharon, 2024; see Appendix F), PB was moderately associated with actual-ideal discrepancies and more strongly with the distress these discrepancies provoked. Actual-ought discrepancies also showed smaller but significant associations, with distress again yielding stronger effects. Importantly, self-discrepancy distress explained an additional 23% of variance in PB beyond age and gender, with ideal-self distress ($\beta = 0.34$) emerging as the strongest predictor. Though the SDT is a general psychological model, its application to burnout illustrates how theories beyond occupational health clarify underlying emotional mechanisms. In this thesis, it is particularly relevant, as medical culture shapes and reinforces physicians' professional ideals (cf. Chapter 2).

2.5 Burnout through a Socio-Ecological Perspective

As outlined in the general introduction, this thesis adopts the **socio-ecological**

[53] Although physicians have historically held higher symbolic status and financial reward than many other (caregiving) professions, scholars note that medicine is gradually losing its prestige and social authority (e.g. Pearl, 2021).

model (SEM; Bronfenbrenner, 1986; McLeroy et al., 1988) as its overarching framework[54]. The SEM is one of several ecological approaches applied to health (Sallis et al., 2008) built on the idea that health and behaviour are shaped by multiple, interacting levels of influence (from individual and interpersonal factors to organizational, community, and policy contexts). Because these levels influence one another, health cannot be understood in isolation from its wider environment (hence the term 'ecological'). Ecological approaches also emphasize that multi-level interventions are more effective than strategies focused on a single level (Sallis et al., 2008). Applied to burnout, socio-ecological perspectives stress that it cannot be explained by individual vulnerabilities alone but must be understood as the product of influences across *multiple* levels (cf. General Introduction of this thesis for a brief account of each of them). Scholars have proposed using the SEM as a framework for burnout research (e.g. the Social Ecology of Burnout; De Lisser et al., 2024) and prevention (e.g. the Socio-ecological Model for Burnout Prevention; Habeger et al., 2022), and describe how individual, relational, organizational and societal factors interconnect in shaping burnout risk. Following this approach, empirical studies have applied the SEM to identify drivers of burnout across multiple levels, including in healthcare settings (for an example, see Olapeju et al., 2024).

For physicians, the SEM similarly highlights that PB is not merely an individual issue but a multi-level phenomenon shaped by interconnected personal, interpersonal, organizational, and societal contexts. Carmack (2019) has argued for a socio-ecological analysis of PB, framing it as a public health crisis that is shaped by overlapping personal, institutional, and cultural forces (see table 1, p. 248 of the book section). In this thesis, Chapter 7 returns to the SEM to examine more closely how medical culture, situated as a separate layer of influence, contributes to physicians' vulnerability to and experience of burnout.

2.6 The Job-Demands Resources Model

The Job Demands-Resources (JD-R) model (Demerouti et al., 2001) is one of the most widely used frameworks for explaining and predicting job burnout. It proposes that any job can be characterized by job demands - those aspects of work

[54] Note that in their original paper, McLeroy and colleagues (1988) described an 'ecological model for health promotion', and never used the term 'socio-ecological model'. The SEM terminology became common later in public health literature and practice (e.g. CDC, WHO) to denote this multilevel perspective. Nonetheless, many authors in public health and health promotion cite McLeroy et al.'s (1988) work as the foundational reference for what is today referred to as the socio-ecological model (SEM). In this thesis, we likewise use the term SEM to refer to the model as originally described by McLeroy and colleagues. Importantly, McLeroy's framework was itself an application of Bronfenbrenner's ecological systems theory (1979) to health behaviours and health promotion.

that require sustained effort, such as workload, time pressure, or role conflict - and job resources - which help achieve goals, reduce demands, or support personal growth, such as autonomy, feedback, or social support. These demands and resources can be physical, psychological, social, or organizational in nature, and they mediate the relation between work characteristics and well-being, including work satisfaction. The model describes two main processes: a health-impairment process, where excessive demands lead to exhaustion, and a motivational process, where insufficient resources foster disengagement. Burnout is most likely when demands are chronically high and resources scarce. The JD-R is also flexible, as it allows the specific demands and resources to vary by occupation and by person (Demerouti et al., 2001, 2021, p. 202).

Meta-analytic evidence supports the JD-R model. In a review of 231 samples ($N \approx 91{,}000$ ps), Alarcon (2011) found that demands such as workload ($\rho = 0.49$), role conflict ($\rho = 0.53$), and role ambiguity ($\rho = 0.32$) were strongly associated with emotional exhaustion, whereas resources such as control ($\rho = -0.26$) and autonomy ($\rho = -0.24$) showed protective effects. Cynicism displayed a similar pattern, with negative associations with control ($\rho = -0.29$) and autonomy ($\rho = -0.31$). Reduced personal accomplishment was most strongly predicted by low resources, such as lack of control ($\rho = -0.39$)[55]. These results confirm the JD-R's dual pathways and highlight the central role of both excessive demands and insufficient resources.

The JD-R has also been applied to physicians. In a study of Canadian doctors ($N = 407$), Chênevert and colleagues (2021) found that stress ($\beta = 0.81$), work overload ($\beta = 0.12$), and work–family conflict ($\beta = 0.18$) were positively associated with emotional exhaustion, while recognition from patients ($\beta = -0.25$) and meaning at work ($\beta = -0.26$) were protective against depersonalization. Together, these findings indicate that when imbalances between demands and resources persist over time, they create the conditions for burnout to develop in physicians (Marchalik, 2019; Rothenberger, 2017; C. P. West et al., 2018).

[55] Here, ρ indicates corrected meta-analytic correlations, adjusted for measurement error and sampling error.

3. Appendix C: Correlates of PB with references

The categorization of correlates presented in this appendix is based primarily on systematic reviews, meta-analyses, and narrative syntheses of the burnout literature, rather than on individual empirical studies. These sources provide a consolidated view of the most frequently reported associations, while also acknowledging inconsistencies and the limits of causal inference.

3.1 Ontosystem

Research has examined demographic, psychological, and personal lifestyle factors that are associated with PB. Demographic variables such as younger age (Galaiya et al., 2020; Meredith et al., 2022; M. Yates & Samuel, 2019; Q. Zhang et al., 2020) and female gender (Galaiya et al., 2020; Q. Zhang et al., 2020; Zhou et al., 2020) have frequently been linked to PB. Yet findings remain inconsistent, with several studies reporting null or even inverse associations (Grow et al., 2019; Marques-Pinto et al., 2021; Meredith et al., 2022; C. P. West et al., 2018; M. Yates & Samuel, 2019; Zhou et al., 2020). More robust evidence points to psychological health and coping. Anxiety, depression, and sleep problems are consistently associated with higher burnout, as is substance misuse (Galaiya et al., 2020; Meredith et al., 2022; Patel et al., 2018; Q. Zhang et al., 2020). Conversely, exercise, mindfulness, and meditation are linked to lower PB (Galaiya et al., 2020; Grow et al., 2019; Meredith et al., 2022). Personality traits such as neuroticism or perfectionism, as well as poor emotional regulation correlate with greater PB (Dyrbye & Shanafelt, 2016; Galaiya et al., 2020; S. R. Martin et al., 2022; Patel et al., 2018) whereas self-efficacy and optimism are associated with lower PB (Marques-Pinto et al., 2021; Zhou et al., 2020). Additional correlates include reluctance to seek mental healthcare and stigmatization of the latter (Grow et al., 2019; Meredith et al., 2022), self-denial and delayed gratification (Drummond, 2016), low self-valuation (Trockel et al., 2021) and imposter feelings (Shanafelt, Dyrbye, et al., 2022).

3.2 Microsystem

Daily family and interpersonal relationships shape PB. Family responsibilities (e.g. young children, non-physician partner) (Patel et al., 2018; C. P. West et al., 2018) have frequently been linked to PB. Social support is linked to lower PB (Dyrbye & Shanafelt, 2016). Financial stress or educational debt are also frequent correlates (Dyrbye & Shanafelt, 2016; Galaiya et al., 2020; Zhou et al., 2020). In the workplace, excessive workload, long hours, and night/weekend shifts are strongly correlated with burnout (Dyrbye & Shanafelt, 2016; Galaiya et al., 2020; Meredith et al., 2022; Patel et al., 2018; C. P. West et al., 2018; M. Yates & Samuel, 2019; Q.

Zhang et al., 2020). Experiencing autonomy in daily practice and time spent on meaningful work correlate negatively with PB (Galaiya et al., 2020; D. Lee, 2018; R. T. Lee et al., 2013; Meredith et al., 2022; Patel et al., 2018; Prins et al., 2007; Rothenberger, 2017). One often-cited benchmark suggests that physicians should spend at least 20% of their time on personally meaningful work to protect against burnout (Shanafelt et al., 2009). Experiencing medical errors correlates positively with PB (Grow et al., 2019). Relational demands, such as exposure to patient suffering or disrespect are associated with higher PB (Galaiya et al., 2020; Marques-Pinto et al., 2021; Patel et al., 2018; M. Yates & Samuel, 2019), as do work relationships including conflicts with colleagues (Sibeoni et al., 2019). Conversely, mentorship (Galaiya et al., 2020), collegial support (H. Li et al., 2019; Patel et al., 2018; Prins et al., 2007) and interpersonal collaboration (West et al., 2018) correlate negatively with PB. In some specialties, such as surgery, frequent shaming has been identified as linked to higher burnout (Galaiya et al., 2020).

3.3 Mesosystem

The *interaction* between physicians' professional and family spheres is a salient correlate of PB. Studies consistently show that difficulty reconciling work and family responsibilities is associated with higher levels of PB. In particular, work-home conflict has been repeatedly linked to PB across specialties (R. T. Lee et al., 2013; Prins et al., 2007; C. P. West et al., 2018).Beyond family life, physicians often report difficulties in preserving time for themselves, engaging in leisure activities and cultivating identities outside of medicine. This has also been associated with greater burnout (Grow et al., 2019; Y. Li et al., 2023).

3.4 Exosystem

Organizational features of the work environment and institutional processes indirectly shape physicians' experiences. Inefficient work processes, particularly administrative burdens linked to electronic health records (EHRs) and computerized order entry, are prominent correlates of exhaustion and depersonalization (Grow et al., 2019; Patel et al., 2018; C. P. West et al., 2018). Compensation systems, incentive- or performance-based incomes, and medico-legal accountability mechanisms are linked to higher PB rates (C. P. West et al., 2018). Leadership style and behaviour have also been associated with PB (D. Lee, 2018; Meredith et al., 2022; Patel et al., 2018; Sibeoni et al., 2021; Sterling et al., 2022; C. P. West et al., 2018). Specialty also matters: burnout prevalence is particularly high in emergency medicine (Kansoun et al., 2019; C. P. West et al., 2018; Q. Zhang et al., 2020) and several surgical specialties (Bartholomew et al., 2019; Rodrigues et al., 2018). Career development opportunities correlate with reduced PB (Galaiya et al., 2020;

Patel et al., 2018; Zhou et al., 2020).

3.5 Macrosystem

Broader cultural contexts frame the organizational and individual levels. A culture of productivity and efficiency, competition, and medico-legal climate have been frequently invoked through conceptual and qualitative accounts as factors that erode physicians' well-being (Gazelle et al., 2015; Montgomery, 2014; Patel et al., 2018; Shanafelt et al., 2019; Sibeoni et al., 2019). Societal expectations about physicians' roles are likewise seen as shaping PB (e.g. Galaiya et al., 2020). At this level, organizational cultures and climate have also received some empirical attention. For instance, values of fairness and justice, and alignment with institutional mission are associated with lower PB (Grow et al., 2019; Marques-Pinto et al., 2021; Rothenberger, 2017; Sterling et al., 2022). By contrast, the professional culture of medicine and medical education (which emphasizes self-sacrifice, perfectionism, and stigma around help-seeking) has been frequently invoked as a determinant of PB, but remains poorly studied empirically (cf. Chapters 2 and 3).

3.6 Chronosystem

PB must also be understood in relation to historical and structural evolutions in medicine and to wider societal pressures that keep increasing. Physicians are increasingly asked to 'do more with less' (Shanafelt et al., 2019; Sinskey et al., 2022), confronted with tighter budgets and resource shortages (Montgomery, 2014; C. P. West, 2025), even though patient complexity and workload escalate. Modern healthcare systems seem more focused on institutional self-preservation than on supporting caregivers or patients. This erodes the sense of meaning that physicians derive from their work and creates the very conditions that fuel burnout (Montgomery, 2014). Reforms in healthcare delivery have reshaped physicians' roles in ways that many experience as misaligned with their vocation (Shanafelt et al., 2019). Rapid organizational changes have narrowed physicians' prerogatives, shifted attention to the 'business of medicine' (cf. Chabot's perspective), and increased bureaucratic procedures that add little to patient care (Souba, 2002; as cited in Horowitz et al., 2003). Increased productivity expectations, shorter visits, and clerical overload from electronic health records, together with an array of performance metrics, leave physicians feeling micromanaged (Shanafelt et al., 2019; Sinskey et al., 2022). In line with these evolutions in medicine, younger generations face new stressors such as intense competition for training positions, workforce shortages, exponential growth of medical knowledge, and expanding roles of non-physician actors in healthcare and clinical practice (Dyrbye & Shanafelt, 2016; Gazelle et al., 2015; C. P. West et al., 2018).

4. Appendix D: Narrative and reflective sources on medical culture and physician distress

Type	Title	Reference
Editorials		
	The Increasing Number Of Female General Practitioners: Why We Need To Change Medical Culture	van Zalinge et al., 2009
	Doctors' Health: Stigma And The Professional Discomfort In Seeking Help	Garelick, 2012
	Improving The Culture Of Medicine	Lemire, 2020
	Are Doctors Putting Their Health Last?	V. Agarwal & Prabhakar, 2024
	The Neglected Healers: Urgent Need For Physicians Self-Care In Healthcare	Raza, 2024
Review articles		
	Physician Wellness: A Missing Quality Indicator	Wallace et al., 2009
	Understanding Physician Burnout	Grow et al., 2019
	Beyond Burnout: Looking Deeply Into Physician Distress	Wong, 2020
	The Wicked Problem Of Physician Well-Being	Sinskey et al., 2022
Testimonies / opinions / personal viewpoints / commentaries		
	The Painful Truth: Physicians Are Not Invincible	Miller & McGowen, 2000
	The Role Of Medical Culture In The Journey To Resilience	Beckman, 2015
	Medicine: In Need Of Culture Change	Ward & Outram, 2016
	Breaking The Stigma - A Physician's Perspective On Self-Care And Recovery	Hill, 2017
	I Solemnly Share	Gupta, 2018
	'I Wasn't Alone After All"—How Modelling Vulnerability Can Support Staff Wellbeing	Morgan, 2024
	I Retired From Medicine And Felt Guilt	Ronan, 2025
	A Call For Mental Health Reform In Medical Education: Breaking The Silence	Ruddell & Ruddell, 2025
	From Tragedy To Action - How To Collectively Move Forward	Dyrbye, 2025
Special journal articles / conceptual articles		
	Healing The Professional Culture Of Medicine	Shanafelt et al., 2019
	The Inevitability Of Physician Burnout: Implications For Interventions	Montgomery, 2014
	Physician Health And Wellness	Taub et al., 2006
	Physician Well-Being In Practice	Khan & Vinson, 2020
Perspectives		

	When Doctors Need Treatment: An Anthropological Approach To Why Doctors Make Bad Patients	Wessely & Gerada, 2013
	Professional Stigma Of Mental Health Issues: Physicians Are Both The Cause And Solution	Brower, 2021
	Self In Medicine: Determinants Of Physician Well-Being And Future Directions In Improving Wellness	Mendelsohn, 2022
Books and book chapters		
	Medical Culture	Núñez, 2000
	Health And Culture	Quah, 2001
	When Doctors Become Patients	Klitzman, 2008
	Self-Care, Resilience, And Work-Life Balance	Worley & Stonnington, 2017
	Physician Mental Health And Well-Being: Research And Practice	Brower & Riba, 2017
	Why physicians die by suicide: lessons learned from their families and others who cared	Myers, 2017
	The Art And Science Of Physician Wellbeing: A Handbook For Physicians And Trainees	Weiss Roberts & Trockel, 2019
	Uncaring: How The Culture Of Medicine Kills Doctors & Patients	Pearl, 2021
	Beneath the white coat: doctors, their minds and mental health	Gerada & Al-Naijar, 2020
	We are all perfectly fine: a memoir of love, medicine and healing	Horton, 2021

Note. This table provides a more comprehensive list of narrative and reflective contributions on medical culture and physician distress. The sources are organized by type (editorials, reviews, testimonies, special articles, perspectives, and books) and, within each type, in chronological order. They include both earlier works that informed the initial stages of this thesis and more recent publications that were consulted during its development.

5. Appendix E : Qualitative contributions mentioning medical culture

Thematic focus	Illustrative references	Example of how culture is described
Barriers to self-care and help-seeking	Clough et al., 2019; Geuijen et al., 2022; Henderson et al., 2012; Mills et al., 2018; Riley et al., 2018; Schneider et al., 2015; Thompson et al., 2001; Zaman et al., 2022	Physicians describe stigma, embarrassment, or guilt about seeking help; illness is seen as incompatible with the physician role; confidentiality and professional consequences of seeking help are also mentioned as barriers.
Vocational ideals and blurred identity	Humphries et al., 2018; LaDonna et al., 2025; Lenoir et al., 2021; Song, 2020	Medicine is framed as a vocation or 'total identity'; where sacrifice is expected and blurred boundaries exist between work and personal life; difficulties reconciling other identities with professional ideals.
Norms of invulnerability and endurance	Danielsson et al., 2018; Fältholm, 2007; LaDonna et al., 2022; Rich et al., 2024; Verdonk et al., 2014; Wainwright et al., 2017, 2019	Physicians internalize expectations of invincibility; work through illness; the professional identity is built around toughness and denying vulnerability; students and trainees quickly learn the 'suck it up' mentality.
Role conflicts and professional transitions	Fox et al., 2009; Hutton et al., 2024; Klitzman, 2008; McKevitt & Morgan, 1997; Onyura et al., 2015; Scallan et al., 2025	Physicians struggle with being patients; retirement and late-career transitions threaten professional identity; motherhood and family-building highlight incompatibilities with medical expectations.

Note. This table does not claim to be exhaustive, but it includes examples of qualitative studies on medical culture that were identified and reviewed in the course of this thesis and that mention medical culture, either in physicians' responses or in the discussion of results by authors.

6. Appendix F: Physician burnout and professional self-discrepancy

Note to the reader. The following appendix includes the manuscript authored by Youval Aharon as part of his master's thesis, which was conducted under Pr. Mikolajczak and my supervision and has since been submitted for publication. Only the main manuscript is included here. Readers interested in consulting the supplementary files are invited to refer directly to the submitted manuscript for full details.

Reference: Aharon, Y., De Timary, P., Mikolajczak, M., Philippot, P. & Banse, E. (2025). *When the Doctor's Ideal Fades Away: Physician Burnout and Professional Self-Discrepancy* [Paper submitted for publication in Self & Identity]

6.1 Introduction

Physicians' self-image is frequently challenged throughout the course of their professional careers (Sarraf-Yazdi et al., 2024; Sawatsky et al., 2023). Due to the social responsibility conferred upon them, both society and physicians themselves maintain high expectations regarding their competence and effectiveness in meeting the needs of patients and the broader population (Cruess & Cruess, 2020; de Rouffignac et al., 2024). Yet, it frequently occurs that physicians feel they do not live up to their own expectations or to those projected by colleagues and patients. For example, during the Covid-19 pandemic, healthcare workers suffered from the perception of being at times useless, incapable of curbing the spread of the disease, and consequently developed low self-esteem (Chiam et al., 2022; Lepiège et al., 2022). This constitutes one example among many, indicating that a sense of responsibility and personal failure can be widely shared by healthcare workers in a medical context marked by shortages and systemic dysfunctions (J.-P. Byrne et al., 2023; Jenkins, 2023; Moniz et al., 2021; Winning, 2023).

In this fragile medical context, it is therefore crucial to better understand the discrepancies between the perception a professional has of themselves, their ideal self, and the expectations of others. These discrepancies are studied at the intersection of psychology and sociology (Marcussen & Gallagher, 2017; Trettevik & Grindal, 2016).

6.1.1 Self-Discrepancies for social identity and mental health

Based on Higgins' (1987) Self-Discrepancy Theory, several authors posit that for each social identity a person holds (e.g., professional, familial), there exist at least three types of self-perceptions (Trettevik & Grindal, 2016; Large & Marcussen,

2000). Within the work context, these include the *actual professional self* (i.e., the worker as they see themselves), the *ideal professional self* (i.e., the worker as they would like to be), and the *ought professional self* (i.e., what they believe others expect of them). When a discrepancy is perceived between one's actual self and either the ideal or ought self, this can generate negative affect (Trettevik & Grindal, 2016).

Research shows that general self-discrepancies in a person are associated with several mental health problems (Mason et al., 2019). These have been linked to depression and anxiety (Schlechter et al., 2022; Philippot et al., 2018), eating disorders (Bazo Perez & Frazier, 2024; Mason et al., 2016), and suicidal ideation (Cornette et al., 2009). For specific social identities, self-discrepancies have also demonstrated associations with undesirable states. For instance, in the parental identity context, discrepancies between selves were first associated with negative affect (Liss et al., 2013), and later with parental burnout (Roskam et al., 2022). More specifically, in the medical context, increased depressive and anxious symptoms have been observed among medical students who perceived a gap between their self-image and their ideal physician (Erschens et al., 2024).

Self-discrepancies are thus closely linked to psychological distress across multiple social roles. Yet, this phenomenon remains underexplored in the context of physician burnout, even though the latter could reflect suffering associated with distancing from the core values that make up physicians' professional (J.-P. Byrne et al., 2023; Moniz et al., 2021; Shanafelt et al., 2019). For this reason, it is essential to understand how this professional identity is constructed and why it lies at the heart of these experienced tensions.

6.1.2 Physicians' professional identity

To fulfill the very essence of their profession, physicians are often motivated to act in accordance with values transmitted by medical culture: integrity, compassion and commitment (Minicuci et al., 2020; Shanafelt et al., 2019). Through adherence to the values, beliefs, and professional ethics that shape medical culture (Cruess & Cruess, 2020; Mattila et al., 2024), medical education enables members to develop a distinct professional identity (Darmon, 2023; Côté et al., 2020). This professional identity leads them to "think, act, and feel like a physician" (Merton, 1957, p. 7). For many, it comes to occupy an extremely important place in their lives, eventually becoming central (Banse et al., 2025a; Keller, 2014; Sawatsky et al., 2023). Physicians invest considerable time and energy in this identity, both in training and in daily practice, to the extent that some of them may ultimately neglect their outside interests (Lenoir et al., 2021; Mavor et al., 2014).

The ideals associated with medical professional identity, while a source of motivation and meaning (Branch et al., 2017), may also become a source of distress when physicians are prevented from fully realizing them. These obstacles contribute to the feelings of self-discrepancies experienced within the professional identity, which we examine below.

6.1.3 Professional self-discrepancies: contributing factors and consequences

Social, organizational, and personal factors may interact in the emergence of professional discrepancies, such that many values attached to physicians' professional identity may at times be incompatible with one another, with the actual work performed, or with the organizational context (Byrne et al.,at 2023; Sawatsky et al., 2023; Fitzgerald, 2020; Côté et al., 2020; Shanafelt et al., 2019; Daloz, 2007). In this regard, the expansion of administrative tasks characteristic of the 21st century (Wirion, 2023) limits the time physicians can dedicate to building and maintaining patient relationships, which represent a key element of their professional identity (Côté et al., 2020; Kello & Allen, 2022). Physicians may also struggle to feel competent and useful when essential resources for care are lacking, making treatment impossible despite their qualifications (Byrne et al., 2023). In this context, physicians sometimes express their frustration as follows: "What is exhausting is not what we do, it is what we don't do" (author's translation; Côté et al., 2020, p. 303). Thus, shortcomings in healthcare systems, by forcing compromises that distance physicians from their professional ideals, may widen the gap between actual practice and these ideals and generate profound existential distress (Moniz et al., 2021).

In addition to organizational constraints, the interaction between cultural and personal factors plays a key role in shaping how physicians experience professional self-discrepancies and the associated distress, particularly through maladaptive perfectionism. Medical culture and its educational system promote perfectionistic norms that emphasize flawless performance and intolerance of error (Sawatsky et al., 2023; Jenkins, 2023; Robertson & Long, 2018). These rigid standards are difficult to reconcile with the inherent uncertainty of medical practice (Yon et al., 2015; Selder & Paustian, 1989), where medical errors are inevitable. This ideal of flawless performance constitutes a core component of rigid perfectionism (Smith et al., 2016), which has been shown to be associated with physician burnout (Kleinhendler-Lustig et al., 2023; Pereira et al., 2022).

Also, this medical culture fosters the image of the physician as an invulnerable superhero (Banse et al., 2025; Shanafelt et al., 2019), and is also associated with a culture of blame, in which physicians are held responsible for errors for which they

are not always solely accountable (Winning, 2023). As a result, perceived discrepancies between actual practice and professional ideals may intensify physicians' distress in response to failure and discourage them from seeking help for their psychological suffering (Schulte et al., 2024; Lenoir et al., 2021).

6.1.4 Physician burnout

At a time when physicians worldwide are facing a significant burnout crisis (Shanafelt et al., 2025; Shen et al., 2022; Hiver et al., 2022; Doraiswamy et al., 2021; Dubale et al., 2019), physician burnout constitutes a public health issue given its numerous implications for physicians themselves, their patients, and health-care systems.

Multiple conceptual formulations have been developed over the years to explain the etiology of burnout, yet none has achieved consensus (Pines, 2002; Schaufeli, 2021; Schwenk & Gold, 2018). Although the model by Maslach and colleagues (2001) is the most widespread, for the present study we rely on the definition proposed by Schaufeli et al. (Schaufeli, Desart, et al., 2020). This definition offers several advantages, which we will outline after presenting it.

Burnout corresponds to a state of work-related exhaustion, and its symptoms are categorized into core and secondary symptoms, following the conceptual framework of Schaufeli and Taris (2005). The core symptoms of burnout comprise exhaustion, cognitive impairment (i.e., attention and memory deficits), emotional impairment (i.e., difficulties in emotion regulation), and mental distance (i.e., psychological detachment from one's work and its beneficiaries). In addition, three secondary dimensions of burnout are included in the definition because they are often the reason individuals with burnout seek help: psychological distress, psychosomatic complaints, and depressed mood (Schaufeli, Desart, et al., 2020). This definition appears to have several advantages over that of Maslach et al. (2001) because it accounts for the cognitive and emotional symptoms frequently experienced in physician burnout and which constitute practical difficulties in their work (Almarzouki, 2024; Brulin et al., 2025; Jackson-Koku & Grime, 2019). Indeed, a systematic review by Deligkaris and colleagues (Deligkaris et al., 2014) reports that burnout is associated with impairments in executive functions, attention, and memory. These functions are essential and contribute to critical thinking, problem-solving, and clinical judgment for physicians (Almarzouki, 2024; Kiratipaisarl et al., 2024). Moreover, emotion regulation is important for managing stress, supporting performance and resilience, and maintaining well-being (Jackson-Koku & Grime, 2019). Taken together, these cognitive and emotional difficulties are associated with increased sickness absence among physicians (Brulin et al., 2025)

The literature identifies multiple factors that contribute to physician burnout and interact at various levels (societal, cultural, organizational, relational, and personal) (Banse et al., 2025a; Jenkins, 2023; Shanafelt et al., 2019; Sibeoni et al., 2019; Unger, 2020). Among the factors examined, certain demographic characteristics remain debated in the literature: gender (Thakur et al., 2025; Dodelzon et al., 2024; Dillon et al., 2022; Shanafelt, West, Dyrbye, et al., 2022; Khoodoruth et al., 2021; Nwosu et al., 2020; O'Connor et al., 2018; C. P. West et al., 2011; McMurray et al., 2000) and physician age (Hellin et al., 2022; El-Menyar et al., 2021; Chemali et al., 2019). To cite only a few examples of the consequences of physician burnout, it imposes costs on society (Dewa, Jacobs, et al., 2014), is associated with medical errors affecting patients (Shanafelt et al., 2010; C. P. West et al., 2006) and relates to depression and suicidal ideation (E. Ryan et al., 2023).

6.1.5 Professional self-discrepancies and physician burnout

"We feel a pressure from within to work and help and we feel a pressure from the outside to give […] [Our] guilt may then promote [us] to even further 'giving' and ultimate exhaustion." p. 161).

To our knowledge, no empirical study has yet tested the associations between physician burnout and professional self-discrepancies. As cited above, Freudenberger's (1974) seminal account already posited that burnout arises when individuals cannot attain their ideals or conform to others' expectations. In this vein, clinical and qualitative work has highlighted a potential link between burnout and discrepancies from professional ideals or social prescriptions among workers in general (Maslach & Leiter, 1997; Pines, 2002, p. 200; Vanheule & Verhaeghe, 2005) and more specifically among physicians (S. D. Agarwal et al., 2020; Bourquin et al., 2023; J.-P. Byrne et al., 2023; Daloz, 2007; Selder & Paustian, 1989).

The links between professional self-discrepancies and burnout are likely bidirectional. On the one hand, such self-discrepancies may contribute to burnout and emotional exhaustion (van den Bosch et al., 2019; Haines & Saba, 2012), particularly among physicians given the centrality of their professional identity. The literature also indicates that both anxiety and depression are associated with self-discrepancies (Philippot et al., 2018; Mason et al., 2019; Schlechter et al., 2022), and both are correlated with physician burnout (Crudden et al., 2023; E. Ryan et al., 2023; de Mélo Silva Júnior et al., 2022; Johnson et al., 2020). Moreover, the inability to attain professional ideals essential to medical identity can lead to a sense of alienation (Bourquin et al., 2023; J.-P. Byrne et al., 2023) which frequently co-occurs with burnout (Leiter & Maslach, 2016) or may follow it (Iliffe & Manthorpe, 2019).

Conversely, several studies note that burnout itself may alter the perception of

professional identity by generating new self-discrepancies. Burnout entails a diminution of certain capacities that are integral to the caregiver's role (e.g., empathy, engagement, or the ability to work effectively). Illness in physicians - whether mental or physical - may likewise conflict with their conception of the physicians' role (Wallace, 2012). Consequently, the experience of burnout can lead caregivers to feel cast down as they grow distant from their professional ideal. This distancing is experienced as a painful loss of their ideal and of their professional identity (Daloz, 2007; Lathrop, 2017; Schaufeli et al., 2009). Thus, while different lines of evidence suggest a link between professional self-discrepancies and burnout, the direction of causality remains to be determined.

Nevertheless, this link may not always be present, and some individuals may perceive larger self-discrepancies without necessarily suffering from them. One reason may lie in their greater acceptance of these discrepancies through healthy self-compassion they have developed (Neff, 2009). Accordingly, distress associated with self-discrepancies is a better predictor of mental health problems than the magnitude of the discrepancies per se (Philippot et al., 2018).

6.1.6 The current study

Based on the elements developed above, we hypothesize that professional self-discrepancies are associated with physician burnout. More specifically, we expect that the risk of burnout (BAT; Schaufeli, De Witte, & Desart, 2019) will be related to perceived discrepancies between the *actual professional self* and the *ideal professional self* or the *ought professional self*, as well as to the emotional distress associated with these discrepancies (Philippot et al., 2018).

The hypotheses investigated in this article are as follows:

- Hypothesis 1. The physician's risk of burnout is correlated with the discrepancy between the *actual professional self* and the *ideal professional self*.
- Hypothesis 2. The physician's risk of burnout is correlated with the **distress** associated with the discrepancy between the *actual professional self* and the *ideal professional self*
- Hypothesis 3. The physician's risk of burnout is correlated with the discrepancy between the *actual professional self* and the *ought professional self.*
- Hypothesis 4. The physician's risk of burnout is correlated with the **distress** associated with the discrepancy between the *actual professional self* and the *ought professional self*.

6.2 Method

6.2.1 Procedure

This research is an exploratory cross-sectional study conducted in Belgium among French-speaking physicians. It follows a correlational design in order to examine associations between physicians' professional self-discrepancies and burnout. Prior to data collection, the protocol received approval from the Ethics Committee of the Cliniques universitaires Saint-Luc, UCLouvain (protocol number: 2023/05SEP/369). Sampling relied, on the one hand, on a "snowball" method - i.e., multiple recruitment via social networks or by telephone calls - and, on the other hand, on contacting by email and distributing paper questionnaires within various physicians' associations, hospitals, and community health centers. Participation was voluntary and no compensation was offered. To limit self-selection bias, the term "burnout" in the survey title was replaced by "occupational well-being."

Data were collected from 11 December 2023 to 8 March 2024 using an anonymous questionnaire. It was administered either online via a public link on the REDCap platform hosted at UCLouvain (Harris et al., 2019) or in paper format also generated by the same platform. Before proceeding, participants were required to provide informed consent.

6.2.2 Participants

A power analysis using G*Power (Faul et al., 2009) was conducted to determine the required sample size for the present study. A sample exceeding 84 participants would allow detection of significant results, if present, for medium effect sizes $|\rho| \geq .30$, with alpha $< .05$ and statistical power of .80. Physicians were eligible if they were French-speaking, under 75 years of age, currently practicing, trained in or currently completing specialty training, and if they answered all mandatory survey questions. A total of 230 physicians who met the inclusion criteria responded to the survey, including 139 women (60.4%), 90 men (39.1%), and 1 person who did not wish to specify their gender (0.4%). Among these, 71.7% were senior physicians and 28.3% were junior physicians (or in training for a specialization). Regarding medical orientation (or specialization), 72.6% were specialists and 27.4% were general practitioners. In terms of working hours, 88.5% of participants worked full-time, 11.5% worked part-time, and 1.7% were missing. Finally, the average age is 40.9 years (± 13.2) for the entire sample, 38.14 years (± 11.26) for women, and 45.39 years (± 14.87) for men.

6.2.3 Materials

Demographic data

Five demographic variables were collected: gender, age, physician status

(senior, junior), medical orientation (general practitioner, specialist), and work schedule (full-time, part-time).

Physician Self-Discrepancies Scale

To assess self-discrepancies (Higgins, 1987) in physicians' professional context, we adapted the Self-Discrepancies Scale (SDS; Philippot et al., 2018) for this specific population, with the permission of P. Philippot (author of the original scale). In our study, the scale was administered in French, but we provide an English translation in this article (cf. Supplemental material). To this end, we compiled a list of the main characteristics desired in physicians as formulated by physicians themselves, their patients, or society in general (cf. Supplemental material). This list was developed based on discussions with physicians and on qualitative and quantitative research (Koh et al., 2023; Sheikhbahaei et al., 2023; Grundnig et al., 2022; Khawar et al., 2022; R. Woodward et al., 2022; dos Santos et al., 2021; Cruess & Cruess, 2020; S. D. Agarwal et al., 2020; Schrepel et al., 2019; Shanafelt et al., 2019; Branch et al., 2017; Linzer & Harwood, 2018; Côté et al., 2020; Schattner et al., 2004; Rabinowitz et al., 2004; Paice et al., 2002). Before starting data collection, this list was reviewed by two physicians and by a psychologist working in the medical field in order to refine it.

To produce the remainder of the adaptation, we drew on the method used by Roskam et al. (2022), which adapts the SDS (Philippot et al., 2018) while maintaining an idiographic component (i.e participants generate lists of attributes that describe their professional selves without being constrained to choose them from a predefined list). The questionnaire therefore comprised two sections: the [ideal/actual] professional self-discrepancy section and the [ought/actual] professional self-discrepancy section. Each section followed three steps:1) Participants were invited to reflect on the characteristics they would like to possess as physicians. They could freely list up to eight characteristics they would personally like to possess as an ideal physician (i.e., first section) or that society expects of them as physicians (i.e., second section). They could, if they wished, draw on a list of 40 characteristics of the ideal physician (see Supplemental material). 2) They then evaluated the [ideal/actual] and [ought/actual] professional self-discrepancies using two items: (First section) To what extent are you like this ideal physician?; (Second section) As a physician, do you behave the way society (e.g., patients, colleagues) expects you to? (As a physician, do you feel you have the qualities that society (e.g., patients, supervisors) expects of you?). Scores on these two items were recorded from 0 to 100% on a visual analog scale ranging from "I feel very far from my ideal physician" to "I feel very close to my ideal physician" (first section), and from "I do not behave like this at all" to "I behave exactly like this" (second section). To

improve interpretability, scores were inverted so that higher scores reflect larger self-discrepancies. 3) Participants rated their distress associated with their [ideal/actual] and [ought/actual] professional self-discrepancies using two items: (First section) How much distress is caused by the discrepancy between your ideal of a good physician and how you see yourself?; (Second section) How much distress is caused by the difference between what is expected of you as a physician and how you actually behave? Scores on these two items ranged from 0 to 100, from "I do not feel any distress related to this discrepancy" to "I feel significant distress related to this discrepancy." In our sample, Cronbach's alpha was .67, which is higher than the alpha of .60 reported for the original scale (Philippot et al., 2018).

Burnout

Risk of burnout was assessed using the Burnout Assessment Tool (BAT; Schaufeli, De Witte, & Desart, 2019) . The BAT includes 23 items capturing the four central dimensions of burnout (BAT-Central, abbreviated BAT-C). All items are rated for frequency on a 5-point Likert scale from Never to Always. Eight items measure Exhaustion (e.g., "*After a day at work, I find it hard to recover my energy*"), five items measure Mental distance (e.g., "*At work, I do not think much about what I am doing and I function on autopilot*"), five items measure Cognitive impairment (e.g., "*I make mistakes in my work because I have my mind on other things*"), and five items measure Emotional impairment (e.g., "*I do not recognize myself in the way I react emotionally at work*"). Averaging the four subscales yields the total score of core symptoms. In our sample, Cronbach's alpha was .93, which is close to what prior studies have reported (α = .95; Schaufeli, Desart, et al., 2020).

Several reasons led us to prefer assessment via the BAT (Schaufeli et al., 2019) rather than the Maslach Burnout Inventory (MBI; Maslach et al., 1997), despite the latter's popularity. As mentioned in the Introduction, the BAT highlights symptoms frequently experienced by physicians - namely cognitive and emotional difficulties (Almarzouki, 2024; Brulin et al., 2025; Jackson-Koku & Grime, 2019).Moreover, these difficulties are particularly important to detect clinically and are not captured by the MBI. Unlike the MBI, the BAT enables assessment of burnout using a single overall score (Hadžibajramović et al., 2020), and a recent meta-analysis by Villacura-Herrera and colleagues (2025) indicates that the BAT exhibits better reliability indices.

6.2.4 Data analysis

First, we conducted preliminary analyses to determine the most appropriate correlation coefficient for evaluating associations between physician burnout and professional self-discrepancies. Using boxplots, we identified meaningful outliers in

the data, which we elected to retain. These included physicians at higher risk of burnout or reporting larger discrepancies with their ideal professional self or ought professional self (see Supplemental material). We considered their inclusion essential for the analysis. In addition, our variables did not consistently exhibit normal distributions, as indicated by central tendency indices, kurtosis and skewness indices divided by their standard errors (Kim, 2013), and the Kolmogorov-Smirnov test (Field, 2009; R. M. West, 2021) (see Supplemental material). For these reasons, Spearman's rank correlation was deemed the most robust approach to test the associations specified in our hypotheses (Schober et al., 2018).

Accordingly, we computed Spearman's correlations (r_s) between the risk of occupational burnout (Schaufeli et al., 2019) and indices from the adapted Self-Discrepancies Scale (SDS; Philippot et al., 2018) for physicians. Because r_s coefficients can themselves be interpreted as effect-size measures (de Winter et al., 2016; Kraemer, 2006; Altmejd et al., 2019; Gaskin & Happell, 2014), we adopted the following benchmarks: r_s = .10 (small), .30 (moderate), .50 (large) (Gaskin & Happell, 2014). We used an alpha level of $\alpha = .05$ for significance testing of the primary hypotheses. For clarity, our notation "[x/y] professional self-discrepancy" denotes "the discrepancy between professional self *x* and professional self *y*."

Following the presentation of the main results below, we conducted an exploratory hierarchical multiple regression to examine the contribution of the distress variables to the prediction of burnout scores, over and above demographic variables. In line with the principle of parsimony (Field, 2009), the demographic predictors retained in the model were age and gender, both frequently examined in the burnout literature (Thakur et al., 2025; Shanafelt, West, Dyrbye, et al., 2022; Khoodoruth et al., 2021; O'Connor et al., 2018). We also verified the standard assumptions for multiple linear regression: independence of observations, normality of residuals, homoscedasticity, and absence of multicollinearity (see Supplemental material).

6.3 Results

6.3.1 Main results

Table 1 shows the means, medians, and interquartile ranges for the Burnout Index and Physician Self-Discrepancies Scale. Table 2 indicates the Spearman's correlations between the Physician Self-Discrepancies Indices and Physician Burnout scores.

Table 1. *Descriptive Statistics*

	Range	Mean	Median	Interquartile range (IQR)
Burnout	[1 ; 5]	2.13	2.04	[1.74 ; 2.43]
[Actual/Ideal] discrepancy	[0 ; 100]	28.84	25.5	[20.00 ; 35.25]
Distress associated with [Actual/Ideal] discrepancy	[0 ; 100]	35.32	29.5	[13.75 ; 54.25]
[Actual/Ought] discrepancy	[0 ; 100]	38.22	35	[25.00 ; 50.00]
Distress associated with [Actual/Ought] discrepancy	[0 ; 100]	38.05	35.5	[15.00 ; 58.25]

N = 230.

Table 2. *Spearman's Correlations between Physician Self-Discrepancies Indices and Physician Burnout*

	Spearman's rho with Burnout	Significance (2-tailed)	95% Confidence Intervals (2-tailed)[a,b]	
			Lower	Upper
[Ideal/Actual**]** professional self-discrepancy	.38	< .001	.26	.49
Distress associated with **[Ideal/**Actual**]** discrepancy	.52	< .001	.41	.62
[**Ought**/Actual] professional self-discrepancy	.23	< .001	.11	.36
Distress associated with [**Ought**/Actual] discrepancy	.47	< .001	.36	.57

a. Estimation is based on Fisher's r-to-z transformation. b. Estimation of standard error is based on the formula proposed by Bonett and Wright.

As shown in Table 2, burnout is significantly correlated with all indices of the scale ($p < .001$). The highest correlations concern the distress associated with the discrepancies ($r_s = .52$ for the distress related to the [Ideal/Actual] discrepancy, and $r_s = .47$ for that related to the [Ought/Actual] discrepancy). The correlations with the perceived discrepancies themselves are smaller ($r_s = .38$ for the [Ideal/Actual] discrepancy and $r_s = .23$ for the [Ought/Actual] discrepancy).

Effect sizes for the correlations can be estimated from the confidence intervals reported in Table 2. The correlations between burnout and the distress associated with the discrepancies (H2 & H4) fall between moderate and large. In contrast, the correlations with the discrepancies themselves (H1 & H3) fall between small and moderate. Put differently, higher burnout scores are associated with feeling further from one's professional ideal (i.e., one's ideal of a good physician) or from the expectations of one's professional environment (e.g., colleagues, hierarchy,

patients), and with greater distress regarding these perceived gaps, with the distress variables showing the stronger associations.

6.3.2 Exploratory analysis: burnout and distress related to the physician self-discrepancy

Given the strength of the correlations observed between burnout and the distress linked to professional self-discrepancies, we conducted a hierarchical multiple linear regression to further examine these associations. Table 3 presents the results, with gender and age entered as covariates in Step 1, followed by the two types of self-discrepancy-related distress added to the model in Step 2.

Table 3. *Hierarchical multiple regression of the association between burnout and the two types of distress related to the physician self-discrepancy, while controlling for covariates*

		Unstandardized Coefficients		Standardized Coefficients
Step		B	Std. Error	β
1	(Constant)	2.755	0.131	
	Gender	-0.139	0.072	-.13
	Age	-0.011	0.003	-.26***
2	(Constant)	2.039	0.140	
	Gender	-0.082	0.063	-.07
	Age	-0.005	0.002	-.13*
	Distress associated with [Ideal/Actual] discrepancy	0.007	0.001	.34***
	Distress associated with [Ought/Actual] discrepancy	0.004	0.001	.22**

Table 3 shows that Block 1, which includes gender and age, significantly predicts burnout, explaining 10% of its variance ($F(2, 227) = 12.87$, $p < .001$). At this stage, only age shows a significant effect ($\beta = -.26$, $p < .001$). By adding the distress variables in Block 2, an additional 23% of the variance in burnout scores is explained ($R^2 = .33$, adjusted $R^2 = .32$, $F(4, 225) = 27.61$, $p < .001$; $\Delta F(2, 225) = 38.14$, $p < .001$). In this overall model, burnout shows a stronger association with the distress associated with the [Ideal/Actual] discrepancy ($\beta = .34$, $p < .001$) than with the distress associated with the [Ought/Actual] discrepancy ($\beta = .22$, $p = .002$). As for age, its effect is attenuated but remains significant ($\beta = -.13$, $p = .027$).

6.4 Discussion

Physicians are confronted with a high prevalence of burnout that has serious consequences for their own health, for their patients, and for the health-care system as a whole (Shanafelt et al., 2025; Sibeoni et al., 2019; C. P. West et al., 2018). Because burnout appears to interact with physicians' professional identity (Daloz,

2007; Moniz et al., 2021), our study set out to elucidate the mechanisms underlying this interaction through the lens of professional self-discrepancies. According to Trettevik and Grindal (2016), workers' identity is constructed in relation to ideals (*ideal professional self*) and social prescriptions to be met (*ought professional self*) against which individuals compare themselves as professionals. Prior research has demonstrated associations between deleterious outcomes and self-discrepancies tied to specific social identities (e.g., student, parent) (Erschens et al., 2019; Liss et al., 2013; Roskam et al., 2022; Trettevik & Grindal, 2016). However, to our knowledge, no quantitative study has shown this link between professional self-discrepancies and physician burnout.

In line with our primary hypotheses, we found that perceived discrepancies with the ideal professional self (H1) and, to a lesser extent, with the ought professional self (H3) were both significantly correlated with physician burnout. More than the magnitude of the discrepancies per se, it was the distress associated with each discrepancy that showed the strongest link with burnout (H2 & H4). We then conducted an exploratory analysis to control for gender and age in the relationship between discrepancy-related distress and burnout. These distress variables remained strongly associated with physician burnout, while the effect of age also remained significant. Put differently, the more physicians suffer from not realizing their professional ideal, or from not corresponding to perceived expectations in their professional environment (colleagues, hierarchy, or patients), the higher their risk of burnout. To a lesser extent, in this model, being a younger physician also constitutes a risk factor for burnout.

Our study contributes to understanding physician burnout from the theoretical standpoint of professional self-discrepancies, which, to our knowledge, has not previously been investigated empirically in this population. To do so, we developed the Physician Self-Discrepancies scale by adapting the Self-Discrepancies Scale (Philippot et al., 2018). This adapted measure showed satisfactory internal consistency (Cronbach's alpha = .67) and enabled us to build an exploratory model explaining 33% of the variance in burnout scores among participating physicians. Although the direction of causality remains unknown, our results better delineate the distress experienced by physicians with burnout in relation to their professional ideals and prescriptions. Our findings also support Trettevik and Grindal's (2016) postulate that discrepancies with the ideal self and the ought self can be experienced through a given social identity (for example, familial or professional), and not solely through a global identity. Such discrepancies may generate distress depending on the importance individuals ascribe to their social identity (i.e., identity salience; see Marcussen & Gallagher, 2017). Our results also align with prior work linking ideals

or social prescriptions to burnout among professionals in general (Leclercq & Hansez, 2024; van den Bosch et al., 2019; Maslach & Leiter, 1997), as well as among physicians and other caregivers specifically (D. Byrne, 2022; Moniz et al., 2021; S. D. Agarwal et al., 2020; Daloz, 2007; Selder & Paustian, 1989; Freudenberger, 1974). Returning to Freudenberger's (1974) foundational model, burnout appears to interact with professional ideals and prescriptions : particularly via the distress they engender (J.-P. Byrne et al., 2023; Moniz et al., 2021) and the guilt that drives workers (Guidetti et al., 2018) to invest themselves to the point of exhaustion.

Several factors may explain why discrepancies with professional ideals and prescriptions arise in medicine and why they generate distress correlated with burnout. First, a substantial portion of physicians' professional ideals is shared - most notably through medical culture and training (J.-P. Byrne et al., 2023; Moniz et al., 2021). Physicians are expected to provide altruistic, ethical, and competent service (Cruess & Cruess, 2020). At the same time, strongly rooted humanistic values (Pu et al., 2022) confer meaning to their work and serve as a source of resilience in the face of numerous stresses encountered in practice (Branch et al., 2017). However, the medical system exhibits dysfunctions (e.g., limited resources, inadequate performance metrics), and physicians often strive to keep the system functioning at the expense of their mental health (Jenkins, 2023; Moniz et al., 2021). Indeed, systemic shortcomings force physicians to make compromises that distance them from core humanistic values (e.g., empathy, access to essential care; (Moniz et al., 2021). Moreover, values promoted within the system frequently conflict with one another or prove difficult to realize (Sawatsky et al., 2023; Côté et al., 2020; S. D. Agarwal et al., 2020; Shanafelt et al., 2019). Given the importance physicians accord to their professional identity (Banse et al., 2025a; Côté et al., 2020; Lenoir et al., 2021), unrealized professional ideals and prescriptions contribute to burnout (J.-P. Byrne et al., 2023; Moniz et al., 2021). From a more individual perspective, other considerations may account for the weaker correlation between burnout and the size of the discrepancies, relative to the distress associated with them. For instance, some individuals adapt by adjusting their ideal when they perceive it as unattainable (Taris et al., 2010) or by developing healthy self-compassion that fosters acceptance (Neff, 2009). Yet such self-compassion can come up against medical cultural norms (Jenkins, 2023; Lenoir et al., 2021; Robertson & Long, 2018) and may leave a portion of discrepancy-related distress intact. Medical culture often promotes the image of the physician as a "superhero", infallible and error-free (Banse et al., 2025a; Shanafelt et al., 2019). These norms interact with a culture of blame that attributes to physicians errors for which they are not always, or not solely, responsible (Winning, 2023). Nepon and colleagues (2016) also show that individuals high in

interpersonal perfectionism (i.e., believing that others expect them to be perfect and seeking to project such an image) frequently engage in efforts to conceal imperfections, efforts that are, in the long term, linked to burnout.

Because our study is cross-sectional and correlational, we cannot determine causality. It is therefore likely that relationships between burnout and professional self-discrepancies are bidirectional. Burnout entails a diminution of capacities integral to the caregiving role (e.g., engagement, empathy, the ability to work effectively). This may lead caregivers to feel dejected and distanced from their professional ideal. Such distancing can be experienced as a painful loss of their ideal and of their professional identity (Daloz, 2007; Lathrop, 2017; Schaufeli et al., 2009). Burnout and discrepancies between professional selves may thus be causally linked in both directions. In another context, a longitudinal study has shown such a bidirectional link between parental burnout and discrepancies between parental selves (Roskam et al., 2022).

Finally, considering our exploratory analysis, several elements may help explain why variables show different correlations with burnout. Similar studies have observed the same pattern whereby discrepancies involving the ideal generally entail more negative consequences than those involving the ought prescription (Mason et al., 2019; Tang, 2022; Trettevik & Grindal, 2016). Among physicians, this pattern may reflect the lower priority of certain prescriptions, cost-effectiveness or productivity in particular (see Supplemental material), within their professional identity (S. D. Agarwal et al., 2020; Shanafelt et al., 2019; Martinussen & Magnussen, 2011). Humanistic values, by contrast, seem to be more central to their professional ideal.

6.5 Limitations

Despite these contributions, the study has several limitations. The sampling methods used (voluntary participation and “snowball” recruitment; see Method) limit the generalizability of the findings (as compared, for instance, with a random sample drawn from a defined physician population). From a statistical perspective, our sample may not have been large enough to detect certain effects, such as a gender effect interacting with age on burnout. Sample size may also account for the wide confidence intervals associated with some significant results (Hypothesis 3). Nevertheless, we collected data across varied medical settings (public or private hospitals, community health centers, and independent practice), which should support representation of diverse professional contexts in our sample.

We also note limitations of our Physician Self-Discrepancies Scale. Because

this adaptation was used for the first time in the present study, its measurement properties and validity cannot be guaranteed. In particular, assessing the professional ought self may have posed difficulties for some participants, because expectations from the professional environment can be multiple and contradictory (e.g., colleagues, patients, hierarchy). Future work should consider making finer distinctions among the different sources and types of expectations and validate the measurement of the Physician Self-Discrepancies Scale.

Further methodological considerations could enrich understanding of relationships between burnout and professional self-discrepancies. As noted above, the cross-sectional, correlational design precludes causal inference regarding discrepancies and burnout; a longitudinal approach would be beneficial. Additional variables capturing contextual and personal factors could also improve our understanding of these mechanisms. For example, it may be informative to examine associations with average time per patient, autonomy, or endorsement of harmful dimensions of medical culture (Banse et al., 2025a).

6.6 Practical implications

Several interventions could be implemented to help physicians and other caregivers address the strain placed on their medical values and the interaction this may have with burnout. First, it seems important to act on the structural causes that lead physicians to distress (J.-P. Byrne et al., 2023; Jenkins, 2023; Moniz et al., 2021; Winning, 2023). Accordingly, prior work suggests that health-care organizations should strive for better alignment between medical values and organizational realities (J.-P. Byrne et al., 2023; Moniz et al., 2021; Shanafelt et al., 2019). Indeed, physicians' mental health deteriorates when they are prevented from practicing in line with the standards of good medical practice (J.-P. Byrne et al., 2023; Moniz et al., 2021). One key lever is protecting time with the patient (Shanafelt et al., 2019) which constitutes an essential dimension of physicians' professional identity (Côté et al., 2020) and is hindered notably by administrative work.

In psychological support for physicians, it may be useful to help them become aware of their medical values when these are under strain (Kallai et al., 2023; Schrepel et al., 2019) and of the ideals and prescriptions with which they feel discrepant (Donda et al., 2016). This therapeutic proposal is part of Self-System Therapy (SST) (Strauman & Eddington, 2017; Vieth et al., 2003), which aims to reduce suffering due to such discrepancies. This evidence-based psychotherapy examines the role that standards play for an individual, helps to operationalize these standards, make them more accessible, or adapt them to the situation. In some cases, it may be helpful to redefine the physician's self-realization goals by taking into

account the means at their disposal (Gilibert & Daloz, 2008).

6.7 Conclusion

At a time when physician burnout constitutes a major problem in health care, it is important to understand the tensions within professional identity that interact with burnout. The Self-Discrepancy Theory applied to a specific social identity may help to better assess these tensions and the distress experienced by physicians with burnout. Our study demonstrates a significant association between physician burnout and discrepancies with professional ideals and prescriptions. While the distress arising from these discrepancies appears to be a promising target for therapeutic interventions, it is also important to consider these forms of distress from a systemic perspective, and to recognize that physicians' mental health is at times compromised in order to keep health-care systems functioning.

7. Appendix G: Report of an educational intervention on medical culture

Not to the reader. This report was translated from French to English using DeepL. The reader should keep in mind that this report was made between March and July 2024 (mid-thesis process, before writing the present thesis manuscript).

7.1 Context

7.1.1 Purpose of the report

The purpose of this report is to provide an account to the Faculty of Medicine of the UCL of a specific course delivered on 28/03/2024 as part of the General and Medical Psychology course given to first year bachelor students in medicine. The course focused on medical culture and the importance of self-care for medical students. A few weeks later, we were able to gather feedback from the students on this course. Given the interest shown by the students, we thought it essential to report on these elements while referring to the scientific literature on medical education to justify its relevance.

7.1.2 General and medical psychology course

The General and Medical Psychology course (**WMDS1116**) is a 50-hour course given in the first year of the bachelor's degree in medicine (Q2) at UCLouvain. The course is taught by several teachers: Professors. E. Constant, P.de Timary, M.Mikolajczak and S.Symann. It is worth 6.00 credits and consists of two tabs. The first concerns *general psychology* and enables the development of contemporary psychological concepts. The second concerns *medical psychology* and raises students' awareness of the importance of the quality of the doctor-patient relationship.

7.1.3 Intervention: a course on taking care of yourself

As part of this second tab, I was invited by Professor M. Mikolajczak to speak at a session. My doctoral thesis explores the links between well-being, doctors' health and medical culture. It enabled me to conduct an in-depth review of the literature on physician burnout and medical culture, while collecting data that is currently being analysed. I also had rewarding discussions with many doctors, some of whom shared their experiences of burnout within the profession. In line with the findings of the scientific literature on medical education (Dyrbye et al., 2015; Dyrbye & Shanafelt, 2011a; Louie et al., 2007; Mahood, 2011), we believe that it is crucial for students to acquire an understanding of the realities of the profession from the earliest stages of their training, in terms of education, medical culture and the current healthcare

context. This approach is also intended to encourage reflection on the importance of self-care (Dyrbye et al., 2015; Montgomery, 2014; Vanheerentals, 2024) for both medical students and doctors, and on the different strategies they can adopt in this respect. The course combined a theoretical presentation of the main concepts from the literature, vulgarized research data and extracts from doctors' testimonies. A summary of the course content is presented in the following section. The presentation material used during the course is also appended to this report. The associated references are included in the main bibliography of the present thesis.

7.2 Course content

7.2.1 Burnout, well-being and health behaviours in doctors

The first part of the session combined a theoretical presentation of the scientific literature on burnout and professional distress in doctors with testimonies from doctors who had experienced professional burnout, providing a concrete insight into this professional reality. After defining the concept of burnout and its symptoms, I highlighted two observations: firstly, the prevalence of burnout among doctors continues to rise, exceeding that observed in other professions; secondly, the repercussions of burnout are felt at various levels, impacting patients, colleagues, healthcare institutions and doctors themselves.

Burnout is accompanied by associated symptoms of psychological distress, such as anxiety, depression and even suicidal ideation, and an increased risk of suicide (in Belgium, an estimated 5 doctors die by suicide every year (Vanheerentals, 2024)). At the same time doctors display questionable health behaviours that are not conducive to their own well-being. These include presenteeism, substance abuse, a tendency to self-diagnose and self-treat, and difficulty seeking help from healthcare professionals, whether for physical or mental health problems. These behaviours are often exacerbated in burnt-out doctors. Medical students are also affected by this psychological distress and these health behaviours. According to scientific literature, these factors tend to become insidiously entrenched in the first years of university. The risk factors for burnout are personal, specific to the nature of the profession, but also linked to the healthcare system. Existing interventions aimed at preventing and/or treating burnout in the profession have apparent limitations. Today, the scientific literature highlights a growing concern shared by doctors about an aspect that is often neglected but potentially crucial to understanding this distress and the reactions that ensue: medical culture.

7.2.2 Medical culture and its influence

Medical culture represents the beliefs, values, attitudes and norms shared by

doctors. It helps to shape expectations about how members should behave and provides a sense of identity for its members. Medical culture is transmitted within medical education and throughout the learning environment, both through a formal component and through informal or unofficial mechanisms, referred to as the "hidden curriculum" (see conclusion of the report). This medical culture is assimilated very quickly by students, and not always consciously.

The scientific literature and the testimonies of doctors note that certain aspects of this medical culture are likely to contribute unintentionally to the distress observed within the medical community. As Montgomery summarizes, « For physicians, burnout is the inevitable consequence of the way medical training is organized and the resulting maladaptive behaviours that are reinforced in healthcare organizations through the hidden curriculum. » (Montgomery, 2014). Indeed, medical culture encompasses norms that could have deleterious and unintended repercussions on the health and well-being of doctors. Although rarely made explicit formally, these norms are transmitted implicitly to medical students and young doctors in training. The testimonies of doctors presented in the slides of the presentation illustrate this phenomenon.

7.2.3 Harmful dimensions of medical culture and their link to burnout

In the initial research conducted as part of my thesis, we attempted to verify doctors' intuitions that certain dimensions of medical culture transmitted through medical education could have unintended harmful consequences for doctors, particularly in terms of their association with burnout. Using an online survey, we were able to collect data from 1002 doctors and over 200 extracts from testimonials. Statistical analysis enabled us to identify a model representing the harmful dimensions of medical culture. This model, presented in the PowerPoint, consists of **three interdependent dimensions positively associated with professional burnout** in our sample:

- **The doctor's professional commitment**, which encompasses the impact of work on the practitioner's personal life, the centrality of professional identity to their overall identity, and the sacrifices perceived as necessary to succeed in their medical career.
- **The myth of the invulnerable doctor**, reflecting on the one hand the moral sense and responsibility doctors feel towards their patients and colleagues, and on the other the discomfort practitioners feel when they find themselves in the position of patient, which creates tension between their role as carer and that of receiver of care.

- **The stigma associated with professional burnout among doctors,** which refers to the stigmatizing attitudes, both internal and external, towards the experience of burnout within the medical community.

In addition to these three dimensions, another dimension, **the existential meaning of being a doctor**, was identified statistically. This dimension expresses the extent to which the practice of medicine confers meaning on the practitioner's life as a whole. It was more independent of the other dimensions and was negatively correlated with burnout. This suggests that a greater sense of meaning derived from medical practice is associated with a lower risk of burnout, which explains why this dimension was not retained in the modelling of *harmful* dimensions of medical culture.

The students noted that they already perceived these dimensions at their level, in their role as medical students. These dimensions were then illustrated by testimonials from doctors, which reinforced the credibility of the model and aroused keen interest among the students.

Here are a few examples of the extracts that were presented:

> I think that the way in which medical studies are taught forces us not to respect our limits (because otherwise it's almost impossible for most students to pass their year, given the huge amount of material we have to study in a short space of time). I think that after 6 years (minimum) we've all kept this habit, which then puts us in difficulty when we become an assistant. There's also a sort of culture of 'suffering', where you're deserving when you've suffered a lot. Both of these factors encourage us not to set our limits before they are exceeded.
>
> Medicine is too often seen as a vocation that takes the place of many other things in a doctor's daily life.
>
> We are "educated" to set ourselves up as saviours and not to save ourselves.
>
> Culture transmitted "doctors are superheroes".
>
> I think there's a taboo in the doctor's mind, which means that burnout and psychological problems are rarely discussed.

7.2.4 How can we take care of ourselves in this context?

In conclusion, based on this context, I discussed ways in which students could take care of themselves and participate in a positive evolution of medical culture. The aim was to get students to think proactively about how to become doctors who are fulfilled both professionally and personally.

The literature offers a number of avenues to explore: seeking a balance by

promoting more humanism and caring in the profession, while maintaining excellence in care; moving from a culture of stigma and competition to one of compassion and collaboration; remembering that the doctor is first and foremost a human being with limitations, not a superhero; and reconciling the core values of the profession while recognizing the realities of the human limitations that doctors also face.

Universities have a role to play in instilling these values in future doctors from the very start of their training. The doctors who responded offer pertinent perspectives on how universities can contribute to a positive evolution in medical culture:

> [There is a] lack of information about specific support structures for doctors: doctors in difficulty, the Ordre des Médecins team with its coaches and lawyer, etc. Lack of information about access to part-time medical work and guaranteed income insurance support,lack of testimonials at conferences and congresses from doctors who have gone through burn- out and come out the better for it.
>
> [It's] really interesting that exchanges are taking place between [these] different generations and
>
> [it's] important to take this into account in the overall organisation of healthcare in Belgium.
>
> Appropriate prevention and communication about strategies for dealing with [these] sources of pressure could be judicious during university studies.
>
> There is no awareness in our studies of the fact that you have to know how to take care of yourself in order to be able to take care of others.
>
> [We need to] keep talking about it in a preventive and active way. We have to stop thinking that we're superheroes and that we know and can do everything. To look after others, you first have to look after yourself physically and psychologically.
>
> It is urgent and essential to have supervisory forums in which to express the difficulties and feelings associated with medical practice.

As will be reported in the next section (section 4) the students' responses are an interesting reflection of the perspectives provided by the doctors.

Finally, I wanted to provide some more concrete ideas for the students at the end of the course:

- Initiate a reflection on the type of doctors they aspire to become, to deliberately create a **professional identity** and position themselves in relation to the norms of the existing medical culture to guard against some of its harmful consequences.

- To make **taking care of themselves** an individual responsibility, and to think about what resources they have outside their studies, an approach that may be unique to each person.
- Maintaining a **fulfilling life** and an identity of their own outside their role as a medical student. Even if the investment required for their studies can sometimes give the opposite impression, students are much more than "just" medical students.
- **Role models** have a powerful influence on the way (future) doctors think and behave. I have encouraged students to find around them supervising doctors whom they consider to be good clinicians, role models whom they want to be like. These doctors will serve as role models and the fact that many of them recognize the possibility of being a good doctor but also being vulnerable at some point in their career, doctors who are able to set limits to protect their well- being, can help to demystify and desacralize certain aspects.
- Don't lose sight of the reasons why they chose their studies and this profession. These **intrinsic motivations** will be a powerful source of motivation in the face of the difficult times they will inevitably encounter during their studies and their future careers. They tie in with the notion of meaning developed in the theoretical content of the course.

7.3 Interaction with students during the first course

Via the Wooclap platform, students were able to interact anonymously and answer a series of questions throughout the course. Several students also gave me their impressions of the course content at the end of the session.

7.3.1 Wooclap

The scatterplots representing the answers to the open-ended questions are available upon request of the authors.

To the question « What words do you think of when the word 'BURNOUT' is mentioned to you? », the students evoke a series of terms that come close to exhaustion, but also to its consequences. The notion of a loss of meaning came up several times, as did the impression of too much, too much, too much. Some students also mentioned studying medicine.

To the question « What words do you spontaneously think of when someone says 'medical culture' or culture of doctors? » (N= 228), a number of terms used in this cloud of points are worth mentioning. For example: devotion, prestige, perfect, having the title by merit, unhealthy. Aspects of history, ethics, study and learning are also included.

To the question « What do you think are the ideal characteristics expected of a doctor in society? What does the ideal doctor look like? » (N = 317), personality characteristics and ways of working were mentioned, such as perfectionism, being available 24 hours a day, omniscience, perfect knowledge, or the notion of savior.

To the question, « Have I ever taken a substance (alcohol, stimulant, sleeping pill, etc.) to cope with the stress of studying, to work better, to fall asleep more quickly during exam periods, etc.? » (N= 221), 45% of students replied « I've already done that ».

To the question « Do you already feel this pressure mentioned by doctors during your medical studies? » (I was referring to the extracts of testimonies presented, available on the powerpoint) (N= 161): 47% answered 'yes, often'; 48% answered 'sometimes' and 5% answered 'never'.

Here are the most telling responses regarding the question « What solutions would you propose to bring about a positive change in medical culture? »:

- Doctors are not superheroes
- Enable more people to study medicine, even if it means giving them more time to do so, fewer hours of lessons for better studies.
- Withdraw the landscape decree
- Less competition among students who feel superior or better
- Raise awareness outside medicine; testimonials at conferences; training in hospitals to raise awareness of medical culture; prevention.
- Have more doctors to reduce the workload
- Also promote other studies and professions; desacralize the ideal and inhuman idea of the doctor, desacralize the profession; reduce elitism
- More psychology courses
- Become aware of taboos so that they can be stopped and not passed on; become aware of unspoken things and change them

The students therefore already seem to be proposing various ways of bringing about positive change in medical culture.

7.3.2 Interactions with the students

Here is some feedback from the students that I was able to gather at the end of the course, which helped to further nuance my understanding of the reality experienced by the students:

- For some students, the 'toxic' aspects of medical culture **can sometimes have positive effects**. For example, one student pointed out that for her, working to

the point of exhaustion gave her a sense of satisfaction. In her view, stopping work without being exhausted would mean that she hadn't worked hard enough. She felt that she should only stop working when she literally felt exhausted, seeing this as an indicator of success.

- Students also highlighted the fact that the pressure induced by medical culture is also exacerbated by a **wider societal culture** and by **the expectations that society places on doctors** (hyper-availability, the role of savior, etc.). While medical education can contribute to change, other stakeholders, particularly patients and society as a whole, need to evolve their way of thinking, recognizing the limitations of doctors. This will require ongoing education and awareness-raising.
- Many students expressed the **need to desacralize the medical profession** and their weariness at the idea of being placed on a pedestal because of their medical studies. In their view, medicine is a course of study like any other, and each has its challenges. We discussed the reasons why studying medicine is so idealized (length of study, workload, prestige of the profession, opportunity to save lives, etc.).

The students I spoke to at the end of the course expressed their gratitude for the course. **For them, it was crucial to have a reality check and to free themselves from the ideals conveyed by the university** (Castro-Frenzel, 2022). Studying medicine is not easy, and the distress felt by many both during their studies and in practice is very real.

7.4 Student feedback on the course in Microsoft Forms

During the session on 18/04/2024, students completed a Microsoft Forms questionnaire (N = 189), the graphical representations (for quantitative questions) and full answers (for open-ended questions) of which are available upon request from the authors. I used ChatGPT 3.5 to summarize the main themes emerging from the students' qualitative responses and to identify broad categories of responses.

These responses reflect the students' experiences and suggestions for improvements that could be made at several levels. They testify to the interest of the students, who have really grasped the themes addressed and, in this sense, they could be useful for the Faculty of Medicine in considering points for attention regarding changes that could be envisaged in the course programs and their organization within the faculties of medicine.

7.4.1 Appreciation of the course

Overall, the students said they enjoyed the course (average rating of 8.1/10)

and noted that they thought it was important for medical students and doctors to be given a course on medical culture, well-being and self-care (average rating of 8.7/10). The majority of students (77.8%) thought it was appropriate to give this type of course in the first year of their bachelor's degree, but to be able to recall the concepts covered during their work placements and initial contact with the field.

Here is an excerpt from the response to the question « What did you appreciate most about the course given on medical culture (concerning the content, the way the course was given, ...)? »:

> The course was very interesting in terms of its content. It helped me put these studies into perspective, as they tend to put a lot of pressure on you in terms of expectations. Our studies are highly sacred in society and that tends to scare me, the feeling that I have to meet certain expectations. Thanks to the presentation, I've got a number of ideas for things I can do to reduce stress. I felt less alone in the audience about this feeling of pressure. I also had some great discussions with my parents about what going to medical school entailed, they reassured me enormously, and told me that I had to believe in myself and what I wanted and not in society's expectations. In conclusion, I'd say that this presentation was essential for me, especially at this level (I'm in my first year of medicine after a quadri, which gave us an initial idea of what studying was like).

Here are the themes that stood out in the students' responses:

- **Content and concrete examples**: Students appreciate the information given and the concrete examples that illustrate the concepts covered.
- **Raising awareness**: The course enables students to become aware of the issues surrounding medical culture and burnout in the profession.
- **Personal accounts and real-life situations**: Personal accounts, particularly those of practicing doctors, are very much appreciated as they give students a better understanding of the reality of the profession and the challenges they will face.
- **Interactivity**: The interactive aspects of the course, such as exchanges with students via Wooclap, are valued for their commitment and participation.
- **Honesty and openness**: Students appreciate the honesty with which subjects are tackled, without taboos, particularly when it comes to the consequences of burnout.
- **Suitability for students**: Students commented positively on the fact that the course was tailored to medical students, while addressing issues relevant to their future profession.
- **Prevention and advice**: The course offers advice and avenues of prevention for managing stress and preventing burnout in the early years of study.

- **Dynamic teacher**: The dynamic and engaging attitude of the teacher is also mentioned as a positive point, encouraging students' attention and interest.
- **Reflection on mental well-being**: The course encourages reflection on the mental well-being of future doctors and on the importance of taking care of oneself.
- **Breaking taboos**: Students appreciate that the course tackles subjects that are often taboo and that it helps to break certain implicit norms in the medical profession.

Here is one of the responses to the question « What could we do to improve this course? »:

> I thought the lessons were very good, the only sad thing during the course was that the course made us aware of what was going on, but for the moment we don't necessarily see a "way out" because no matter how much we know that medical culture pushes us to always work harder despite it being bad for our health, in the meantime while we're studying, it's the grades that will later determine our specialties so we don't really have a choice. I hope your survey will change things a bit ;)

Here are the themes that emerged in the responses:

- **Demand for solutions and positivity**: several students pointed out that although the course content was interesting, it was sometimes alarmist, not very reassuring and focused too much on the negative aspects of the medical culture and profession, leaving aside all the positive dimensions that also make up this culture.
- **Requests for interactivity and involvement**: the students also noted a desire for even more interaction during the course, with even greater use of Wooclap, and the possibility of having students talk about their experiences, or even having doctors testify in the auditorium (a proposal that came up many times and is in line with the ideas put forward in the literature on medical education).
- **Requests for organization and structuring**: the students asked to have the course material available before the course, and possibly to be able to give it in smaller groups to encourage discussion. Some students suggested that the course be given later in the year or in the course, others suggested that it be given earlier, or that it be divided into different parts throughout the medical course.

The biggest limitation of the course was that it was perhaps too defeatist and not focused enough on solutions. This ties in with the current state of my thesis in the sense that it is only at the exploration and identification stage, but does not yet propose concrete avenues for prevention and intervention. What's more, the changes that need to be made are at different levels, including the more systemic levels on

which students have little control, as highlighted in one of the following subsections.

Students were also given the opportunity to provide additional feedback on the course. Here is one such comment that is worth mentioning:

> I found the presentation very well presented, the subject was really well explained and was seen in depth, I liked it. However, I'd like to use this form to share my impression with you. I was quite divided and didn't particularly understand the point of us seeing this because we experience it on a daily basis or we'll experience it later. I didn't really manage to come up with any concrete solutions to help us and I think that's a shame. I understand that it's a work in progress, which is why we're answering this survey, but as I said in the previous question, if it's really going to help us, it would be interesting to have more advice. Perhaps, for example, doctors who have come out of depression and explained how they managed to get back on their feet. I think that what's more interesting for medical students is not to know that doctors get depressed, that studying is hard and that internships are complicated, but to explain to us how to deal with all that, how to get out of it. It's interesting that the problem has been raised, but I think we're already aware of it when we start our studies.

7.4.2 Well-being among medical students

This section contains a series of responses from students reflecting the state of their well-being within the Faculty of Medicine.

To the question « Do you feel exhausted in your role as a medical student? » the average rating was 6.28/10.

To the question « Are you afraid you won't be able to cope with the pressure of studying and becoming a doctor later on? », the average rating was 6.32/10.

7.4.3 Students' relationship with medical culture

a) What can you do, at your level, to protect yourself from the deleterious consequences of medical culture?

All the answers are available upon request from the authors. Here is an example of a response:

> Trying to find ways of balancing personal and professional life. I find that what makes medicine a more difficult field than others is the fact that doctors have to devote and even sacrifice every aspect of their lives to their patients and their work. I think that to be a good doctor, you need to know how to manage not only your stress but also your workload.

Here are the main themes that emerged from the students' answers:

- **Taking care of yourself and making time for activities outside your studies**:

Students stressed the importance of maintaining a balance between personal and academic life, taking time for leisure, rest, sport and socializing.

- **Speaking out and raising awareness**: Students recognize the importance of talking about burnout and medical culture, as well as making those around them aware of these issues.
- **Time management and organization**: They stress the need to manage their time effectively and to be organized to avoid being overwhelmed by their studies.
- **Maintain a positive outlook and keep things in perspective**: Some students recommend maintaining a positive outlook, keeping difficulties in perspective and remembering the reasons why they chose to study medicine.
- **Consider balance and diversity**: They stress the importance of not allowing themselves to be defined solely by their medical studies, but of maintaining a balance between the different facets of their lives and remembering that they are more than just medical students.

b) <u>What solutions do you see in the short, medium and long term to change this medical culture?</u>

The students proposed short-, medium- and long-term solutions. These concern both concrete changes in the area of prevention and more systemic changes. All the responses are available upon request from the authors. Here are the main responses that emerged.

In the short term :

- **Awareness-raising and information**: Students suggested organizing courses, lectures and information sessions to raise awareness among students during their studies and afterwards, in hospitals.
- **Psychological interventions**: Some students suggest individual solutions, such as therapy or psychological help, as well as sharing sessions between older doctors and young professionals.
- **Organizational changes**: They recommend changes to the education system, such as the organization of workshops, upgrading of the nursing profession, less intense programs and easy access to psychological services to deal with burnout.

In the medium term:

- **Curriculum review**: Some students suggest reviewing the curriculum to eliminate certain courses deemed unnecessary in their program.
- **Raising awareness among the general public**: It was suggested that awareness should be raised not only among doctors, but also among the general public, in

order to promote a more empathetic attitude towards medical staff.

- **Improving organization**: The students recommend improving the organization of hospitals and regulating consultation time per patient more effectively.
- **Increasing resources**: It is suggested that the number of places in medicine should be increased to reduce doctors' workloads.
- **Promoting well-being**: Initiatives such as relaxation workshops and stress management exchanges are proposed to improve the well-being of medical students.
- **Ongoing awareness-raising**: Students recommend ongoing awareness-raising among lecturers and students on issues related to medical culture.

In the long-term:

- **Awareness** and sensitivity to the problem at all levels, among both students and healthcare professionals.
- **Review the organization of the medical profession**, reduce the workload and the competitive spirit, and upgrade the status of assistants and young doctors.
- **Implement** initiatives such as increasing the number of INAMI numbers in order to have more doctors, reviewing teaching to make studies less elitist, and imposing mental health training for all medical staff.

7.4.4 Students' views on the role of the university

Through their responses, the students were able to highlight the essential role played by the university in their day-to-day lives. Their responses can be used to suggest a number of avenues to be pursued and, once again, we provide the main themes repeated here.

a) What do you think the university should do to protect students from the harmful consequences of this medical culture?

Responses included:

- **Raising awareness and education on the subject**, with specific courses and lectures accessible to all students.
- **Reducing workload**, overwork and pressure, and encouraging students to seek psychological help **without stigma**.
- **Promoting mutual support** between students, rest and relaxation areas on campus, and **courses** that highlight the different facets of medical culture.
- **Improving access to psychological support services**, as well as interaction between students and professors to improve mutual understanding.
- **Revision of course timetables, teaching methods and academic requirements** for a healthier balance between work and rest.

- **Recording of all courses** to enable students to manage their timetable more easily and access course materials at any time.
- Encourage to look at **systems in other countries** and adopt practices that are beneficial to their well-being.

b) How do you think universities can contribute to changing the medical culture?

Responses included:

- **Raising awareness and training teaching staff** to better understand the psychological issues facing students.
- **Reform of the curriculum**, considering the opinions of students and new doctors, with a reduction in the workload and a reorganization of the course thematics.
- Promoting a **collaborative** and empathetic approach, emphasising teamwork among medical staff.
- Creating **relaxation and rest areas** on campus to promote student well-being.
- **Encouraging teachers to change their attitude** towards students, avoiding competition and offering appropriate teaching support.
- Setting up days that are different from simple lectures in lecture theatres, including a **variety of activities** to encourage relaxation and the creation of links between students.
- **Raising awareness** among training supervisors and other supervisors of the challenges of medical culture and their impact on students.
- Revising course content to make it more **practical and interactive**, with concrete exercises and role-playing.
- Training teachers on the **psychological consequences** of studying medicine and on best **teaching practice**.
- **Informing** the government, patients and **all stakeholders** about the limitations of doctors, in order to promote a culture of respect for the well-being of practitioners.

7.5 Conclusions and outlook

I have written a report for the Faculty of Medicine to share the positive feedback we received from students about the course we offered. This approach could contribute to the reflections currently underway on the changes and adjustments that need to be made to medical study programs. I believe it is essential to take account of students' voices in the development of these changes.

7.5.1 The current context and the role of medical faculties

The university plays a role in the future professional development of medical students. It shapes the way in which students and doctors approach their profession, partly determines their commitment to it, and contributes to the development of their professional identity.

In the current context, where the prevention of burnout among doctors has become a major public health concern (Eckleberry-Hunt & Lick, 2015; A. L. Walsh et al., 2019; G. Walsh et al., 2019), it seems necessary for the Faculty of Medicine to become involved and take an active stance. Medical schools can take responsibility for developing a professional culture that is more attentive to the challenges faced by their students and future doctors (Dyrbye & Shanafelt, 2016). The aim of medical education is not simply to impart the medical knowledge and skills that will enable students to become good doctors (Cruess et al., 2014; Hafferty, 2008; Monrouxe et al., 2011; Wald, 2015; Wald et al., 2015), although this is an eminently essential objective. Medical education also plays a role in the acquisition of values and behaviours associated with professionalism (Gordon et al., 2012). In this sense, it must make future doctors aware of the reality of the profession and the importance of their own well-being, at a time when their professional identity is in the process of being established (Louie et al., 2007; Phillips & Clarke, 2012; Wald, 2015; Wald et al., 2015). Many English-speaking medical schools note that self-care should be a professional skill in its own right (Mahood, 2011; Shanafelt, 2021; Weiss et al., 2021), recognizing its crucial role in medical practice and in the professionalism of doctors (Dyrbye & Shanafelt, 2016). In Belgium, these concepts have been developed in the Code of Medical Deontology, which states in article 10: « The doctor is attentive to his own health. The doctor strives to maintain a balance between his professional activities and his private life » (Ordre des Médecins, 2019). How can a doctor take care of his patients if he does not take care of himself? How can a doctor accept his own vulnerabilities if this capacity has been ignored within his educational context (Sinskey et al., 2022)? This perspective takes on added importance when we consider the suffering of many young doctors faced with the reality of the field. Recent studies conducted in the French-speaking world conclude, for example, that a significant proportion of assistants would not choose to pursue the same studies again (Nohales et al., 2024). This malaise among the youngest doctors and this disenchantment of the profession are also perceptible in the field.

The sources of this distress are partly to be found in the current reality of the healthcare system and its organization. But this reality must also be tackled upstream (G. Walsh et al., 2019), especially as psychological distress seems to appear relatively early in the academic career, encouraging students to develop or

exacerbate personality traits, attitudes and beliefs that predispose them to burnout (Eppe & Depuydt, 2022; LaDonna et al., 2022; Montgomery, 2014), such as perfectionism, conscientiousness, demandingness, competitiveness, imbalance between private and professional life, stigmatization of psychological support, etc. Changes are needed (Dyrbye & Shanafelt, 2011a; Shanafelt, 2021; Shanafelt et al., 2019).

7.5.2 A course focusing on well-being in the profession

Offering a course focusing on the concepts of professional well-being and self-care, as well as on the hidden curriculum and medical culture, is a promising first step in primary prevention (Dyrbye et al., 2015; Dyrbye & Shanafelt, 2016). This initiative, which is not too costly, feasible and well received by students, seems to be having a positive impact. However, this type of course still needs to be improved, and the suggestions made by students will help us in this process.

The students wanted to get to grips with the issues raised, and we saw a real interest in the themes addressed. It would be interesting if the faculty could explore the avenues for development proposed by the students. The involvement of students in reflecting on the difficulties inherent in the profession, in particular burnout, as well as on more systemic aspects linked to their education and their future professional culture, seems beneficial and appreciated:

> This course] reminds us that our health, fulfilment and well-being must be our priority. It's also an eye-opener. It's also a subject that leads to discussion with other students or the doctors around us, who for my part really found themselves in your discourse.

> [I appreciated] the fact that we were talking about a phenomenon that everyone knows exists, but no one realizes just how pervasive it is. I knew that there was pressure intrinsic to being a doctor, but thanks to the testimonials, I realized that it was much greater than I thought. It scared me a bit, but in the end, you gave me some ideas for change, and I find that reassuring.

Students appreciate being consulted and questioned about their needs as learners of the medical profession. Their voice deserves to be heard. Their ideas should be considered, such as the greater inclusion of small group discussions on the difficulties encountered or the idealization of the profession; or the desire to hear from doctors about the reality of the profession and how to cope with it:

> [I appreciated the fact that we were presented with] content based on the lived experience of doctors and students (not just theoretical truths) ...

The medical education literature highlights role modelling as one of the most powerful forms of learning (Cleland & Johnston, 2012), following the adage ‘See

one, do one, teach one'. Inviting doctors to testify in front of an audience (A. Martin, Chilton, Gothelf, et al., 2020; A. Martin, Chilton, Paasche, et al., 2020; G. Walsh et al., 2019) is a promising and effective way of countering certain beliefs, such as stigmatizing attitudes towards mental illness or burnout among doctors. It was also felt that students needed to understand why a particular course was included in their curriculum. How will this subject help them to become good doctors? These needs must be listened to, so that we can move towards studies that remain meaningful for students, without losing sight of the very objective of medical education. Incorporating more courses that are genuinely concerned with the health and well-being of students, and not just actively learning theoretical knowledge, is therefore already a way of sending out a strong message: that the medical school attaches real importance to these issues.

7.5.3 We need to go further: addressing the hidden curriculum in medical schools

There are other avenues worth exploring to address the current issues facing the medical profession. Adding courses to already overloaded curricula will not be enough in the face of the long-term changes required and the responsibility of medical schools to promote the well-being of their students (Cleland & Johnston, 2012; Dyrbye et al., 2015). Moreover, limiting action to the formal curriculum alone without changing the wider organizational culture and learning environment may even lead to feelings of hypocrisy and cynicism (Dyrbye & Shanafelt, 2011a; Hafferty, 1998; Hafferty et al., 2015). It is also necessary to tackle the hidden curriculum.

Professor F. Hafferty, a medical sociologist and Professor of Medical Education at the Mayo Clinic, points out that medical education encompasses dimensions other than those explicitly set out in the official curriculum: what students are taught and what they retain are two different things. There is a distinction between the formal curriculum, which corresponds to what a school officially declares it teaches (its mission, syllabuses, materials, objectives), the informal curriculum, which includes the unplanned teaching and learning that takes place outside the formal curriculum (for example, at the bedside of patients on placement), and the hidden curriculum, which encompasses all the attitudes, beliefs, rituals and values implicitly conveyed by teaching structures and their practices. The latter often exerts a more powerful influence than the formal curriculum. If medical students are taught in theory classes that taking care of oneself is important, but in practice the messages conveyed by teachers or placement supervisors through their behaviour run counter to this idea, it is the latter message that will prevail. This is the main way in which medical culture is transmitted, and medical education is seen

as a process of enculturation into the profession. This process will have a strong influence on medical students' conception of self-care and well-being (Gordon et al., 2012).

Through the organization of course programs, the allocation of credits, or the courses that are not taught in medical school, the latter unwittingly transmits a powerful message about the values and skills that it considers to be priorities, and those that it considers to be superfluous (Montgomery, 2014). Students are quickly informed each year which courses are important, and which are perceived as 'easy' to pass. Numerous implicit messages are thus transmitted and integrated by the students, influencing their subsequent behaviour. The taboo surrounding the emotional challenges faced by future doctors is well known in the field of medical education (Fischer et al., 2008; Hafferty, 1988), and constitutes an important element of this hidden curriculum (Karnieli-Miller et al., 2010).

According to Hafferty, the main challenge for medical educators is to be willing and able to take a step back from the messages conveyed by the structures they have set up and for which they are responsible (Hafferty, 1998). This approach seems essential for the development of the profession, especially in the light of the distress experienced by many medical students and doctors today. Hafferty proposes to explore four specific areas to assess the presence and impact of the hidden curriculum within a medical school: institutional policies, assessment activities, resource allocation and institutional nomenclature (Hafferty, 1998). As well as including new courses, it is therefore probably also time for Belgian medical schools to make this hidden curriculum explicit and assess its impact on medical students (Mahood, 2011), in order to determine what changes need to be made. With this in mind, the medical students on this course propose a number of possible solutions for faculties to encourage a more caring medical culture.

7.5.4 General conclusion

Medical schools have the opportunity to decide to stop feeding and perpetuating a medical culture with potentially deleterious consequences for medical students and doctors (Brazeau et al., 2014), by opening up dialogue on subjects still considered taboo within the medical profession. By encouraging the emergence of potential changes while taking greater account of the preferences and needs of new generations of students (Brazeau et al., 2014), the Faculty of Medicine will demonstrate its commitment to the well- being of its students and future doctors. This orientation will encourage the development of a professional culture characterized by more authenticity and vulnerability (Shanafelt, Dyrbye, et al., 2022). Medical schools will thus produce clinicians who are not only competent but

also aware of the demands and challenges inherent in their profession, as well as their own vulnerabilities, and of the need to set limits in good time and ask for help when needed. Today, the well-being of medical students and doctors should become one of the fundamental objectives of medical education (M. Henderson et al., 2012).

It is imperative to recognize that medical students and physicians are first and foremost human beings. This perspective should permeate the values instilled in future generations of doctors from the outset of their training, in the content taught, the structure and design of training, and in the expectations placed on medical students (Shanafelt, 2021). The medical school's openness to these issues in no way means a reduction in the quality of the doctors it trains (Shanafelt et al., 2019), on the contrary, it will make a significant contribution to training future generations of professionals who are fulfilled, resilient and empathetic. Maintaining a level of excellence in medical education is crucial, but it must no longer be at the expense of students' health. It is essential to reconcile these two aspects rather than pit them against each other. It is time that doctors learn to accord themselves and their peers the same level of excellence in care that they provide to their patients (M. Henderson et al., 2012). This will benefit not only medical students and future doctors, but also, in the long term, the patients they will have to care for on a daily basis, and society at large.

8. Appendix H: Field feedback on medical training and medical culture

This appendix summarizes the main themes that emerged from invited presentations and discussions conducted during this PhD with physicians (feedback compiled from approximately twenty presentations and discussion sessions between 2023 and 2025, involving hospital supervisors, general practice trainers, faculty educators, and medical school leadership). These exchanges helped refine the practical implications of finding 6 and situate them within real-world training contexts. This feedback serves to complement, not replace, the empirical findings presented in Chapter 7.

Theme	Illustrative feedback and reflections
Transmission through training	▪ Training often functions as a *rite of passage*; many supervisors acknowledge a 'battered-child' effect where harsh practices are reproduced. ▪ Learning by doing remains valuable, but without safeguards it transmits outdated or harmful norms. ▪ Some see these dynamics as systemic or international rather than isolated problems.
Hidden curriculum vs. formal teaching	▪ Clear gap observed between what is formally taught (well-being, respect, limits) and what is modeled in practice (endurance, silence, overwork). ▪ Students absorb most lessons through observation ▪ Admission and evaluation systems may select for profiles prone to perfectionism or conformity.
Role modelling and trainer's dual role	▪ Supervisors are crucial transmitters - both inspiring and harmful role models coexist. ▪ Dual *trainer-employer* role creates power imbalance and silences disclosure. ▪ Suggestions included separating pedagogical evaluation from employment and reducing the number of trainees per supervisor.
Service vs. learning tension	▪ Residents often perceived as workforce rather than learners. ▪ Legal work-hour limits contested as 'incompatible with proper training'. ▪ Fear that lowering hours equals lowering commitment; opting out seen as 'fragility'.

Generational dynamics	▪ Younger physicians value balance and boundaries; older cohorts equate dedication with total availability. ▪ 'Sandwich' or 'sacrified' generation caught between both sets of expectations. ▪ Dialogue needed where each side hears the other's constraints. ▪ Supervisors note societal change requires time and support to adapt.
Patient focus and societal change	▪ Some perceive younger doctors as less patient-centered; others highlight unrealistic societal and institutional demands. ▪ Leadership notes steep decline in physicians' social prestige and income, widening the gap between student and professor generations.
Preparation and transition gaps	▪ Early trainees often feel unprepared for clinical realities; shock between preclinical ideals and practice. ▪ Proposals to identify and support struggling residents early (first six months).
Stigma and vulnerability	▪ Admitting limits remains linked to shame and perceived incompetence. ▪ Training fosters 'superhuman' ideals; endurance equals worthiness. ▪ Late-career disillusion frequently attributed to lack of recognition and persistent stigma.
Opportunities and solutions	▪ Make supervision/mentorship a normative element of medical culture, as in psychology. ▪ Separate training and employment hierarchies to limit abuse. ▪ Reduce administrative overload to preserve meaningful learning. ▪ Presenting the SEM framing helps reduce resistance by showing shared responsibility. ▪ Promote modules on medical culture, self-care, and limits early in curricula. ▪ Use structured two-way forums to negotiate tensions between service and learning.

Note. This appendix was organized and summarized with the assistance of *ChatGPT (OpenAI)*, which was used as a writing-support tool to help group and structure field notes into thematic categories.

9. Appendix I: Field feedback on broader influences

These insights were similarly as for Appendix G collected during informal discussions with physicians and academic supervisors after the presentation of the study results. They add context to the findings of this thesis and our discussions by showing how economic, political, and social factors shape physicians' daily experience of medical culture. Interestingly, some of these reflections - especially about financial pressure and regulation - also echo Chabot's (2013) view of burnout as a social and ethical signal rather than just an individual problem. In that sense, physicians' distress can also be seen as a reaction to a system that often conflicts with their values and ideals of care.

Theme	Illustrative perspectives from field discussions
Political and regulatory environment	Physicians repeatedly noted that state regulation and political control shape how they can work: "It's the state that mistreats us". They cited the deontological obligation of *'continuité des soins'* increasing administrative control, and lack of political understanding of the realities of healthcare.
Economic and structural constraints	Physicians highlighted the Belgian *INAMI* fee-for-service model as a major source of overwork and competition. The economic structure "rewards quantity, not quality", and creates tension between patient care and financial survival.
Societal change and public expectations	Several physicians noted a shift toward consumerist and immediacy-driven expectations: "Patients want everything, right now." This change was seen as increasing complaints and reducing tolerance for physician limits.
Institutional productivity pressures	Hospital physicians described escalating productivity targets, bureaucracy, and lack of recognition. They described that paramedical staff were also seen as affected by the same culture of performance and exhaustion.
Professional status and identity	Physicians with a self-employed status stressed the absence of the right to be ill (i.e. financially). Young doctors entering practice face financial pressure, administrative overload, and limited support. Older physicians expressed fatigue from decades of adapting to changing systems.
Generational evolution	Participants discussed the 'generation gap' between older doctors, who internalized traditional ideals of sacrifice, and younger ones, who seek balance and authenticity. Both groups expressed distress

	about this shift but for different reasons.
Cross-disciplinary perspectives	Many called for joint reflection across psychology, sociology, organizational science, law, and education to understand physicians' distress as a systemic issue rather than an individual one. Some proposed inter-professional forums or round-tables to co-design reforms.

Note. This appendix was organized and summarized with the assistance of *ChatGPT (OpenAI)*, which was used as a writing-support tool to help group and structure field notes into thematic categories.

10. Appendix J: Interdisciplinary perspective

The perspectives proposed below represent our own interpretation of how different disciplines could meaningfully contribute to this research field, without claiming expertise in any of them.

Discipline	Main potential contribution
Clinical and identity psychology	Further explore how physicians' sense of self, meaning, and personal identity are shaped by medical culture. Examine experiences of loss of meaning, self-discrepancies, and self-awareness when experiencing professional distress.
Work and organizational psychology	Investigate the role of vocation, professional identity, and work values in medical culture. Study how organizational climates, leadership, and work design affect cultural change in medicine.
Social psychology	Analyse social identity processes, belonging, ostracism, and minority influence within the medical culture.
Cross-cultural psychology	Compare how medical culture manifests across societies and value systems (e.g. collectivistic vs. individualistic countries).
Law and policy	Examine how labour law, regulation, and legal frameworks (e.g. duty of continuity of care) structure physicians' work, reinforce medical culture and influence their well-being.
Organizational sciences and management	Study how institutions, leadership styles, and incentive systems reproduce or challenge cultural norms of the profession.
Medical education and sociology	Furher understand how norms and values are transmitted and sustained in training environments (notably in francophone contexts). Draw from the sociology of organizations to analyse how institutions maintain culture.
Anthropology and ethnography	Observe how medical culture is lived, reproduced, or contested in everyday practice (cf. documentary '*Dans le ventre de l'hopital',* le Maire & Chabot, 2016).
Sociology and media studies	Investigate how public, media, and policy narratives shape societal expectations of physicians.
History and medical humanities	Trace how ideals of vocation, devotion, and endurance became embedded in medical identity and how they evolve (cf. Arnold-Forster et al., 2022; Wilson et al., 2019).

11. Appendix H: Declaration of AI assistance and artistic contribution

This thesis was reviewed with the assistance of ChatGPT (OpenAI) for linguistic refinement and improvement of clarity. No AI tool was used in the conception of the research, data analysis, or generation of specific scientific content. The author assumes full responsibility for the scientific integrity and content of this work.

The author also gratefully acknowledge her friend Hannah Wobben for creating the original watercolor illustration featured on the thesis cover.

Medicine is a profoundly meaningful profession, yet physicians increasingly face a persistent crisis of burnout. While many studies have examined individual and organizational contributors, the role of medical culture - its shared norms, values, and tacit expectations - remains largely overlooked. Still, physicians' testimonies repeatedly suggest that medical culture plays a central role in their experience of burnout. This thesis investigates how cultural assumptions in medicine shape physicians' vulnerability to burnout and related health outcomes. Across four empirical chapters, it examines the structure of potentially harmful cultural norms, their associations with burnout and other health indicators, differences in their endorsement across physician groups, and how physicians themselves describe and interpret these expectations. Findings suggest that medical culture acts as a macrosystemic influence on physician well-being and highlight the central role of training and socialization in transmitting potentially harmful norms. This work underscores the need to address and change cultural norms in medicine as a key pathway to preventing burnout.

La médecine est une profession profondément porteuse de sens, mais les médecins sont aujourd'hui confrontés à une crise persistante de burnout. Si de nombreux travaux ont étudié les facteurs individuels et organisationnels, le rôle de la culture médicale - ses normes, valeurs et attentes tacites - demeure largement sous-étudié. Pourtant, les témoignages de médecins indiquent de manière récurrente que cette culture joue un rôle central dans leur expérience de burnout. Cette thèse examine comment certaines attentes et normes culturelles en médecine façonnent la vulnérabilité des médecins au burnout et à d'autres soucis de santé. À travers quatre chapitres empiriques, elle analyse la structure de normes culturelles potentiellement délétères, leurs liens avec le burnout et divers indicateurs de santé, les variations de leur adhésion selon les groupes de médecins, ainsi que la manière dont ceux-ci décrivent et interprètent ces attentes. Les résultats suggèrent que la culture médicale exerce une influence macrosystémique sur le bien-être des médecins et soulignent le rôle central de la formation et de la socialisation dans la transmission de normes potentiellement délétères. Ce travail met en évidence la nécessité d'aborder et de changer les normes culturelles en médecine pour prévenir le burnout des médecins.

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Emilie Banse obtained her Master's degree in Clinical and Health Psychology from UCLouvain in 2021. During her clinical and research internships in hospitals across Belgium and France, she developed a sustained interest in the well-being of physicians and in the challenges of contemporary medical practice. From 2022 to 2026, she conducted a PhD in Psychological Sciences at the UCLouvain, funded by the FNRS. Her research focuses on how medical culture shapes physicicians' vulnerability to and experience of burnout. Throughout her thesis, she has been involved in the dissemination of research and awareness-raising initiatives to promote well-being in both the medical profession and faculties.