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Erlend Løvø Fjær

Inequalities in Health Care Utilization in Europe

Doctoral thesis

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Norwegian University of Science and Technology
Thesis for the Degree of
Philosophiae Doctor
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Abstract

Background: This thesis examines inequalities in health care utilization in Europe. Equal access to health care is an important principle in European welfare states. However, previous studies have shown that health care utilization is dependent on measures of socioeconomic position (SEP), such as income and education. There is a need to address gaps in the literature on the extent and impact of social inequalities in health care utilization across Europe. This is important since social inequalities in health care utilization may translate into social inequalities in morbidity and mortality. Knowledge on how health care is used by different social groups in different welfare states may also provide greater understandings of which aspects of welfare state institutions are most likely to influence health and health inequalities.

This study has two overarching aims. The first aim is to identify barriers, both found at the individual level and at the institutional level, for health care use in Europe. The second aim is to identify the role of health care as a determinant of health and health inequalities between countries with different health care systems.

More specifically, the thesis will first examine the magnitude and variation of socioeconomic inequalities in access to health care in terms of a) unmet needs, b) general practitioner (GP) and specialist visits, c) informal care, and d) alternative health care across European countries. Moreover, the thesis examines how educational inequalities in access to health care can be understood by differences in European welfare regimes. Subsequently, the thesis examines the magnitude and variation of educational inequalities in mortality amenable to health care (also known as amenable mortality). The next research question is how the variation of amenable mortality can be understood by differences in European health care systems. Finally, the thesis examines if educational inequalities in amenable mortality can be understood according to patterns of health care utilization.

Data and Methods: This study is based on two types of data sources: the seventh round of the European Social Survey (ESS) (Papers I – IV) and the project 'Developing Methodologies to Reduce Inequalities in the Determinants of Health' (DEMETRIQ) (Paper V).

Papers I – IV conduct analyses with multilevel logistic regression and logistic regression in 20-21 European countries. Paper V classifies 21 European populations into educational tertiles to calculate both relative (RII) and absolute (SII) inequalities.

Results: The results showed socioeconomic inequalities in different types of health care utilization in Europe. Conventional health care utilization includes unmet need for health care, as well as GP and specialist utilization. Non-conventional health care utilization includes informal care and alternative health care. Two-thirds of all unmet need for health care were due to waiting lists and appointment availability. Women and young age groups reported more unmet need. Financial strain was found to be an important factor for all types of unmet need in Europe. All types of health care use and poor health were associated with unmet need. Low physician density and high out-of-pocket payments were found to be associated with unmet need due to availability.

There was a cross-national tendency that groups with lower socioeconomic position were less likely to use specialist services, even in countries where they had higher or equal probability of GP utilization. Moreover, in countries where higher SEP groups used more GP services, there were comparable levels of inequalities in specialist care utilization. This was the case for three social markers (education, occupational class and social networks), while the pattern was less pronounced for income (financial strain).

In terms of informal care, around a third of the population were caregivers, and less than 10% were intensive caregivers (providing care for minimum 11 hours a week). Countries with high numbers of caregivers had low numbers of intensive caregivers and vice versa. Caregiving was most prevalent among women, 50–59-year-olds, non-employed and religious persons. Caregivers, especially female and intensive caregivers, reported lower mental well-being than non-caregivers.

Use of complementary and alternative medicine (CAM) was more common among women and those with higher education at the individual level. Financial strain and employment status were found to be related to physical and overall CAM use, but not consumable CAM use. Doctor visits were the strongest predictor for all types of CAM use. While self-reported health did not show a significant relation to any CAM use, having a longstanding health problem was positively related to all types of CAM use. At the country-level, health expenditure per capita was positively related to overall and physical CAM use.

All countries and health care system types demonstrated relative and absolute educational inequalities in mortality amenable to health care. The low-supply and low performance mixed health care systems had the highest inequality point estimate for the male and female population, while the regulation-oriented public health care systems had the overall lowest. Due to data limitations, results were not robust enough to make substantial claims about typology differences**.**

Conclusion: There were significant socioeconomic inequalities in conventional and non-conventional health care in Europe. These inequalities, particularly concerning non-conventional health care, vary between different welfare regimes. Moreover, there were inequalities in mortality amenable to health care between different types of health care systems. However, socioeconomic inequalities in amenable mortality were observed in all European countries, implying that there is not any health care system in Europe that can fully protect its citizens against such inequalities. Finally, patterns of informal care between socioeconomic groups were associated with the magnitude of educational inequalities in amenable mortality. Inequalities in health care utilization should be continuously monitored in Europe and European welfare states should continue their efforts in maintaining equal access to health care.

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An old saying states that a book is never finished, only abandoned. I guess the same could be said about a thesis. The work on this thesis has spanned for a period of eight years. Throughout this time, there are many people that have helped me on the way.

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When working with a PhD, the purpose sometimes appears to be unclear. The distance to the goal often seems to be inversely proportional to the time span that constitutes the PhD period. As Paul Simon remarked in a song, ‘the nearer your destination, the more you’re slip slidin’ away’. You could easily get lost along the way. It has certainly been a hard day’s write. However, it has become easier ‘with a little help from my friends’.

Trondheim, October 2021

Erlend Løvø Fjær

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Abbreviations

ANOVA	Analysis of variance
ARR	Adjusted risk ratio
CAM	Complementary and alternative medicine
CES-D	Center for Epidemiological Studies-Depression (scale)
CHAIN	Centre for Global Health Inequalities Research
CORDIS	Community Research and Development Information Service
DEMETRIQ	Developing methodologies to reduce inequalities in the determinants of health
DHSS	Department of Health and Social Security
EGP	Erikson-Goldthorpe-Portocarero (class scheme)
ESeC	European Socioeconomic Classification (class scheme)
ESS	European Social Survey
EUROSTAT	Statistical Office of the European Communities
EU-SILC	European Union Statistics on Income and Living Conditions
FCT	Fundamental cause theory
GDP	Gross domestic product
GP	General practitioner
HiNEWS	Health Inequalities in European Welfare States
ICC	Intraclass correlation
ICD	International Classification of Diseases
ISCED	International Standard Classification of Education
NCDs	Non-communicable diseases
NHS	National Health Service
NORFACE	New Opportunities for Research Funding Agency Cooperation in Europe
OECD	Organisation for Economic Co-operation and Development
OMT	Osteopathic manipulative treatment
QDT	Questionnaire Design Team
RII	Relative index of inequality
SEP	Socioeconomic position
SES	Socioeconomic status
SHARE	Survey of Health, Ageing and Retirement in Europe
SII	Slope index of inequality
THE	Total health expenditure
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHO	World Health Organization

List of Papers

Paper I:

Fjær, E. L., Stornes, P., Borisova, L. V., McNamara, C. L., & Eikemo, T. A. (2017): Subjective perceptions of unmet need for health care in Europe among social groups: Findings from the European social survey (2014) special module on the social determinants of health. *European Journal of Public Health, 27*(Supplement 1), 82-89.

Paper II:

Fjær, E. L., Balaj, M., Stornes, P., Todd, A., McNamara, C. L., & Eikemo, T. A. (2017): Exploring the differences in general practitioner and health care specialist utilization according to education, occupation, income and social networks across Europe: findings from the European social survey (2014) special module on the social determinants of health. *European Journal of Public Health, 27*(Supplement 1), 73-81.

Paper III:

Verbakel, E., Tamlagsrønning, S., Winstone, L., Fjær, E. L., & Eikemo, T. A. (2017): Informal care in Europe: findings from the European Social Survey (2014) special module on the social determinants of health. *European Journal of Public Health, 27*(Supplement 1), 90-95.

Paper IV:

Fjær, E. L., Landet, E. R., McNamara, C. L., & Eikemo, T. A. (2020): The use of complementary and alternative medicine (CAM) in Europe. *BMC Complementary Medicine and Therapies*, *20*, 108.

Paper V:

Rydland, H. T., Fjær, E. L., Eikemo, T. A., Huijts, T., Bambra, C., Wendt, C., Kulhánová, I., Martikainen, P., Dibben, C., Kalėdienė, R., Borrell, C., Leinsalu, M., Bopp, M., & Mackenbach, J. P. (2020): Educational inequalities in mortality amenable to healthcare. A comparison of European healthcare systems. *PloS One*, *15*(7), e0234135.

1 Introduction

Equal access to health care, regardless of social position, is a frequently discussed and cited principle in the academic literature and in government policy documents (Mooney, Hall, Donaldson, & Gerard, 1991; World Health organization, 2008). It is also a crucial principle with respect to the increasing interest in health inequalities and their social determinants (World Health Organization, 2008). The social determinants of health represent '…the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness' (World Health Organization, 2008: 2).

However, despite the principle of equal access to health care being so prominent, previous studies have shown that health care utilization is dependent on measures of socioeconomic position (SEP), such as income (van Doorslaer, Koolman, & Jones, 2004; van Doorslaer, Masseria, & Koolman, 2006) and education (Stirbu, Kunst, Mielck, & Mackenbach, 2011). Moreover, there is currently an absence of evidence on the true extent and impact of social inequalities in health care utilization across Europe. Addressing this gap is of critical importance since social inequalities in health care utilization may translate into social inequalities in morbidity and mortality.

Greater understanding of social inequalities in health care utilization may also provide insight into lingering questions about the persistence of social inequalities in health in Europe and how they can be reduced (Eikemo, Bambra, Huijts, & Fitzgerald, 2017). For example, it has been shown that there are systematic differences in people's health between different welfare states (Dahl et al., 2006; Eikemo, 2009). The 'welfare state' is a term used to describe the characteristics of states' social policies (Eikemo & Bambra, 2008). Welfare states are important institutional determinants of health as they mediate the extent, and impact of, socioeconomic position (Beckfield et al., 2015). While health care systems have been characterized as one of the key dimensions of modern welfare states (Olafsdottir & Beckfield, 2011: 102), they have been relatively absent from major welfare state theories of health (cf. Esping-Andersen, 1990). This is surprising given that there are systematic differences in people's health care seeking behaviour between different welfare states (Frie, Eikemo, & von dem Knesebeck, 2010). Knowing more about how health care is used by people belonging to different social groups in different welfare states may not only provide insight into the persistence of social inequalities in health in Europe but will also respond to calls for greater understandings of which specific aspects of welfare state institutions are most likely to influence health and health inequalities (Beckfield et al., 2015).

Recently, cross-national data have become available on health care utilization across Europe. Comparative approaches to inequalities in health are important for at least two reasons. First, they are important in order to establish the nature of health inequalities, e.g. whether these inequalities are a universal phenomenon or take place in specific institutional contexts. Second, systematic cross-national comparisons can provide insight on whether it is possible to organize society in a way that reduces (or eradicates) social inequalities in health (Eikemo et al., 2017).

1.1 Research aims and questions

Thus, drawing on this new data, the overarching aims of this study are to:

(1) identify barriers, both found at the individual level and at the institutional level, for health care use in European countries, and

(2) identify the role of health care as a determinant of health and health inequalities between countries with different health care systems.

Broadly speaking, the thesis will do this by examining socioeconomic disparities in access to both conventional (e.g. visits to a general practitioner and medical specialists) and less conventional forms of health care. Less conventional forms of health care include those that are typically found outside the formal health care system including alternative health care (e.g. acupuncture, homeopathy) and informal care provided by family members, relatives and friends. Of course, not all people receive the health care they need and are entitled to. Therefore, the thesis will also examine the degree to which this is the case and highlight some of the reasons behind this fact.

It is important to know how inequalities in access and utilization of health care are linked to actual health inequalities. This examination is of particular interest because if the organization of health care has implications for health inequalities, this would also say something about what can be done to reduce them. Moreover, if there are variations in the magnitude of socioeconomic inequalities in mortality amenable to health care between distinct health care systems, this would bring us another step towards understanding how institutions generate or buffer against health inequalities.

In undertaking these examinations, this thesis will specially answer the following research questions:

(1) What is the magnitude and variation of socioeconomic inequalities in access to health care in terms of a) unmet needs, b) GP and specialist visits, c) informal care, and d) alternative health care across European countries?

(2) How can the cross-national variation of educational inequalities in access to health care be understood by differences in European welfare regimes?

(3) What is the magnitude and variation of educational differences in mortality amenable to health care among European countries?

(4) How can the cross-national variation of mortality amenable to health care be understood by differences in European health care systems?

(5) Can educational inequalities in mortality amenable to health care be understood according to patterns of health care utilization? In other words, do countries with larger inequalities in health care utilization also have larger inequalities in amenable mortality?

1.2 Organization of the thesis

The thesis includes 6 chapters, which are divided into multiple subchapters. In Chapter 1, I have provided an introduction to health care utilization, identified gaps in the literature and presented the research questions. In Chapter 2, a theoretical background for the empirical analyses is presented. This includes a definition and discussion of important concepts. This chapter aims to provide a framework for how health care services can create and reduce health inequalities, and the need to address health care, both at the individual and contextual level. Chapter 3 presents data and methods. This includes an overview of data sources, variables and methods of analysis. Chapter 4 first provides a summary of the papers, including main results. This is followed by a synthesis of the results from an institutional perspective. The main findings are discussed in Chapter 5. In this chapter, I will discuss socioeconomic inequalities in conventional and non-conventional health care, both at the individual and contextual level. Furthermore, the chapter includes a methodological discussion. Chapter 6 provides a conclusion on the thesis.

2 Theoretical background

This chapter will provide a theoretical background for the empirical analyses. I start with describing different measures of socioeconomic position (SEP) in health research (2.1). In section 2.2, I present different theoretical approaches to social stratification, focusing on social class and status. The next section (2.3) presents education as an indicator of socioeconomic position and discusses strengths and limitations related to this measure. Basic principles of the fundamental cause theory (FCT) are outlined in section 2.4. Section 2.5 describes health care seeking behaviour at the individual level. I will first present the concepts of access to health care, unmet need for health care, informal care and alternative health care. Next, I will provide a conceptual clarification regarding different types of health care. Section 2.6 introduces health care as a determinant of health and health inequalities at the contextual level. This includes a discussion of both health care and the welfare state, as well as classifications of welfare regimes and health care systems. Overall, the sections will make clear why we need to address health care both at the individual (2.5) and contextual level (2.6). Finally, I provide a summary of the different objectives of the thesis.

2.1 Socioeconomic position and health

The relationship between socioeconomic position and health is well established. In recent decades, several studies have demonstrated that people in a higher socioeconomic position have better health and live longer than people with lower socioeconomic positions (e.g. Mackenbach et al., 1997; Cavelaars et al., 1998; Mackenbach, Cavelaars, Kunst, & Groenhof, 2000). These inequalities are sometimes referred to as the *social gradient* in health (Marmot, 2005). It has not only been shown that there is a divide between top and bottom, but also fine-graded differences across the entire social spectrum, displaying a stepwise, gradual, deterioration in health when moving down the social hierarchy (Adler et al., 1994; Marmot, Ryff, Bumpass, Shipley, & Marks, 1997). However, health inequalities will vary depending on the measure of socioeconomic position. The most frequently used measures of SEP are occupation or occupational class, income and education (Arntzen, 2002). These measures are related, but they focus on different aspects of a social phenomenon.

In health research, the term socioeconomic position refers to the social and economic factors that influence what position(s) individuals and groups hold within the structure of society (Lynch &

Kaplan, 2000; Galobardes, Lynch, & Davey Smith, 2007; Krieger, Williams, & Moss 1997). Thus, socioeconomic position is an aggregate concept that include both resource-based and prestige-based measures, of which both are linked to childhood and adult social class position (Krieger et al., 1997; Lynch & Kaplan, 2000). Resource-based measures refer to material and social resources and assets, such as educational attainment and income level. Prestige-based measures refer to rank or status in a social hierarchy, exemplified by access to and consumption of goods, services and knowledge, as linked to their occupational prestige, income and educational level (Krieger, 2001).

Socioeconomic position and socioeconomic status (SES) are often used interchangeably. The practice is a little confusing, as these concepts are slightly different. Krieger and colleagues (1997) have argued against using the term socioeconomic status, because this blurs the distinctions between two different aspects of socioeconomic position: (1) actual resources, and (2) status, referring to prestige- or rank-related characteristics. I will therefore use the term socioeconomic position in this thesis.

2.2 Approaches to social stratification

Sociological theory and stratification distinguish between two main types of social stratification in modern societies: class and socioeconomic position (status) (Goldthorpe, 2010). The concept of class has roots in the works of Karl Marx (1818–1883) (class theory) (Marx, 1976 [1867], 1981 [1894]) and Max Weber (1864–1920) (class analysis) (Weber, 1958 [1946], 1978 [1922]). The theories are different in the conceptualization of what forms a social class (Crompton, 2008), although there are overlaps between the two approaches (Breen & Rottman, 1995; Arntzen, 2002).

Marx's theory of class is based on a fundamental conflict of interest which is centred around the means of production in society. In Marx's analysis, there is a political conflict between the *bourgeoisie* (middle class), who owns the means of production, and the *proletariat* (working class), who only owns their own source of labour (Marx, 1976 [1867]).[1] A key concept in the class analysis

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[1] In his book *Capital Vol III*, Marx describes three main classes: industrial capitalists (the bourgeoisie), landowners (rentiers), whose income is rent, and wage labourers (the workers or the proletariat). He states that these three classes 'make up the framework of modern society' (Marx, 1981 [1894]: 756). However, the major divide goes between the capitalists and the wage labourers.

of Marx is the concept of 'exploitation' (Wright, 2005).[2] Exploitation describes a particular form of interdependence when it comes to the material interests of people. This is defined by three main criteria (Wright, 1997: 10; Wright, 2005: 23):

(1) *The inverse interdependent welfare principle*: The material welfare of the exploiters (the bourgeoisie) depends on the deprivation of the exploited (the proletariat). This implies that the interests of the actors within these relations are not only different, but antagonistic: the realization of interests of the exploiters happens at the expense of the exploited.

(2) *The exclusion principle*: The inverse interdependent welfare principle depends on the exclusion of the exploited from access to certain productive resource. This exclusion is often backed by force in the form of property rights.

(3) *The appropriation principle*: The exclusion principle enables the exploiters to gain a material advantage because they have the possibility to use and harvest the fruits of labour of the exploited.

An important contributor to class theory within the neo-Marxist tradition is Erik Olin Wright (1947–2019). Wright argues that exploitation and domination are the central features of Marxist class analysis of the structured interactions within class relations (Wright, 2005: 24-25; Wright, 2008: 341-342). Wright's class scheme is based on assets in the means of production, control of organizational assets and skill assets (Wright, 1985).

Weber's theory of class analysis has more fine-graded approach compared to Marx. Weber describes class in relation to the position people occupy on the labour market, and a social class in therefore a group of people with the same *life chances*.

> We may speak of class when: (1) a number of people have in common a specific causal component of their life chances, insofar as (2) this component is represented exclusively be economic interests in the possession

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[2] According to Ritzer (2007: 25), Marx' thinking on exploitation is derived from the concept of surplus value, defined as 'the difference between the value of a product when it is sold and the value of the elements (including worker's labour) consumed in the production of the product'. Like all value generated from the perspective of the labour theory of value, the surplus value comes from the worker.

> of goods and opportunities for income, and (3) is represented under the conditions of the commodity of labor markets. (Weber, 1978 [1922]: 927)

According to Weber (1978 [1922]: 302), 'a class situation is one in which there is a shared typical probability of procuring goods, gaining a position in life, and finding inner satisfaction'. Therefore, members of a class share common life chances (Breen, 2005: 32). Weber's notion of life chances has also been elaborated by other theorists. In Giddens's (1973: 130-131) terms, life chances can be understood as 'the chances an individual has for sharing in the socially created economic or cultural "goods" that typically exist in any given society'. Simply put, life chances are the chances that individuals have of gaining access to scarce and valued outcomes (Breen, 2005: 32).

In addition to economic inequalities, Weber also includes the concepts of status and power when explaining stratification and classes (Weber, 1978 [1922]: 926ff.). In Weber's writing and terminology, status is a complex concept.[3] Weber wrote about the 'social honour' that could be ascribed to a particular group or occupation (Weber, 1958 [1946]: 186ff.). Status groups have been identified as 'consciousness communities' (Crompton, 2008: 35), and exemplified as 'associational groups sharing common cultures … Participation in such groups gives individuals their fundamental sense of identity' (Collins, 1971: 1009). Furthermore, status could also describe certain consumption categories or 'lifestyle', understood as 'the totality of cultural practices such as dress, speech, outlook and bodily dispositions' (Turner, 1988: 66).

Weber's concept of power analyses how people are mobilized to secure their advantage in competitive settings (Cohen & Kennedy, 2007: 165). In a famous definition, power is formulated as 'the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests' (Weber, 1978 [1922]: 53). For Weber, status groups and political parties form, along with classes, the major phenomena of the distribution of power in society (Breen, 2005: 33).

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[3] Weber used the German word *'Stand'* (plural '*Stände'*), which has been translated variously as 'status' or 'estate', depending on context. As 'status' and 'estate' are ambiguous and imprecise, some authors have preferred to use the German term (Waters & Waters, 2010). According to Crompton (2008: 35), one meaning of status reflects the etymological link with 'estate' or 'Stände' and describes positions which represent particular life chances or fates for the respective status groups.

John Goldthorpe is an important contributor to the neo-Weberian class theory. His main works and the Erikson-Goldthorpe-Portocarero (EGP) class scheme is developed in cooperation with his associates Robert Erikson and Lucienne Portocarero (Erikson, Goldthorpe, & Portocarero, 1979). EGP classes are based on occupational class and designed to distinguish between positions on the labour market (Erikson & Goldthorpe, 1993). Conceptually, the European Socioeconomic Classification (ESeC) is based on the EGP class scheme, while improving issues related to validation and comparability (Rose & Harrison, 2007; Harrison & Rose, 2006; Leiulfsrud, Bison, & Jensberg, 2010). The ESeC classification classifies people according to their positions within labour markets and production units, with particular focus on their employment relations. The ESeC is designed to facilitate comparative analysis across the EU countries (Rose & Harrison, 2010).

2.3 Education as an indicator of socioeconomic position

Education is often used as an indicator of socioeconomic position within social science and social epidemiology (Galobardes, Shaw, Lawlor, Lynch, & Davey Smith, 2006; von dem Knesebeck, Verde, & Dragano, 2006). Education seeks to measure a person's competence and knowledge (Lynch & Kaplan, 2000), and is strongly influenced by parental characteristics (Galobardes et al., 2006). Moreover, education shapes the likelihood of being unemployed and is an important determinant for later occupation and income (Galobardes et al., 2006; von dem Knesebeck et al., 2006; Ross & Wu, 1995; Arntzen, 2002). Education reflects people's socioeconomic position in a broad manner and is related to their material and non-material resources (Lahelma, 2010). Educational attainment is closely related to health literacy, which is the ability to use readings and numerical skills to understand health information provided by health professionals like physicians, nurses and pharmacists (Kickbusch, 2001). Hence, education is important for health as it increases the knowledge and skills that may affect individuals' cognitive functioning, making them more receptive to health education messages, or more able to communicate with health professionals and access appropriate health care services (Galobardes et al., 2006).

There are advantages of using education as an indicator of socioeconomic position. One of the advantages is to avoid problems associated with health-related social mobility, because the education is normally completed before the health problems occurs later in life, while income changes during the life course (Siegrist & Marmot, 2006: 3; Krieger et al., 1997). In addition, education is easy to measure and the response rates are good. It is relevant for most people, both younger and elderly, independent of employment status, unlike other indicators on socioeconomic position (Galobardes et al., 2006). Moreover, education is a pragmatic measure of social position which is reasonably comparable across contexts, and often used in cross-national studies where data on income or occupation is unavailable or considered too context-dependent (Braveman et al., 2005).

There are also limitations of using education as an indicator of socioeconomic position. An important limitation is that it is does not tell anything about the *quality* of the educational experience or *where* (i.e. in what country) the education was taken (Galobardes et al., 2006). Moreover, the importance of educational level could vary, for example between different age groups and birth cohorts (Hadden, 1996). Even though people's socioeconomic may be more accurately captured through occupation or income, one could argue that education is the key to people's socioeconomic position in society, because it is a fundamental determinant of both occupation and income (Lahelma, 2010; von dem Knesebeck et al., 2006; Ross & Wu, 1995; Arntzen, 2002).

Ross and Wu (1995) distinguish between three main pathways through which a higher level of education leads to better health and well-being and lower risk of mortality: (1) work and economic conditions, (2) social-psychological resources, and (3) health lifestyle. The first pathway underlines that higher education leads to better material conditions. Compared to the lower educated, higher educated people are less likely to be unemployed. At the same time, they are more likely to work full-time, to have fulfilling, subjectively rewarding jobs, high income and low financial hardship. These factors in turn leads to fewer health problems. According to the second pathway, the higher educated report more a greater sense of personal control over their lives and their health. They also receive more social support than the lower educated. Both factors reduce the risk of illness and premature death. The third pathway suggests that higher educated people have a healthier lifestyle compared to lower educated people. The higher educated are less likely to smoke, drink moderately, are more likely to exercise and receive preventive medical health care. Three of these behavioural determinants – smoking, alcohol and physical exercise, as well as eating – are also known as the ‘holy four’ health behaviours (Lahelma, Martikainen, Rahkonen, & Silventoinen, 1999). People with higher education have lower levels of mortality, morbidity and disability than people with lower education. In contrast, people with lower educational attainment have poorer self-reported health, higher rates of infectious disease, many chronic diseases and shorter life expectancy (Feldman, Makuc, Kleinman, & Cornoni-Huntley, 1989; Guralnik, Land, Blazer, Fillenbaum, & Branch, 1993; Mackenbach et al., 1997; Dalstra et al., 2005; McNamara et al., 2017; Huisman et al., 2005; Strand et al., 2010).

In conclusion, high educational attainment improves health directly and indirectly. First, the direct effect of education indicates that even after adjusting for other explanatory variables, such as occupation and income, a high level of education significantly contributes to an improvement in health. Second, education improves health indirectly through the three main pathways of work and economic conditions, social-psychological resources and health lifestyle (Ross & Wu, 1995).

2.4 Fundamental cause theory

The relationship between socioeconomic position and health is not a new phenomenon, but have been recognized for centuries (Antonovsky, 1967). A striking feature of health inequalities is that they have remained so persistent through time. This implies that society’s poor and otherwise less privileged members live in worse health and die younger than the rich and privileged ones (Phelan & Link 2013: 105).

A perspective that has tried to explain this phenomenon is the fundamental cause theory (FCT). The theory of fundamental causes is based on Stanley Lieberson’s (1933–2018) concept of ‘basic causes’ (Lieberson, 1985: 185-195). The basic causes have enduring effects on a dependent variable. This is because when the effect of one mechanism declines, the effect of another emerges or becomes more prominent (Link & Phelan, 1995: 87). A basic or fundamental cause could be compared against a causal force that leads to a specific outcome, via alternative mechanisms and substitutional intervening factors (Elstad, 2012: 354). The primary statement of the fundamental cause theory appeared in an article by Bruce Link and Jo Phelan in 1995 (Link & Phelan, 1995). According to the authors, a fundamental cause of health inequalities has four essential features:

> First, it influences multiple disease outcomes, meaning that it is not limited to only one or a few diseases or health problems. Second, it affects these disease outcomes through multiple risk factors. Third, fundamental social causes involve access to resources that can be used to avoid risks or to minimize the consequences of disease once it occurs. Finally, the association between a fundamental cause and health is reproduced over time via the replacement of intervening mechanisms. (Phelan & Link, 2013: 106)

In short, the important mechanism is how flexible resources like knowledge, money, power, prestige and beneficial social connections are 'transformed into the health-related resources that generate patterns of morbidity and mortality' (Link & Phelan, 1995: 88). Therefore, the essential feature of fundamental causes is that they involve access to resources that can be used to avoid risks or to minimize the consequences of disease once it occurs (Link & Phelan, 1995: 87). Having resources also imply the utilization of resources. Even when health care is provided to the whole population (e.g. through universal health care system) this does not guarantee that health-related inequalities in the population will disappear. The amount of money that was previously spent on health care could then be used on other things, and these activities could promote (or possibly damage) health.

The fundamental cause must be *something* that is persistently unequal between social strata and social classes, not only in a particular social context, but for many societies and time periods (Elstad, 2012: 355). Link and Phelan provide an answer by pointing at the socioeconomic inequalities in *resources*. Such inequalities have been present through history and have taken various forms, dependent on factors like economic organization, technology and political systems. In stratified societies, there will always be inequalities between different social strata in terms of access to important resources, such as knowledge, money, power, prestige and beneficial social connections (Phelan., Link, & Tehranifar, 2010). These resources are flexible and can adapt to changing health-related conditions. Therefore, health inequalities by socioeconomic position persists across time and despite changing conditions (Phelan, Link, Diez-Roux, Kawachi, & Levin, 2004: 269).

In the FCT, the inequalities in resources are of vital importance because they imply inequalities in the *capacity to act* (Elstad, 2012: 356). Inequalities in resources imply an unequal ability and possibility to act and handle different areas in society. Resources is a general and overarching mechanism – a *metamechanism* – behind inequalities in health (Freese & Lutfey, 2011; Lutfey &

Freese, 2005). This metamechanism explains how multiple concrete mechanisms are generated and reproduce a particular relationship between socioeconomic position and health in different places and different times (Freese & Lutfey, 2011: 69). Therefore, the metamechanism provides what Freese and Lutfey (2011) term a 'durable narrative' in explaining the persistent relationship between socioeconomic position and health. The existence of a durable narrative – and what makes the fundamental causes 'fundamental' – is their persistent effect on health inequalities in the face of dramatic changes (Freese & Lutfey, 2011: 69; Phelan & Link, 2013: 106).

Link and Phelan's concept of resources resembles the capital concept by the French sociologist Pierre Bourdieu (1930–2002) (Bourdieu, 1986). Resources could be viewed as a form of capital. Resources is not only something individuals *have*, but also something they *use*. Bourdieu (1986) distinguishes between three types of capital: economic, cultural and social. *Economic capital* is directly convertible into money and material assets (such as income, financial investments and property rights). *Cultural capital* can exist in three forms: in an embodied state (i.e. long-lasting dispositions of the mind and body, such as values, skills, knowledge and taste), in an objectified state (e.g. the possession of cultural goods, such as pictures, art, books and artefacts) and in an institutionalized state (e.g. educational qualifications, vocational certificates and job titles).

When applying Bourdieu's (1986) general notion of cultural capital in the context of health and health care research, cultural health capital can be defined as comprising 'all culture-based resources that are available to people for acting in favour of their health. In its incorporated form it comprises health-related values, behavioural norms, knowledge and operation skills' (Abel, 2008: 2). *Social capital* represents the aggregate material and non-material resources that individuals can mobilize via different social relationships (Abel & Frohlich, 2012; Bourdieu, 1986). Thus, social capital is a collectively owned capital that is distinct from cultural and economic forms of capital because it is external to the individual and (re)generated through the structure of an individual's social relationships. Bourdieu's work is worthwhile because it details the pathway that connects the accumulation and convertibility of resources, changes in SEP and individual agency to make decisions about their health (Mrig, 2021).

The fundamental cause theory has been tested in different ways. An ethnographic study from the United States compared the treatment of diabetes by two routine clinics (Lutfey & Freese, 2005). US studies have also examined the association between the degree of medical control for specific conditions and the degree of social inequality for these conditions (e.g. Phelan et al., 2004; Phelan & Link, 2005). A European study tested the fundamental cause theory by comparing inequalities in mortality between more and less preventable causes of death in European populations (Mackenbach et al., 2015). These studies provided support to the theory.

A study by Weiss, Sund, Freese and Krokstad (2020) built further on and tested some of the underlying assumptions of the FCT in a Norwegian context. The article examined patterns of adoption and diffusion of innovative health technologies by socioeconomic position. In this way, they assessed the extent to which these technologies may be a fundamental cause of health-related inequalities. Their findings suggest that socioeconomic variations in access and use of innovative health technologies could act as a mechanism through which inequalities are reproduced. This is also the case with tax-based public health care with universal coverage. The study underlines that health technology may be a resource that expresses the relative value of higher social position.

2.5 Individual level: Health care seeking behaviour

2.5.1 Access to health care

Access to health care is a concept which refers to the supply side of health care services and ‘indicates the level of service which the health care system offers the individual’ (Goddard & Smith, 2001: 1151). While much research focuses on the supply side related to health care services, some also attach attention to the demand side (Oliver & Mossialos, 2004). The notion of access is dependent on context. In the United States, access commonly refers to whether individuals have health insurance, while the level of insurance or magnitude of co-payments are less important. In Europe, where almost all citizens are insured in principle, access is interpreted differently. At a general level, access to health care can be defined as the ability to secure a specified range of health care services, at a specified level of quality, subject to a specified maximum level of personal inconvenience and cost, while in possession of a specified amount of information (Goddard & Smith, 2001: 1151). With a flexible definition like this, it is possible to adapt this term to different country settings or other circumstances. Access can vary between countries, in particular with respect to the economic resources that the health care system is subject to (Oliver & Mossialos, 2004).

Moreover, access to health care services can vary between population groups in terms of availability, quality, costs and information. Even though there are different indicators of access (such as waiting lists and co-payments), the rather complex notion of access described above can rarely be observed directly. Rather, it is utilization that is observed (Goddard & Smith, 2001). According to Aday and Andersen (1981), this reflects the extent to which 'potential access' is converted into 'realized access'.

A common way to measure inequalities in access to health care is to determine whether factors other than need for health care affect health care utilization (Aday & Andersen, 1974, 1981). Some have pointed out limitations with this method, such as missing information about non-users, while the quality of the received care is not possible to include (Allin, Grignon, & Le Grand, 2010; Pappa, Kontodimopoulos, Papadopoulos, Tountas, & Niakas, 2013).

Equal access to health care, regardless of social standing, has been an important principle in European welfare states (Mooney et al., 1991; World Health Organization, 2008). Ronald M. Andersen, an American professor of health services, emphasizes that equality in access to health care 'is best considered in the context of whether people *in need* of medical care receive it or not' (Andersen, 1978: 458, italics in original).[4] To what extent people receive the care that they need depends on many conditions, such as: (1) people's inclination to seek help (2), the availability of health care services, and (3) the quality of health care services (Lian & Westin, 2009: 318-319; Dahl, Bergsli, & van der Wel, 2014: 34). People's inclination to seek help relates to their knowledge about health care services and their expectations about what the services should provide them. Availability of health care services is related to user charges (co-payments), doctors' referral practices and their priorities. The quality of health care services depends on communication (problems), the accuracy of diagnoses and the quality of the treatment.

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[4] The terms medical care and health care are commonly used as synonyms.

2.5.2 Unmet need for health care

Discussions of a ‘social’ need have been going on since the 1970s, and the concept of need has been distinguished through several dimensions (Oliver & Mossialos, 2004). There is disagreement concerning what constitutes a ‘need for health care’. For example, it is unclear whether it relates to an individual’s level of illness or the capacity to benefit from treatment. Two identical individuals may respond differently to health care services because the effect of previous health care can differ (Goddard & Smith, 2001). To measure and compare needs related to individual health is a difficult and complex task (Oliver & Mossialos, 2004), in part because there is not necessarily a correlation between health care need and health care utilization.

Unmet need for health care occurs when an individual does not receive a treatment that could have improved his or her health (Allin et al., 2010). Unmet need is defined as ‘the differences, if any, between those services judged necessary to deal appropriately with defined health problems and those services actually being received… an unmet need is the absence of any, or of sufficient, or of appropriate care and services’ (Carr & Wolfe, 1976: 418).

Unmet need is a useful tool for monitoring the accessibility of health care and assessing the extent of inequality in access to and use of health care services (Allin & Masseria, 2009a). In practice, the concept must be measured through available data. There is both a ‘clinical’ and ‘subjective’ approach for measuring unmet need in a population (Allin et al., 2010). The first approach relies on clinical assessment and measures if a person has received appropriate care. Care is deemed appropriate based on clinical guidelines and a narrow set of conditions and treatments.

A subjective approach is often considered more feasible and a better measure of unmet need.[5] To begin with, the concept already exists in numerous surveys. Previous studies have also indicated that individuals are in an advantageous position to report their own health status (Idler & Benyamini, 1997) and in a better position than most to identify shortcomings in their experiences

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[5] Some studies specifically refer to the term subjective unmet need or self-assessed unmet need (SUN) (Allin et al., 2010; Gibson, Grignon, Hurley, & Wang, 2019). For the sake of simplicity, I will only refer to unmet need in the following text.

with health care (Allin et al., 2010). Compared to other measures of health care, which are based on actual utilization (such as physician visits and hospitalization rates), subjective indicators allow to account for the perceived medical needs that do not turn into demand. Furthermore, subjective indicators make it possible to investigate the process of seeking medical care and the subjective barriers that individuals with health needs encounter in accessing it (Cavalieri, 2013).

Due to the broadness of the concept, it is worthwhile to distinguish between different types of unmet need. In this thesis, unmet need is grouped into three categories, based on the classifications by Chen and Hou (2002) and Sibley and Glazier (2009).

(1) *Availability* refers to the adequacy and supply of health care (Penchansky & Thomas, 1981: 128). Unmet need related to availability includes waiting lists, services not being available when required and services not being available in an area.

(2) *Accessibility* concerns ‘the relationship between the location of supply and the location of clients’ (Penchansky & Thomas, 1981: 128). This category generally accounts for client resources and travel time, distance and cost. Accessibility refers to unmet need related to cost.

(3) *Acceptability* concerns reasons related to personal preferences or circumstances of individuals (Sibley & Glazier, 2009: 89). Unmet need related to acceptability refers to not being able to take time off work or having other commitments.

2.5.3 Informal care

Health care is typically understood as something that is provided by professionals. However, not all types of health care are provided formally. In fact, more care is provided informally (by family and friends) than formally (Colombo, Ana, Jérôme, & Frits, 2011). Despite its important role in society, informal care has been characterized as a ‘hidden health care system’ (Levin & Idler, 1981).[6]

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[6] Informal care is sometimes used interchangeably with the term unpaid care.

In Europe, there is an ageing population and a rising life expectancy. With people living longer, we can expect that they do so in poorer health. This could result in an increasing demand for informal care and, thereby, for informal caregivers (Colombo et al., 2011; Verbakel, 2014). However, demographic estimates point to a declining availability of informal caregivers because of declining family size, rising childlessness, rises in divorce rates, increasing employment rates among women, a change in household composition, fewer elderly people living with their children, changing care preferences of elderly people and reduced willingness for informal caring, especially in relation to other responsibilities and obligations (Pickard, Wittenberg, Comas-Herrera, Davies, & Darton, 2000). These developments (increasing demand vs. declining availability) are likely to result in increased pressure on informal caregivers in the future (Verbakel, 2014). Middle-aged women may be particularly exposed to time squeeze, with higher demands for informal care on the one hand and being the major target groups in employment policies for increased labour market participation (Verbakel, Tamlagsrønning, Winstone, Fjær, & Eikemo, 2017; Arksey & Glendinning, 2008).

Providing care could give caregivers a positive feeling of reward and a closer relationship with the receiver of care (Broese van Groenou & de Boer, 2016). Many caregivers can also cope quite well with their role (Kramer, 1997). However, studies have also shown that informal caregiving has negative consequences on mental health and well-being outcomes, such as perceived stress, depression and general poorer subjective well-being (Pinquart & Sörensen, 2003; Verbakel, 2014). People who try to combine informal caregiving with paid work experience more stress than those who concentrate on informal caregiving alone (Pinquart & Sörensen, 2003). Despite the negative consequences, many perform informal care around the world. This is also the case in welfare states with developed health care systems and formal resources available (Eikemo, 2018; Pinquart & Sörensen, 2003). Informal care providers represent a hidden group in the public health care services debate and in public health research. There is a need for more knowledge about the reasons for informal caregiving and the social and health-related consequences for informal care providers (Eikemo, 2018).

2.5.4 Alternative health care

Alternative health care refers to therapeutic approaches used instead of conventional medicine to treat or improve disease. Conventional health care is rooted in modern science (i.e. biomedicine) and is based on methods with designed trials and research (Tabish, 2008). Alternative health care is often referred to as complementary and alternative medicine (CAM), which includes a variety of alternative treatments that have historic origins outside of, and are used in combination with, conventional medicine (Briggs, 2015; Baer, 2010: 374).[7]

The use of CAM treatments, such as acupuncture, homeopathy and chiropractics, has become increasingly popular in Western societies (Frass et al., 2012; Harris, Cooper, Relton, & Thomas, 2012; Wiles & Rosenberg, 2001). For example, in the United States, the use of CAM increased rapidly during the 1990s (Eisenberg et al., 1998). The estimated number of visits to CAM practitioners in 1997 exceeded the projected number of visits to all primary care physicians in the United States by an estimated 243 million (Eisenberg et al., 1998). In Europe, France and Germany were found to have the highest prevalences of CAM use of eight European countries in 1992, with 49 and 46 percent respectively of the populations having used some form of CAM (Fisher & Ward, 1994).

Previous single-country studies have also shown that there are differences in the demographic characteristics and health status of users of CAM and non-users (Wiles & Rosenberg, 2001). For example, women, those in higher socioeconomic groups and those of middle age, have all been found to be more frequent users of CAM (Kelner & Wellman, 1997; Astin, 1998). A more recent study examined the health-related and sociodemographic determinants of CAM treatments specifically in Europe. The findings show that CAM use is greater among those with health problems, and more common among women and those with higher education (Kemppainen, Kemppainen, Reippainen, Salmenniemi, & Vuolanto, 2018).

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[7] In the text, I will use the terms alternative health care and CAM interchangeably.

2.5.5 Conventional versus non-conventional health care

In this thesis, I have distinguished between conventional health care and non-conventional health care. Conventional health care includes access to medical consultation or treatment, measured as unmet need for health care, as well as GP and specialist utilization. Non-conventional health care utilization includes informal care and alternative health care. Informal care and alternative health care are located outside the regular health care system and could also be considered as part of the hidden health care system.

2.5.6 The relationship between formal and informal health care

Formal health care includes health care services provided in the context of formal employment regulations, through services conducted by contract, and carried out by paid care workers (Colombo et al., 2011: 11). The formal health care services are paid or free-of-charge and are provided by public or private institutions (Jimenez-Martin & Prieto, 2012: 461). Meanwhile, informal care is provided by family members, friends and neighbours. Although informal care has been termed 'hidden', it is by no means a modest factor in terms of numbers and contribution. Even when using narrow definitions, the family care workforce is at least twice the size compared to the formal care workforce (e.g. in Denmark) (Colombo et al., 2011: 44). In other countries, this proportion could be higher. The economic contribution of unpaid family care work in European countries, varies between 20 and 37 % of European GDP (Colombo et al., 2011: 44).[8]

The relationship between formal and informal health care has been examined in the economic literature (e.g. Jimenez-Martin & Prieto, 2012). The following section gives an overview of theories and models trying to explain this relationship. There are different ways of categorizing the models and some of them will overlap.

According to a relatively simple categorization, two models may describe the relationship between formal and informal care: (1) the *complementary task-specific model*, which states that formal care provides services that complements the informal caregiver's expertise and capability, and

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[8] GDP: Gross domestic product.

(2) the s*upplementary* or *substitutional model*, where formal and informal care provide similar types of services, and thus are replaceable (Rogero-Garcia & Rosenberg, 2011; Li & Song 2019).

A different categorization is provided by Jimenez-Martin and Prieto (2012), depending on whether formal caregiving hours compensate, substitute, complement or reinforce informal caregiving. The *compensatory model* (Cantor, 1979) states that one care system substitutes the other, following an order of preference. A dependent individual will only seek help from formal care when all the other sources of informal care have been exhausted. Following the *substitution model* (Greene, 1983), when an individual receives formal care, the family of the person will reduce their share of informal care. The *task-specific model* (Litwak, 1985) states that informal caregiving is more suitable for day-to-day care while formal care is reserved for more technological tasks. The nature of the task determines who is most appropriate for providing care. The *complementary model* (Chappell & Blandford, 1991) is a combination of the compensatory model and the substitution model. When the informal care resources are not enough to handle the needs of the dependent individual, formal care provides a necessary support.

Another classification is presented by Janse, Huijsman, Looman and Fabbricotti (2018), which have conceptualized the interplay between formal and informal care in three categories. *Complementation* refers to a task-specific model, with a differentiation of activities based on the caregiver's particular abilities. While informal caregivers perform non-skilled tasks, formal caregivers perform more technical and skilled tasks (Denton, 1997; Litwak, 1985). *Supplementation* is 'the transfer of informal tasks to formal caregivers if the informal caregiver is at risk of overburdening' (Janse et al., 2018: e281-e282). This often involves emotionally as well as physically demanding tasks, such as lifting (Litwin & Attias-Donfut, 2009). *Substitution* occurs when an increase in one type of care corresponds with a decrease of the other type (Bonsang, 2009).

In terms of research, the substitution model has not received much support, as families in most cases continue to provide support when individuals receive informal care (Viitanen, 2007; Rogero-García, Prieto-Flores, & Rosenberg, 2008). For the complementary model, studies from the United States, Germany and Netherlands have shown that older individuals prefer informal caregivers to perform tasks related to short-term needs, household tasks and emotional support. Meanwhile, they prefer formal care for their long-term needs (Pinquart & Sörensen, 2002; Swinkels, Suanet, Deeg, & van Groenou, 2016; Li & Song, 2019). In line with the substitution model, a study found that informal care can substitute certain types of formal care. After control for health status and sociodemographic variables, it was found that older individuals that received informal care, had a lower frequency of doctor visits (Rogero-García et al., 2008).

2.5.7 The relationship between conventional and alternative health care

The epistemological divide between complementary and alternative medicine (CAM) and conventional medicine was established during the nineteenth century. As such, the history of CAM can be situated within the emergence of biomedicine in the West (Gabe & Monaghan, 2013) (for a definition of biomedicine, see p. 23 and note 9). The establishment of the Medical Registration Act of 1858 created the conditions for conventional medicine as a unified and autonomous profession to develop. This resulted in a development that would eventually permit only legally qualified medical practitioners to practice (Bradby, 2008: 23). In consequence, since 1858 there has been a struggle between conventional medicine and CAM to establish the boundaries around medicine and the therapies that are taught, studied and practiced in medical schools and universities. As CAM is a culturally based concept, different cultures have differing notions of what is conventional medicine and what is CAM (Gabe & Monaghan, 2013: 175).

CAM use and informal care may be seen as part of the non-conventional or hidden health care system, and we have to rely on surveys (such as the European Social Survey) to monitor the extent of the use, the reasons and consequences. Because they are located outside the conventional health care system, they are probably also more reliant on the availability of pre-existing resources, such as money. For example, alternative health care is costly and spending time on informal care requires that one can afford not to work full-time. It is important to understand the determinants of informal care, particularly in terms of socioeconomic and demographic characteristics and health status, because European health care systems are dependent upon continuous support from this 'hidden health care system'. There is also limited knowledge on what macro-factors might explain the differences in CAM use between countries.

The biomedical model versus the social model

Biomedicine is the dominant paradigm of understanding health and illness in Western culture. The term biomedicine emphasizes and explains health and medicine in terms of biology (Gaines & Davis-Floyd, 2004: 95; Lloyd, 2019). Therefore, it can be distinguished from the professional medicine of other cultures.[9] In medical sociology, there is general agreement that the biomedical model has several defining characteristics (Barry & Yuill, 2002: 19). The following list presents five principal assumptions (Nettleton, 2006: 2; Barry & Yuill, 2002: 19-20; Cohen & Kennedy, 2007: 265-266):

(1) *Mind-body dualism*. This refers to an acceptance that the mind and the body can be treated separately. The body is perceived as a natural, physical entity subject to biological laws and processes. Its workings are basically separate from that of the mind or the individual person. According to Barry and Yuill (2002), it is the physical body rather than the mind, that is *the* subject of medicine.

(2) *Mechanical metaphor*. This concept views the body as a machine, which functioning is determined by biological and scientific laws. When the doctors understand these laws and have knowledge of how the body functions, they can act like engineers to ‘repair’ any dysfunction.

(3) *Technological imperative*. This refers to the significance of technological interventions when treating the body. There is a tendency to overplay the curative aspect of biomedicine and underplay other beneficial contributions, such as changes in factors related to lifestyle or the environment.

(4) Nettleton (2006) describe biomedicine as ‘reductionist’ in that there is a tendency to reduce all explanations of disease to the biological changes of the body. The role assigned to the physical factors is often accompanied by a relative neglect of social and psychological factors that could influence health.

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[9]. The label biomedicine is commonly used on what has variously been labelled ‘scientific medicine’, ‘cosmopolitan medicine’, ‘Western medicine’, ‘allopathic medicine’ and simply, ‘medicine’ (Gaines & Davis-Floyd, 2004: 95).

(5) *The doctrine of specific aetiology* refers to the belief that all disease is caused by a specific, identifiable agent or 'disease entity', such as a parasite, virus or bacterium.

Additional assumptions could be mentioned. For example, Cohen and Kennedy (2007) states that each disease should be studied by developing its own scientific specialism. There is a clear distinction between normal and abnormal bodily processes. As a result, the handling of a disease partly involves a return to 'normalization'. To examine patients' bodies for analysis and cure is important on the way to normalization. Medical professionals have the job of curing disease, which they do by using various technical or pharmacological interventions, such as pills, blood samples, body scans and surgical operations. Therefore, medical technologies represent the main key to overcoming disease (Cohen & Kennedy, 2007: 265-266).

The biomedical approach has consequences for how disease is perceived. Curing disease is more important than prevention. Moreover, this perspective tends to play down how disease is socially produced, emphasizing the natural processes (White, 2002: 4). According to the biomedical model, health is defined by the absence of disease, but more positive definitions like equilibrium or normal functioning could also be included (Blaxter, 2010: 19).

There are different ways to measure health, most of them are subjective compared to mortality. In English-speaking countries, a common divide is drawn between *disease* and *illness* (Helman, 1981; Blaxter, 2010). Disease is the pathological characteristics of medicine, and can be defined by referring to biological, chemical or other evidence. The mapping of disease is carried out through observation and examination, and is conducted by health professionals, like doctors. In contrast, illness represents the subjective experience of ill health (Twaddle, 1974; Blaxter, 2010). In popular terms, disease is something an organ has, while illness is something a man has (Cassell, 1976: 27).

In contrast to the biomedical model, the social model focuses on the social contexts in which the biological processes can be located. The social model is holistic, implying that the whole cannot be explained by the sum of the parts. Every disturbance in the system will involve the whole system. Therefore, a person is considered as a whole, rather than a series of distinct bodily systems (Blaxter, 2010: 19). The development of a social model, with the incorporation of a more holistic and empowering healing philosophy, could be viewed as a natural step in the growth of alternative medicine. According to Barrett and colleagues (2000), this type of healing strategy is consistent with the adoption of the biopsychosocial model, which was originally proposed by the American psychiatrist Georg L. Engel (1913–1999) in the 1970s (Engel, 1977). The aim of the model was to account for biological, psychological and social factors in explaining health and illness. This could also have contributed to a more positive view on health, being defined not only as the absence of disease. Moreover, it has also contributed to an increased focus on preventing disease and illness (Espnes & Smedslund, 2009: 42). When it comes to conventional medicine, family medicine has perhaps most eagerly included the principles of holism, humanism and biopsychosocial medicine (e.g. Goldstein, Sutherland, Jaffe, & Wilson, 1988).

People seek either conventional or alternative medicine for a variety of reasons. Astin (1998) has identified different types of philosophical orientation as an important factor in the use of CAM. The group that could be identified by an interest in personal and spiritual growth and a commitment to environmentalism and feminism, was defined as ‘cultural creatives’. In Astin’s national study, the group of cultural creatives were twice as likely to use CAM therapies compared to other patients. Kelner and Wellman (1997) conducted interviews with 300 people and concluded that ‘the choice of type of practitioner(s) is multidimensional and cannot solely be explained either by disenchantment with medicine or by an “alternative ideology”’ (Kelner & Wellman, 1997: 203).

Themes of distinction between CAM and conventional medicine

Barrett and colleagues (2000, 2003) have operationalized four main themes that distinguishes CAM and conventional medicine: holism, empowerment, access and legitimization. Holism represents an ‘integrated, whole-person approach’. The focus is to treat the whole person rather than composites of various biomedical attitudes. Holism focus on the importance of treating the whole person instead of just symptoms and using natural methods instead of medicines (Bishop, Yardley, & Lewith, 2007). Empowerment concerns giving patients an independent role in their healing process, relying on personal responsibility for health. In contrast, biomedical practitioners have sometimes been described in terms of disempowering of their patients by ‘acting in condescending, disparaging, chauvinistic, or paternalistic manners’ (Barrett et al., 2000: 236).

Access is defined as various issues related to insurance coverage, combined with physical, economic and social availability. In the study of Barrett and colleagues (2000), which was conducted in the United States, access to conventional health care was found to be relatively accessible as this was financed by insurance that was usually available through employment. Moreover, whereas conventional medicine was described to be physically available in most areas, CAM services was often harder to find and visit. In terms of out-of-pocket payments, CAM was often more expensive.

Legitimization concerns how conventional medicine and CAM is viewed. There is a difference between the official or legal legitimacy of conventional medicine and the less legitimized status of CAM. Moreover, there is a difference between legal legitimacy and legitimacy stemming from credible evidence (Barrett et al., 2000). CAM is often described by the lack of scientific evidence (Tabish, 2008).

The category of access is complex and difficult, and includes issues related to the health care system (such as insurance coverage) and communication between patients and providers (such as language, culture and socioeconomic position). Barrett and colleagues (2000) point to the fact that, in the United States, for most people with health care coverage, conventional health care costs very little out-of-pocket payments. ‘However, for the substantial minority that lack insurance coverage (15% to 20% in the United States), conventional medicine is often beyond their financial reach’ (Barrett et al., 2000: 238). This could increase the relative accessibility of alternative health care.

Models of integrative medicine

Although they are different, there may be possibilities of combining and integrating conventional and alternative health care. There are two dominant models of integrative medicine. The first model is a selective combination of the most effective elements – both in terms of biomedical evidence and experience-based evidence – of CAM and conventional medicine (Barrett et al., 2000; Templeman & Robinson, 2011; Lewith & Bensoussan, 2004). Moreover, health outcomes are valued. According to this approach, traditional health professionals, such as GPs, and CAM practitioners can become co-workers with equal autonomy, input and standing. This implies that some ideas and methods from CAM may be examined more carefully. If they are found deserving, they could be adopted or adapted to the official medical system. The second model is a selective incorporation of evidence-based CAM, referring exclusively to biomedical evidence, into conventional medicine. This is a model where GPs acts as gatekeepers, giving referrals to other medical providers, and are responsible for diagnosis, monitoring and coordination of health care and treatment plans. However, giving biomedicine such a dominating role would probably imply a loss of essential CAM features (Bodeker, 2001). The two models have different levels of equality between CAM and conventional health care with respect to power, autonomy and control. The factors that are common to these models is that health care aims to be client-centred and holistic, and the focus is on health rather than disease, as well as mutual respect among peer practitioners.

The literature on integrative medicine has also described power relationships and interprofessional dynamics. Templeman and Robinson (2011) present three dominant levels of hierarchical relationships in their literary review. The first type is *equitable partnerships*, which are characterized by a collaborative and power-sharing approach to the processes of health care, such as decision making, intervention and evaluation. The focus is to address the needs of the patient.

The second type is *inequitable partnerships*. This can be divided into two subcategories. The first subcategory within this model is *GP/medical-directed care*. This is a partnership where traditional hierarchies dominate. The most common model is where the medical practitioners are acting as primary health care providers and the CAM practitioners have subordinate roles (acting as a secondary primary contact), with a lower level of autonomy. Lewith and Bensoussan (2004) have described the relationship between conventional medicine and alternative medicine in terms of 'pluralism' and 'harmonization'. Pluralism attempts to encourage mutual respect for contrasting systems. Medical pluralism 'allows health consumers to choose the medical option that suits them best, maintaining the principle of patient autonomy', and preserves the integrity of the different treatment systems (Wiese, Oster, & Pincombe, 2010: 329). Harmonization is taking place where conventional and traditional (indigenous) medicines work together with no predetermined outcomes or biases.

The second subcategory within inequitable partnerships is *CAM-directed care*. This model describes a partnership where CAM practitioners have established a medical practice and invited medical practitioners to join. In these cases, the role of the medical practitioners is mainly to 'provide conventional medical diagnoses and Medicare entitlements for pathology tests after initial assessment of clients by CAM practitioners' (Templeman & Robinson, 2011: 88). Interventions can vary in strength, force or degree. According to the 'Degree of Intervention' Model of medicine (Vickers, 1994), all interventions could be placed on a continuum. These vary from 'low' interventions, which only causes a small change in a healthy individual, via 'intermediate' inventions, which have moderate changes, to 'high' interventions, which involves dramatic physical and psychological consequences for the patient, regardless of original health status (Vickers, 1994). This model forms the basis for the choice of treatments. An argument is that CAM is well-suited to a group of patients that require only intermediate level treatments, such as dietary modification, physiotherapy, relaxation techniques and counselling (Vickers, 1994; Gaumer, Koren & Gemmen, 2002).

The third type is *referral networks for CAM services*. This is not a model formally presented in the literature. Yet, Templeman and Robinson (2011: 88) claims that 'secondary referral networks between conventional medical practitioners and CAM practitioners who are not co-located are an increasingly common model of integrative medicine'. However, more research is needed to determine the nature of these referral networks.

There are various factors that influence the degree of integration between CAM and conventional medicine. A successful implementation of integrative medicine is inter alia dependent on positive attitudes of health care professionals, provider knowledge of integrative medicine (Hsiao et al., 2006), inter-personal and inter-professional communication (either through referral resources or team collaboration) (Patterson & Arthur, 2008), and a shared vision among practitioners (Templeman & Robinson, 2011; Sharp et al., 2018a). Nevertheless, there are little consensus as to the ideal model of integration (Luff & Thomas, 2000). A common understanding of what constitutes integrative medicine remains elusive (Hsiao et al., 2006). Consequently, it represents a challenging task to identify successful influences on the integration of CAM and conventional health care.

2.6 Contextual level: Health care as a determinant of health and health inequalities

Inequalities in morbidity and mortality were observed throughout the 20th century, despite great advances in abilities to prevent, diagnose and treat disease (Phelan & Link, 2013: 105; Eikemo et al., 2017: 138). Health inequalities in Western societies have led to increased focus on factors that influence health outside the traditional health care system, often labelled the social determinants of health (Eikemo et al., 2017). These have also been referred to as 'the causes of the causes' (Marmot, 2005). According to the WHO, the social determinants of health are defined as '…the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness' (World Health Organization, 2008: 2). The main social determinants of health have been identified as working conditions, unemployment, access to essential goods and services (specifically water, sanitation, and food), housing and the living environment, *access to health care* and transport (Dahlgren & Whitehead, 1991). The social determinants of health are commonly displayed in the social model of health or rainbow model (Figure 2.1).

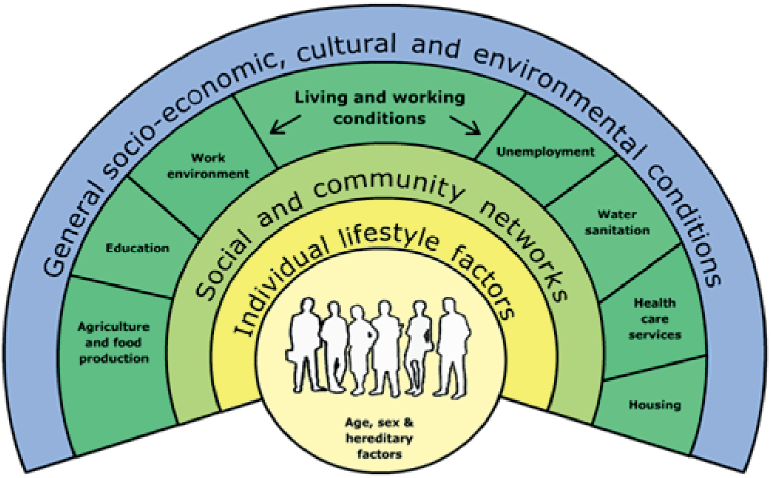

Figure 2.1: The rainbow model on the social determinants of health.

Source: Dahlgren and Whitehead (1991).

Compared to the other determinants of health, health care is *in part* distinguished by focusing on the *treatment* of illness as opposed to the *prevention* of illness. Even so, access to health care has been described as a fundamental determinant of health, particularly in terms of the treatment of pre-existing conditions (Bambra, 2011: 10). Emphasizing the welfare dimension of health care, Freeman and Moran (2000) states that:

> Health care matters. Not often, but sometimes, it is a matter of life and death. More usually, it represents a powerful means of alleviating the anxiety, discomfort and incapacity that come from sickness and ill health. Being able to go to the doctor is one of the hallmarks of citizenship in most advanced industrial countries. (Freeman & Moran, 2000: 35)

The above quote illustrates that health care is not only understood in terms of its concrete performance, but also because it generates a 'feeling of security' (Wendt, Mischke, Pfeifer, & Reibling, 2012: 213) among the citizens, so they know that they will receive medical help in case they need it. It has been pointed out that equality in access to health care 'is best considered in the context of whether people *in need* receive it or not' (Andersen, 1978: 458, italics in original).

In most advanced capitalist countries – including most of the countries in Europe – access to health care is *universal* (Bambra, 2011; Wendt, 2009). One definition of universal health care is that all residents of a geographic area have access to health care (Meades & Roberts, 2007). This implies that all citizens are entitled with a basic set of health care services (Kautto, Heikkilä, Hvinden, Marklund, & Ploug, 1999: 32). However, there are variations in terms of how health care is funded (e.g. social insurance, private insurance or general taxation), the role and level of co-payments for treatment, and the extent of provision – what has been collectively termed 'health care decommodification' (Bambra, 2005a).

Importantly, the provision of health care also varies *within* countries according to socioeconomic position. Using the UK health care system as an example, the British doctor Julian Tudor Hart (1927–2018) wrote about an 'inverse care law' in 1971, stating that: 'The availability of good medical care tends to vary inversely with the need for it in the population served' (Hart, 1971:

405).[10] For example, people in a lower socioeconomic position are less likely to use preventive health services (Veugelers & Yip, 2003). Moreover, they tend to be more intensive users of general practitioners while higher socioeconomic groups report significantly more specialist contacts, even when considering the generally poorer health of lower socioeconomic groups (Droomers & Westert, 2004).

While it is difficult to pinpoint the exact effect of each health determinant relative to each other, according to a rule of thumb, the health care system contributes no more than 10% to overall health care disparities (Beckfield, Olafsdottir, & Sosnaud, 2013: 134). The so-called 10/90 rule was formulated by the American political scientist Aaron Wildavsky (1930–1993) in the 1970s:

> The best estimates are that the medical system (doctors, drugs, hospitals) affects about 10 percent of the usual indexes for measuring health: whether you live at all (infant mortality), how well you live (days lost due to sickness), how long you live (adult mortality). The remaining 90 percent are determined by factors over which doctors have little or no control, from individual life-style (smoking, exercise, worry), to social conditions (income, eating habits, physiological inheritance), to the physical environment (air and water quality). Most of the bad things that happen to people's health are at present beyond the reach of medicine. (Wildavsky, 2018 [1979]: 305)

It has been argued that public health improvements (e.g. basic sanitation) and a general rise in the standards of living have been more important than medical technology for improving population health (and in lowering mortality rates) across the advanced industrial countries (Beckfield et al., 2013; McKeown, 1976a). During the 20th century, average life expectancy increased approximately between 25 and 30 years for citizens of industrial countries. However, it is estimated that only five of these additional years could be attributed to medical care (Bunker, Frazier, & Mosteller, 1994: 225; Wilkinson, 1996: 30-31). Nevertheless, there is still a strong interest in the link between health care and health inequalities (Beckfield et al., 2013), particularly considering the increased impact of chronic conditions (non-communicable diseases) and disease management on daily living (Wright & Perry, 2010). Although health care inequalities may account little for the variation inequalities in rates of disease, the health care services may explain a large share of the variation

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[10] Moreover, Hart emphasizes that the inverse care law 'operates more freely when medical care is most exposed to the market forces, and less so where such exposure is reduced' (Hart, 1971: 405).

in health experiences and outcomes among members of different socioeconomic groups (Wright & Perry, 2010: S109).

There is no experimental design to provide evidence for how the population health would be in the absence of health care services (Stirbu, 2008: 20). However, it is possible to estimate the changes in life expectancy by looking at mortality data and their changes over time. In contrast, estimating the effects of health care on quality of life represents a more difficult task. The quality of life may be captured by terms such as 'health status' and 'well being'. An argument is that increased use of health care is not necessarily used to extend life expectancy, but rather to improve the quality of life (Bunker et al., 1994: 226; Blane, Brunner, & Wilkinson, 1996: 11; Stirbu, 2008: 20-21).

2.6.1 The 'McKeown thesis'

The discussion on the importance of health care has been going on for many decades. It was sparked with a series of publications by the British physician and demographer, Thomas McKeown (1912–1988). This was particularly the case for his book *The Role of Medicine: Dream, Mirage or Nemesis?* (McKeown, 1976a), which suggested that health care services had contributed little to improvements in public health. McKeown provided a detailed analysis of the history of cause-specific mortality in England and Wales since the 1840s. The McKeown thesis attempted to construct a theoretical explanation for the demographic transition, the dramatic increase in population of the industrialized world from around 1750 to the present. [11] The analyses showed that population growth was mainly due to a decline in mortality from infectious disease. This decline was for the most part the result of improved economic conditions that followed in the wake of the Industrial Revolution, which provided the basis for a significant improvement in standards of living. Furthermore, better nutrition was highlighted as the most important factor contributing to

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[11] The literature about the 'McKeown thesis' is extensive. McKeown outlined the core arguments of his thesis in four articles published between 1955 and 1975 in the journal *Population Studies* (McKeown & Brown, 1955; McKeown & Record, 1962; McKeown, Brown, & Record, 1972; McKeown, Record, & Turner, 1975). These articles were followed by two books, both published in 1976: *The Role of Medicine: Dream, Mirage, or Nemesis?* (McKeown, 1976a) and *The Modern Rise of Population* (McKeown, 1976b). An introduction to the thesis, as well as a critique, is written by British historian Simon Szreter (1988; see also Szreter, 2000, 2002). For a summary of the thesis, with additional details on its historical controversy and influence, see Colgrove (2002). For a review on McKeown's dismissal of medical care, see Mackenbach (1996).

increased resistance against disease. McKeown's analyses demonstrated that most of the decline in infectious disease mortality had happened before to the introduction of specific medical interventions, such as vaccinations and antibiotics. This argumentation concluded that the role of medicine could only have been marginal.

McKeown's analyses also demonstrated that most of the decline of mortality from infectious diseases in England and Wales was due to a decline of air-borne diseases, particularly respiratory tuberculosis. Public health interventions could only have played a small role, because they were primarily targeted at water-borne diseases such as cholera, which accounted for only a small proportion of the mortality decline. This must have had another explanation, which McKeown attributed to the improvement in nutrition, due to improvements in agricultural production and food transportation.

McKeown (1976a: xv) argued that medicine placed far too much emphasis on cure, and not enough on care. This was partly related to a misunderstanding of history: 'Misinterpretation of the major influences, particularly personal medical care, on past and future improvements in health has led to misuse of resources and distortion of the role of medicine' (McKeown, 1976a: xiii). In his view, the role of medicine should be modest: 'To assist us to come safely into the world and comfortably out of it, and during life to protect the well and care for the sick and disabled' (McKeown, 1976a: 173). McKeown's conclusion that medical care had contributed little to health was by many interpreted as an attack on medicine (Bunker, 2001). Moreover, many linked McKeown's conclusion to that of Illich's (1995 [1976]) that medicine does more harm than good.[12]

The attention and debate following McKeown's publications needs to be understood in in the light of a historic context, with the social and political climate of the 1970s. In the post-war years, health care services became more costly. At the same time, public finances were tight. This was a time when many questioned whether curative health care services would be the solution to the dilemmas

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[12] Although the subtitle was an explicit reference to *Medical Nemesis: The Expropriation of Health* (Illich, 1995 [1976]), McKeown wrote in the introduction to the second edition of *The Role of Medicine: Dream, Mirage or Nemesis?* that the two books had little in common 'except perhaps in the sense that the Bible and the Koran could be said to be identified by the fact that both are concerned with religious matters' (McKeown, 1979: vii).

of public health (Colgrove, 2002; Elstad, 2000: 66). Consequently, the medical profession underwent a major crisis in confidence in the 1970s. Several publications questioned the ethics, values and priorities of the institutions of medicine (e.g. Cochrane, 1972; Fuchs, 1974; Illich, 1995 [1976]; Brown, 1979). One of the most prominent books was *Effectiveness and Efficiency: Random Reflections on Health Services* (1972), written by the Scottish doctor and epidemiologist Archie Cochrane (1909–1988). The book criticized the lack of reliable evidence behind many of the commonly accepted health care interventions at the time. This criticism called for more rigorous evaluations of health care interventions and highlighted the need for an evidence-based medicine. Moreover, Cochrane emphasized the necessity of randomized control trials (RCTs) in medical studies. This would in turn make medicine more effective and efficient (Cochrane, 1972: 20-66; Shah & Chung, 2009; Greenhalgh, 2004; Elwood, 1988). Another influential book was the polemic *Medical Nemesis: The Expropriation of Health* (1995 [1976]), written by the Austrian philosopher and social critic Ivan Illich (1926–2002).[13] In his book, Illich introduced the notion of *iatrogenic disease*.[14] Illich argued that iatrogenic side-effects posed 'limits to medicine'. Consequently, medicine was described as a malign influence that does more harm than good. The discussion of health care was catalyzed as both the United States and Great Britain began to question the

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[13] The original title from 1976 was *Medical Nemesis*. The book was republished in 1995 under the additional title of *Limits to Medicine*.

[14] The term iatrogenesis is derived from the Greek *iatros*, which means 'physician', and *genesis*, which means 'origin' (Illich, 1995 [1976]: 3). Thus, the term literally means 'doctor-generated' and refers to sickness produced by medical activity (Encyclopedia.com, 2021; Peer & Shabir, 2018). Illich distinguishes between three types of iatrogenesis: clinical, social and cultural (see also Geiger, 1976; Smith, 2002; Peer & Shabir, 2018; Encyclopedia.com, 2021). Clinical iatrogenesis describes the damage done by clinical intervention. In a narrow sense, clinical iatrogenic disease includes 'only illnesses that would not have come about if sound and professionally recommended treatment had *not* been applied' (Illich, 1995 [1976]: 26-27). In a wider sense, clinical iatrogenic disease comprises 'all clinical conditions for which remedies, physicians, or hospitals are the pathogens, or "sickening" agents' (Illich, 1995 [1976]: 27). Social iatrogenesis concerns the overmedicalization of society. More and more problems are viewed as amenable to medical intervention. Social iatrogenesis refers to the process by which 'medical practice sponsors sickness by reinforcing a morbid society that encourages people to become consumers of curative, preventive, industrial and environmental medicine' (Illich, 1995 [1976]: 33). Illich claims that social iatrogenesis represents overmedicalization of life that amount to the expropriation of health. This makes people too willing to place their faith in the hands of medical experts, creating a dependence on the medical profession that allegedly undermines individual capacities. Finally, cultural iatrogenesis 'sets in when the medical enterprise saps the will of people to suffer their reality' (Illich, 1995 [1976]: 127). This represents the destruction of traditional ways of dealing with, and making sense of, death, pain and sickness. Consequently, societies weaken the will of their members, by paralysing 'healthy responses to suffering, impairment and death' (Illich, 1995 [1976]: 34).

expenditures on medical techniques, at the same time as the quality of life seemed to decrease (Colgrove, 2002). Furthermore, 'Doing better and feeling worse' (Wildavsky, 2018 [1979]) became a slogan in the 1970s. This emphasized the apparent paradox that although health (in general) and mortality rates (in particular) seemed to improve, the demand for health care services increased (Elstad, 2000: 66; Barsky, 1988).

> If most people are healthier today than people like themselves have ever been, and if access to medical care now is more evenly distributed among rich and poor, why this talk of a crisis in medical care that needs massive change? If most of the population is satisfied with its medical care, why is there so much pressure in government for change? Why, in brief, are we doing better but feeling worse? (Wildavsky, 2018 [1979]: 306)

There was an apparent answer to the question articulated by Wildavsky. It is worth to note that McKeown's critique of the medical establishment coincided with a new discourse that was emerging in the United States, Canada and Great Britain. This discourse emphasized the role of individual responsibility for health. In 1974, Marc Lalonde, the Canadian Minister of National Health and Welfare, issued the report *A New Perspective on the Health of Canadians* (Lalonde, 1974).[15] The document described the health care system as one of the four 'health field' concepts. However, biology, environment and lifestyle were identified as the main causes of sickness and death in society. Moreover, the report argued that people needed to take more responsibility for their behaviour and lifestyle choices to improve their own health (Lalonde, 1974: 31ff.). In his essay, John H. Knowles (1926–1979), an American physician and president of the Rockefeller Foundation, argued that individuals had the moral responsibility to maintain their own health. Health-related behaviour and lifestyle habits was the solution. Thus, people should stop looking to organized medicine or the government for improvements in health (Knowles, 1977: 78-80).

Such publications gained attention, and especially the Lalonde Report was received very positively.[16] The behavioural approach to prevention had important ideological implications. By

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[15] It also became known as the Lalonde Report.

[16] The report is widely regarded as a ground-breaking document as it recognized that other strategies beyond medical care are needed to improve the health of a population. The report contributed to the development and evolution of health promotion, also recognizing the importance of healthy communities and environments to health (Tulchinsky, 2018; 524-525; Glouberman, 2001: ix; Minkler, 1989: 18-19). The prominence of the report can also be traced in

focusing on individual choices, this perspective could also be associated with a *blaming the victim* ideology. Victim-blaming implied that individuals freely chose to engage in health-damaging behaviours and could be held responsible for their health problems (Blane et al., 1996: 7). This also had implication for public policy, as it was cheaper to provide preventive health campaigns than new hospitals. To redirect the health policies towards individual prevention seemed to be an answer to the question, as well as a way out of the dilemma, put forward by Wildavsky (2018 [1979]) and other commentators. The health implications of the social and economic organization of society were hidden from the agenda. Thus, the political pressure towards governments were reduced. This environment also helps to explain the prominence the McKeown thesis achieved in its time (Evans & Stoddard, 1990: 1351-1355; Blane et al., 1996: 4-7).

2.6.2 The Black Report

Social health inequalities have been reported since the early industrialization of Western societies (e.g. Antonovsky, 1967). Despite this, in the 1960s and 1970s, it was widely believed that the establishing of the modern welfare state had made the class concept irrelevant and reduced health inequalities to a minimum (Ringdal, 2001: 183; Siegrist & Marmot, 2006: 1; Mackenbach, 2019: 4). In 1964, the American sociologist Charles Kadushin concluded that 'in modern Western countries, the relationship between social class and the prevalence of illness is certainly decreasing and most probably no longer even exists' (Kadushin, 1964: 75).

When the Black Report was published in the United Kingdom in 1980, it represented a watershed in the history of social inequalities in health (DHSS, 1980; Townsend & Davidson, 1988).[17] This is often acknowledged as the point when health inequality was put firmly on the agenda, both

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developments within public health. In 1978, the World Health Organization sponsored the Alma Ata Conference, articulating a policy of 'Health for All'. The Alma Ata Declaration emphasized that health depends on more than medical care. Moreover, the Lalonde Report led to the *Ottawa Charter* in 1986 (Tulchinsky, 2018: 523-526). The Ottawa Charter adopted the basic concepts from the report, defining health promotion as 'the process of enabling people to increase control over, and to improve, their health' (World Health Organization, 1986).

[17] The document was published by the Department of Health and Social Security in the United Kingdom. The publication was originally entitled *Inequalities in Health: Report of the Working Group on Inequalities in Health*. It quickly became known as the Black Report, after chairman Sir Douglas Black (1913–2002), then President of the Royal College of Physicians.

within public policy and academic study (Bartley, 2004: 1; Marmot, 2001). The original report, which ran to over 400 pages, showed the distribution and extent of ill health and mortality among the British population. Based on data from England and Wales between the 1950s and the 1970s, the report described differences between occupational classes in mortality, morbidity and use of health care services. The message of the Black Report was that health inequalities between occupational classes were alarming (Elstad, 2000: 33). Moreover, surprisingly, the report also showed that the health inequalities had been widening (and not narrowing, as was previously assumed) after the establishment of the National Health Service (NHS) in 1948 (DHSS, 1980; Townsend & Davidson, 1988; Gray, 1982; Bartley, 2004).

A major finding in the Black Report was that in order to tackle inequalities in health and the origins of ill-health, one needed to look outside the health care sector (Gray, 1982: 369). The Report nevertheless remarked that ‘any inequality in the availability and use of health services in relation to need is in itself socially unjust and requires alleviation’ (DHSS, 1980: 94; Townsend & Davidson, 1988: 68). Moreover, the Report viewed health care as only one factor influencing health and discussed the possibility of focusing on other areas of social policy, such as income maintenance and housing (Gray, 1982: 375). A key element concerned an anti-poverty strategy (DHSS, 1980: 301-305; Townsend & Davidson, 1988: 165-169), which consisted of two parts. The first part promoted a fairer distribution of resources through a more progressive taxation system, the possibility of defining national minimum and maximum earnings and family income. The second part encouraged:

> [S]elf-dependence and a high level of individual skill and autonomy as a basis for creating a more integrated society. We believe that this is possible only by raising the standards and broadening the content of education so that the need for advice or supervision from professionally trained personnel in medicine, nursing, law, housing, child care or administration is less marked and the capacity to undertake a range of skills is greater. This includes improving individual access to information about, and control over, what goes on in the immediate community as well as society generally, and conferring rights to employment and occupation and creating corresponding opportunities for such employment. (DHSS, 1980: 303; Townsend & Davidson, 1988: 168)

Based on these recommendations, the Report focused mainly on strategies targeted at poverty and low income (cf. Fitzpatrick, 2008: 10). The broad strategies were followed by more specific measures. These measures included benefits, such as raising maternity grant and child benefits, in order to reduce child poverty. In addition, the provision of free school meals was promoted. Furthermore, it was remarked that major efforts were needed in housing improvements, the prevention of child accidents and accidents in the workplace, largely occurring in manual occupations (DHSS, 1980: Chapter 9; Townsend & Davidson, 1988: Chapter 9). The recommendations by the DHSS group suggested that, for large sections of society, health was harmed by material deprivation in terms of income, diet and housing, rather than because of the 'diseases of affluence' (Fitzpatrick, 2008: 10). [18]

The Black Committee on Inequalities in Health had been commissioned by the Labour government in 1977. However, the report was given a frosty reception by the Conservative government, which restricted its publication to 260 copies. There was no official press release or press conference for the report. The government dismissed the report's recommendations on the ground that they would be too costly (Townsend, Davidson, & Whitehead, 1988: 3-4; Marmot, 2001). Nevertheless, the report had a profound and lasting influence. Interest in, and concern about, health differences between people has continued to grow in most industrialized and many developing nations (Bartley, 2004: 1; Siegrist & Marmot, 2006: 1).

2.6.3 The welfare state

The welfare state represents a contested concept, as no accepted general definition exists (Powell & Hewitt, 2002: 5). The term was possibly coined, or rather reinvented, in England in the 1940s. The term is to be found in the book *Citizen and Churchman* (1941) by William Temple, Archbishop

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[18] Diseases of affluence is a term that describe diseases and health conditions which are commonly associated with the increasing wealth in a society (Ezzati et al., 2005), also referred to as the 'Western disease' paradigm (Trowell & Burkitt, 1981). They include mostly non-communicable diseases (NCDs) and other physical health conditions for which personal lifestyles and societal conditions associated with industrialization and economic conditions are thought to be an important risk factor. Examples of diseases of affluence include obesity, high blood pressure, coronary heart disease, cardiovascular disease, type 2 diabetes and cancers (Ezzati et al., 2005). They can be contrasted with diseases of poverty, which are largely infectious diseases, or the result of poor living conditions. Primary diseases of poverty include tuberculosis and malaria (Singh & Singh, 2008).

of York[19], where it was contrasted with the ‘power state’ or ‘warfare state’ (Hennock, 2001). In a narrow sense, the welfare state often refers to various post-war state measures for the provision of key welfare services and social transfers. Consequently, the welfare state is used as a collective term for describing the state’s role in different areas like education, health, housing, poor relief, social insurance, in developed capitalist countries during the post-war period (Ginsburg, 1979: 3). Different types of health care services could be included within this definition. The welfare state could also be defined as ‘interventions by the state in civil society to alter social and market forces’ (Orloff, 1993: 304).

Taken together, these definitions are in accordance with the English historian Asa Briggs’s (1921–2016) classic text about the welfare state (Briggs, 1961). According to Briggs, a welfare state is a state that uses organized power deliberately, through politics and administration, in order to modify the play of market forces in at least three directions:

> first, by guaranteeing individuals and families a minimum income irrespective of the market value of their work and their property; second, by narrowing the extent of insecurity by enabling individuals and families to meet certain ‘social contingencies’ (for example, sickness, old age and unemployment) which lead otherwise to individual and family crises; and third, by ensuring that all citizens without distinction of status or class are offered the best standards available in relation to a certain agreed range of social services. (Briggs, 1961: 228)

This illustrates important aspects of the welfare state in terms of its functions. All of them deal with modifying the effect of the market forces, but they are different in scope. The first aim takes a minimum approach and could include means-testing. The second aim arguably focuses more on an overarching function of the welfare state, namely ‘narrowing the extent of insecurity’, at the same time hinting to some concrete welfare arrangement (such as pensions and unemployment benefits) by mentioning the respective ‘social contingencies’ (i.e. difficult events and life situations) that individuals and families may meet. Taken together, the first and second aim describe a ‘social

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[19] William Temple (1881–1944) held this position from 1929 to 1942. In 1942, he was translated to be Archbishop of Canterbury (Hastings, 2012).

service state', a term that used to refer to a state using communal resources in order to reduce poverty and assist those in need (Briggs, 1961: 228).

The third aim is more ambitious in its scope, as it seeks to go further than the aims of the social service state. It seeks to promote 'an equality of the highest standards, not an equality of minimal needs' (Esping-Andersen, 1990: 27). This aim is also more in agreement with universalism compared to the other redistributive principles of social policy (Anttonen, Häikiö, Stefánsson, & Sipilä, 2012). In short, universalism means that social transfers and welfare services are granted to everyone based on (social) citizenship. Universal inclusion means that all citizens or residents are included as potential beneficiaries of social policy and no one is excluded.[20] This implies that despite existing socioeconomic inequalities, every citizen is of equal worth within the welfare state (Dahl et al., 2006: 199-200; Antonnen et al., 2012: 4; Kildal & Kuhnle, 2005: 14). Aiming at the 'best standards available' of social services, the third aim stands in contrast to residualism, which will only provide a minimum, mainly targeted at the poor in society. Moreover, by providing services independent of social status and class, it also diverges from selectivism, which is designed for preserving social divisions (Anttonen et al., 2012: 5). The point is not merely to reduce class-related differences or the needs of marginalized groups, but also to offer an equality of treatment (Briggs, 1961: 228). This would also be most in accordance with universalism, although an equality of treatment does not necessarily imply that all citizens are to be treated in the same way, regardless of their need (Antonnen et al., 2012: 6). In sum, the third aim promotes comprehensive welfare services.

2.6.4 Citizenship and the welfare state

In post-war Europe, the emergence of a modern welfare state was related to the changing status of citizenship (Anttonen et al., 2012: 4). In his classic essay, the English sociologist T. H. Marshall (1893–1981) postulates a relationship between social class and citizenship (Marshall, 1950). Moreover, he emphasizes that social citizenship constitutes a vital element in the welfare state. Marshall defines citizenship as 'a status bestowed on those who are full members of a community

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[20] The idea of access for all citizens or residents to a particular benefit is the clearest criterion for universalism. In practice, access for all is dependent on national legislation, and universal benefits must therefore be under public regulation (Anttonen et al., 2012: 4-5).

and all who possess the status are equal with respect to the rights and duties with which that status is endowed' (Marshall, 1950: 28-29). According to Marshall, citizenship is composed of three elements of civil, political and social rights (Marshall, 1950: 10ff.). The civil element consists of rights underpinning individual freedom, such as equality for the law and freedom of speech. The political element concerns the right to participate in the exercise of political power. The social element (social citizenship) is described in more general terms and comprises a range of rights 'from the right to a modicum of economic welfare and security to the right to share to the full in the social heritage and to live the life of a civilized being according to the standards prevailing in society' (Marshall, 1950: 11). In short, social citizenship is the right to economic welfare and social security according to the standards prevailing in society.

The three elements of citizenship follow in sequence as a progressive development of rights in history: civil rights in the eighteenth century, political rights in the nineteenth century and social rights in the twentieth century (Marshall, 1950). An important point in Marshall's theory is that after obtaining political rights, workers were able to establish social rights through the exercise of political power. The idea of universal social citizenship contributes to an extension of social rights, reaching beyond workers and to all citizens. The citizen is 'constructed as a member of a national welfare state' (Anttonen et al., 2012: 4). For Marshall (1950), the social rights of the welfare state represented the means where the equal status of citizenship could sharply limit, but not eliminate, the inequalities created by the market (Weir, 2001).

A way of portraying citizenship is that it stands in contrast to social class, in the sense that the former represents equality while the last represents inequality. Thus, citizenship has contributed to a reduction of inequality generated by the class system (Marshall, 1950: 30). In particular, services belonging to the social citizenship have contributed to a general reduction of risk and insecurity among different groups in the population (Marshall, 1950: 56). As health may be conceptualized as 'the right to a standard of living adequate for health and well-being', it represents an important aspect of social citizenship (Bambra, Fox, & Scott-Samuel, 2005: 187; United Nations, 1948). Therefore, it could be argued that the welfare state in Europe represent an embodiment of social citizenship. A major factor in European welfare states is *de-commodification*, which can be defined as the extent to which individuals and families can maintain an acceptable standard of living regardless of their market performance (Esping-Andersen, 1990: 22; Esping-Andersen, 1999: 43). By providing de-commodified welfare services, the welfare state ensures that a certain standard of living (although these will vary between different countries) is a right of citizenship rather than something which is acquired solely through individual market position (Eikemo & Bambra, 2008).

According to Marshall (1950: 56), the equalization that has taken place within the extension of social services 'is not so much between classes as between individuals within a population which is now treated for this purpose as though it were one class. Equality of status is more important than equality of income'. This implies that even though people hold different socioeconomic position, and are different with respect to income, education and occupational class, they are considered equal as citizens.

However, the concept of equality could be challenged and problematized. Esping-Andersen (1990: 21) notes that at the same time as social rights entail a de-commodification of the status of individuals vis-à-vis the market, the concept of social citizenship also involves social stratification. As a result, the status as a citizen will compete with, or even replace, the class position. In line with this argument, the welfare state is also referred to as 'a stratification system in its own right' (Esping-Andersen, 1990: 4). Therefore, the welfare state is an active force in the ordering of social relations (Esping-Andersen, 1990: 23).

To illustrate how welfare states are reinforcing existing social divisions in a society, Esping-Andersen describes how countries with social insurance models are designed for stratification purposes. These systems are used to 'consolidate divisions among wage-earners by legislating distinct programs for different class and status groups, each with its own conspicuously unique set of rights and privileges which was designed to accentuate the individual's appropriate station in life' (Esping-Andersen, 1990: 24). The state gives different groups rights and privileges through the social political programs. This is partly a means of rewarding loyalty to the state, and partly a way of illustrating one group's unique social status compared to another. Marshall (1950) primarily focuses on equality in the context of social citizenship. However, it is evident that some forms of inequality could be inevitable. For example, this is noted in the case of health care:

> When a free service, as in the case of health, is extended from a limited income group to the whole population, the direct effect is in part to increase the inequality of disposable incomes, again subject to modification by the incidence of taxes. For members of the middle classes, who used to pay their doctors, find this part of their income released for expenditure on other things. (Marshall, 1950: 56)

The intention of the political decision was to reduce inequality. However, as an unintended consequence, the result could generate a different type of inequality. Social health inequalities can still be present, even though the entitlement to health care is based on citizenship and is provided to the whole population. The quote illustrates that health inequalities seem inevitable because there will always remain a difference with respect to people's disposal of resources. The fundamental cause theory is a perspective that tries to explain the persistence of health inequalities (see section 2.4).

2.6.5 The policy domains of the welfare state

In the welfare state, it is possible to separate between three main policy domains: public health policy, social policy and health care (Thomson, Bambra, McNamara, Huijts, & Todd, 2016). Therefore, the original social model of health (Dahlgren & Whitehead, 1991) could be refined by splitting the 'rainbow' into three parts (Figure 2.2). The distinction between the policy domains of the welfare state, such as different types of public health policy and social policy, may not be clear-cut (Thomson et al., 2016). These policy domains cover a broad area of issues related to the welfare state.

The World Health Organization defines public health as 'all organized measures (whether public or private) to prevent disease, promote health, and prolong life among the population as a whole' (World Health Organization, 2015). Public health could be administered by the private or voluntary sector. In Europe, however, public health is commonly instigated by governments – centrally, regionally or locally (Thomson et al., 2016). Welfare states may impact population health indirectly through influencing the social determinants of health (e.g. by the redistribution of resources in areas like the provision of education, social security and housing) or directly through policies aimed particularly at improving public health (e.g. safe drinking water and vaccinations) and on health care services (Mackenbach & McKee, 2013a: 390).

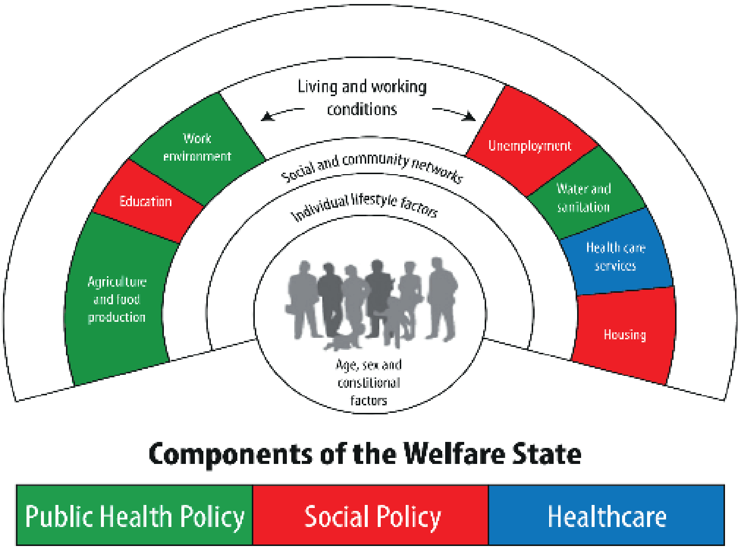

Figure 2.2: Components of the welfare state.

Source: Bambra et al. (forthcoming).

According to Mackenbach and McKee (2013b), public health policies may influence primary prevention and secondary prevention. Primary prevention aims to avoid the occurrence of disease by reducing exposure to health risks. Secondary prevention aims to avoid the development of disease to a symptomatic stage by diagnosing and treating disease before it causes significant morbidity (Mackenbach & McKee, 2013b: 195). While there are reviews which focus on specific areas of public health (Hill, Amos, Clifford & Platt, 2014; Bambra et al., 2009), there is yet no comprehensive overview which seeks to evaluate the full scope of population-level public health policies available to governments (Thomson et al., 2016).

Social policy is particularly concerned with the social services and the welfare state. The social services mainly include social security, housing, health, employment, social work and education (Spicker, 2014: 1). In a broader sense, social policy relates to how welfare is promoted, and 'the social and economic conditions which shape the development of welfare' (Spicker, 2018). Moreover, social policy aims to identify and reduce inequalities in access to services between social groups and between countries (Platt, 2018). In a study by Beckfield, Morris and Bambra (2018), the authors hypothesize that active labour market programs (facilitating entry and continuity in the working life) and child and long-term care policy measures (reducing the burden of care work) is associated with gender health equality through differential effects on women's and men's health. Even though these policies have ambiguous effects on gender health equality, the study concludes that social policy contributes to the distribution of population health (Beckfield et al., 2018).

2.6.6 The empirical value of the institutional perspective

Health care systems have been characterized as one of the key dimensions of all modern welfare states (Olafsdottir & Beckfield, 2011: 102). It may therefore come as a surprise that health care systems have been relatively absent from major welfare state theories (cf. Esping-Andersen, 1990). While this may be due to their lacking focus on social and health care services (Wendt, 2009: 433; Bambra, 2005a, 2005b; Wendt, Mischke, & Pfeifer, 2011), this thesis provides a unique opportunity to examine how and why conventional and non-conventional health care vary within and between welfare regimes.

Besides pensions and education, health care programmes are generally the largest in European welfare states. Therefore, efforts to restructure the wider welfare states inevitably involve efforts to reshape the 'health care state' (Freeman & Moran, 2000: 35; Moran, 1995, 2000). Health care is one of the biggest single consumers of resources in modern welfare states (Moran, 2000: 138; Freeman & Moran, 2000: 35). Thus, health care thereby represents a major source of financial pressure on welfare states. More generally, the role of states is also important as they 'are either the dominant financiers of health care or are central to the regulation of institutions that provide the money. Health care looms large in the modern welfare state, and welfare states loom large in modern health-care systems' (Moran, 2000: 138-139).

While the Black report did not put emphasis on welfare systems in their recommendations to reduce socioeconomic inequalities, this thesis argues that the *institutional perspective* is important (in line with the rainbow model). Therefore, the thesis also aims to show the extent to which socioeconomic inequalities in health can be attributed to welfare systems in European countries. All of this requires an institutional perspective of the welfare state (Beckfield et al., 2015: 4). Institutions are commonly described as the 'rules of the game' (Ervasti, Fridberg, Hjerm, Kangas, & Ringdal, 2008: 1), and are defined as formal or informal procedures, routines, norms and conventions embedded in the organizational structure of the polity or the political economy (Hall & Taylor, 1996: 938). In the context of the welfare state, institutions could for example be expressed through a country's social insurance systems and family law (Ervasti et al., 2008: 1; Jakobsen, 2011: 325). The institutional approach focuses on how welfare institutions, specific social policies and programmes are designed and how these translate into population health (Bergqvist, Yngwe, & Lundberg, 2013).

In addition to policies like income redistribution, welfare states provide a minimum level of health care to citizens (in part by regulating health care access) and limit inequality in some of the factors related to the social determinants of health, such as income (Beckfield et al., 2015: 6). If smaller educational differences in health and mortality were found in countries that share specific macro-level features, this would provide important information for reducing the extent of educational inequality in health within and between countries.

For example, Navarro et al. (2006) proposed a multidimensional conceptual framework, which has been used to understand the relationship between political systems and health outcomes. It is a schematic attempt to show how politics (e.g. expressed in terms of electoral behaviour and trade union characteristics) is related to expansion of the welfare state, in turn reflecting the degree to which societies take care of their citizens. They hypothesized that the social democratic countries are more committed to the expansion of the welfare state, full employment policies, and a higher percentage of women in the labour force, and therefore have less social and income inequalities, better health outcomes and less inequalities in health.

There are also reasons for linking political systems to health outcomes. In a literature review, Muntaner and colleagues (2011) summarize that population health is positively associated with (1) left and egalitarian political traditions, (2) advanced and liberal democracy, (3) social democratic welfare regimes, and (4) negatively associated with globalization indicators. In a similar vein, Pega, Kawachi, Rasanathan, and Lundberg (2013: 177) classifies research traditions focusing on political traditions and ideology (e.g. neoliberalism), processes (e.g. democratization, globalization, corruption, privatization, trade liberalization), systems (e.g. democracy versus autocracy) or institutions (e.g. unions, political parties, bureaucracy). They argue that the advantages of research on political systems and health outcomes lies in its theoretical foundations and general applicability, while lacking causal and contextual sensitivity are among the disadvantages (Pega et al., 2013: 178).

2.6.7 Welfare regimes

Because there are large differences between European welfare states, it has become common practice to categorize the individual countries in clusters of groups. Welfare state typologies[21] group welfare states that are similar in different welfare regimes, which underlines similarities *within* a regime and differences *between* regimes (Eikemo, Bambra, Judge, & Ringdal, 2008a).[22] Thus, welfare regimes include clusters of countries that share important socio-political, but also historical and cultural commonalities, at the same time as they differ from other welfare regimes in their welfare performances (Kautto, Fritzell, Hvinden, Kvist, & Uuisitalo, 2001: 4; Esping-Andersen, 1990: 3). Moreover, they are characterized by geographic proximity (Esping-Andersen, 1990). Welfare regimes are also dynamic in their nature, as a welfare system in a certain country could develop over time, and a country could also move from one regime to another (Kautto et al., 2001: 5).

It is important to emphasize that welfare regimes should be understood as ideal types in a Weberian sense. This implies that no country would have all the characteristics of one model (Kautto et al., 2001: 5). Rather, an ideal type represents a pure theoretical standard of which the empirical cases could be compared against (Weber, 1949: 90). Ideal types can be helpful constructs for empirical comparisons, as they provide researchers an opportunity to study the degree of proximity or conformity of countries to the model (Weber, 1949: 90). As ideal types, the welfare regimes are more or less in accordance with the description of each national state. The welfare policy in one country includes elements of different regime types (Arts & Gelissen, 2002: 139).

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[21] A typology can be defined as a systematic classification of objects (e.g. persons, countries or events) into types that share certain characteristics (Ringdal, 2007: 225).

[22] Welfare regimes and welfare state regimes are used interchangeably in the literature. For simplicity, I have used the term welfare regimes in the thesis.

An influential classification of welfare states has been provided by the Danish sociologist Gøsta Esping-Andersen in his work *The Three Worlds of Welfare Capitalism* (1990). Here, welfare states are divided into groups based on three principles: *de-commodification* (the extent to which an individual's welfare is reliant upon the market), *social stratification* (the role of welfare states in maintaining or breaking down social stratification), and the *private–public mix* (the relative roles of the state, the family and the market in welfare provision) (Eikemo et al., 2008a; Eikemo & Bambra, 2008). A fourth principle, *defamilization*, was later added to the analysis (Esping-Andersen, 1999). The aim was to account for the fact that the family often represent the women's most important source of welfare, especially in Southern Europe (Esping-Andersen, 1999: 62-63). This principle classifies welfare regimes based on whether family members can maintain an acceptable standard of living, independently of the family, either through paid work or social transfers (Lister, 2003: 172; Esping-Andersen, 1999: 51). Based on these principles, Esping-Andersen divides the welfare states into three different welfare regimes: Liberal, Conservative and Social Democratic (Table 2.1). In short, the regimes are distinguished from each other by the primary mechanism that are used to distribute goods and resources in society, respectively the market (Liberal regime), the family (Conservative regime) and the state (Social Democratic regime).

Table 2.1: Countries of different welfare regimes.

Liberal	**Conservative**	**Social Democratic**
Australia	Finland	Austria
Canada	France	Belgium
Ireland	Germany	Denmark
New Zealand	Italy	Netherlands
United Kingdom	Japan	Norway
United States	Switzerland	Sweden

Source: Esping-Andersen (1990: 52); Bambra (2007a).

In the aftermath of Esping-Andersen's (1990) classification, there has been an extensive academic debate concerning welfare regimes as a theoretical and empirical concept (for an overview, see Arts & Gelissen, 2002; Bambra, 2007a). As a result, modified or alternative typologies have been proposed by others (see for example Ferrera, 1996; Bonoli, 1997; Navarro et al., 2003; Bambra, 2004, 2005b, 2007a). These typologies have often focused on the characteristics of welfare states that have not been comprehensively examined by Esping-Andersen or have included additional countries. The welfare regimes of Esping-Andersen have also been tested empirically (e.g. Bambra, 2006, 2007b). Even though there are some inconsistencies in the findings, the main critique is that Esping-Andersen's typology does not fully capture the wide spectre of countries and diversity between the different regimes (Bambra, 2006, 2007b).

A categorization which has publicly been accepted as a new standard typology of welfare regimes remains to be seen (Eikemo, Huisman, Bambra, & Kunst, 2008b). Ferrera's (1996) four-fold typology has been described as one of the most empirically accurate when it comes to similarity within regimes and variation between regimes (Bambra, 2007b). Ferrera distinguishes between the Scandinavian[23] (Social Democratic), Anglo-Saxon (Liberal), Bismarckian (Conservative) and Southern countries. There are clear similarities between Ferrera's and Esping-Andersen's typologies. However, while Esping-Andersen tends to emphasize the quantity of the welfare provided ('how much' issue), Ferrera's classification focuses more on how the welfare is delivered (qualitative aspect) (Bonoli, 1997; Bambra, 2007b). Furthermore, the countries of Eastern Europe have increasingly begun to be analysed as a separate welfare regime (Fenger, 2007; Cerami & Vanhuysse, 2009).

In addition to the European countries, Israel is included in the European Social Survey. While Israel is difficult to classify as a welfare regime, some studies using ESS data have included the country together with the Southern European countries (Huijts, Stornes, Eikemo, & Bambra, 2017; Vonneilich, Lüdecke, & von dem Knesebeck, 2020). However, some scholars have argued that Israel could be grouped as a Liberal/Anglo-Saxon regime due to its limited social insurance (Zambon et al., 2006; Hochman & Skopek, 2013; von dem Knesebeck, Vonneilich, & Kim, 2016).

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[23] The choice between using 'Scandinavian' or 'Nordic' countries appears to be blurred in the literature. In this thesis, I have preferred to use the term Nordic. The use of Scandinavia may be arbitrary because it mainly refers only to Denmark, Norway and Sweden, whereas there is no such ambiguity with the Nordic countries. The Nordic countries are Denmark, Norway, Sweden, Finland and Iceland (Kautto et al., 1999: 18). However, Iceland is not included in this study. In the following text, the Nordic countries will therefore refer to Denmark, Finland, Norway and Sweden.

I have therefore chosen the latter categorization. In the analysis, I will use a typology of five different welfare regimes (Table 2.2).[24]

Table 2.2: Categorization of European countries in welfare regimes.

Social Democratic / Nordic	Conservative / Bismarckian	Liberal / Anglo-Saxon	Southern European	Eastern European
Denmark	Austria			Czech Republic
Finland	Belgium			Estonia
Norway	France	Ireland	Portugal	Hungary
Sweden	Germany	United Kingdom	Spain	Lithuania
	Netherlands	Israel		Poland
	Switzerland			Slovenia

In the thesis, I will empirically test whether we find systematic patterns of educational inequalities in health care utilization between welfare regimes.

2.6.8 Health care systems

The classification of health care systems has emerged as one suggestion in the aftermaths of the welfare regime criticism. The major task of health care systems is to provide health care services for those in need (Wendt, Frisina, & Rothgang, 2009: 73). The health care systems are institutionalized and depend on the raising of money. This establishes relationships between providers of health care services, the beneficiaries and the financing institutions which needs to be regulated (Böhm, Schmid, Götze, Landwehr, & Rothgang, 2013: 260). Several strategies to measure health care systems have been proposed. Wendt (2009) has reviewed several typologies of health care systems that have been suggested since the 1970s. According to Wendt (2009), health care expenditure, financing, service provision and access regulation should be considered when constructing health care system typologies. Based on a cluster analysis of eight indicators (Table 2.3) in 15 European countries, Wendt finds three types of health care systems (Table 2.4).

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[24] For the sake of simplicity, in the following text I will mainly refer to Nordic (Social Democratic), Bismarckian (Conservative) and Anglo-Saxon (Liberal) regimes instead of the synonym terms in parenthesis.

Table 2.3: Indicators for comparative analysis of health care systems.

					Institutional indicators		
	Health care expenditure	Health care financing		Health care service provision	Health care access regulation		
Dimension	Total Health Expenditure (THE)	Public-private mix of health financing	Privatization of risk	Health care provision	Entitlement to health care	Remuneration of doctors	Patients' access to service providers
Indicator	THE per capita in US$ (PPP)[1]	Public health expenditure in % of THE	Private out-of-pocket funding in % of THE	Indices of health care providers	Entitlement based on citizenship, social insurance contributions, or direct out-of-pocket payments	Remuneration of GPs based on fee-for-service, cost per case, per capita (the number of patients on his or her list), or a salary	Access-Regulation Index
Description	Average level of money a society invests in the health of its citizens.	Indicator of the degree of public responsibility to guarantee access to health care.	Share of funding that is directly covered by the individual. Barrier to entry, especially for low-income groups.	Indicators for the level of health care providers. 'Inpatient care index' includes specialists and nurses, while 'outpatient care index' includes GPs and pharmacists.	The indicator describes the main mode of entitlement. Possible bases of entitlement are citizenship, social insurance contributions, private insurance contributions or proven need. In European health care systems, patients are generally covered either based on citizenship or social insurance contributions.	The method of remuneration indicates the degree of doctors' autonomy from state control and presumably whether doctors have an incentive to provide high-volume health care or might reduce the workload.	Indicates whether patients have free access to GPs and whether access to specialists requires a referral, additional co-payment, or is free.

Note: [1] Purchasing power parities (PPP/general deflator). For international comparisons, PPP shows 'the ratio of the prices in national currencies of the same good or service in different countries' (Schreyer & Koechlin, 2002: 2).

Sources: Wendt (2009); Mossialos and Dixon (2002); Moran (1999); Rice and Smith (2002).

Table 2.4: Types of health care systems (2009 findings).

Health service provision-oriented type	Universal coverage – controlled access type	Low budged – restricted access type
Austria	Denmark	
Belgium	Great Britain	Portugal
France	Sweden	Spain
Germany	Italy	Finland
Luxembourg	Ireland	

Source: Wendt (2009).

First, the *health service provision-oriented* type (which includes Austria, Belgium, France, Germany and Luxembourg) has a high level of health care service provision, most notably in outpatient health care. Out-of-pocket payments are comparatively low, and patients have free access and choice of GPs. In general, doctors are paid fee-for-service, and equity of access is considered to be of the highest importance. Second, in the *universal coverage – controlled access* type (including Denmark, Great Britain, Sweden, Italy and Ireland), access to health care is strongly regulated by the state. Hence, there is restricted access to health professionals, and low outpatient care. However, equal access to health care is strongly emphasized by maintaining very low levels of private out-of-pocket payments. Third, countries in the *low budget – restricted access* type (i.e. Portugal, Spain and Finland) have low levels of health expenditure and high private out-of-pocket payments. Combined with low inpatient care provision, this implies that equality of access to health care is lowest in this health care system type. Unlike patients, doctors are under more state control than in the other health care system types since they receive fixed salaries.

In a recent study, Reibling, Ariaans and Wendt (2019) proposed updated indicators to characterize a health care system. The indicators were resources, public-private-mix, primary care orientation, prevention, access regulation and quality. Reibling and colleagues (2019) further operationalized 13 indicators to compose these categories: health expenditure per capita, number of GPs per population (resources), public share of health expenditure, out-of-pocket payments, remuneration of specialists (public-private-mix), expenditure on outpatient-care, GP-to-specialist ratio (primary care orientation), tobacco consumption, alcohol consumption (prevention), access regulation, choice restrictions, cost sharing (access regulation) and quality sum index (quality). Cluster analysis of these indicators on 29 OECD countries resulted in five clusters (Table 2.5), with some countries being full or partial members of these.

When more countries and indicators were included in the analysis, some clusters changed compared to the 2009 findings, while others remain similar. The health service-oriented system (Type 1) remains the same (including Austria, Belgium, France, Germany and Luxembourg), now also characterized by comparatively high consumption of tobacco and alcohol, and high scores on the quality index. Two country clusters share many features from the 2009 universal coverage-restricted access type: Finland, Norway Portugal and Sweden (Type 2), and Denmark, Italy, Netherlands and United Kingdom (Type 3). The low budget-restricted access type is dispersed: Finland is classified with Nordic neighbours Norway and Sweden in a cluster similar to the universal coverage-restricted access type from 2009. Spain could not be grouped as a full member in one distinct group but is reckoned a partial member in Type 3 and Type 4. Switzerland is in a cluster along with the United States (Type 5). The five clusters are described in more detail below (countries included in Paper V in bold):

Type 1 – *Supply- and choice-oriented public systems* (Australia, **Austria**, **Belgium**, **Czech Republic**, **France**, Germany, Iceland, Ireland, Luxembourg and **Slovenia**) are primarily public funded social insurance systems. They are characterized by medium to high levels of financial resources and high level of human resources. Access regulation is only by cost sharing and citizens have free choice of doctors. Despite generous supply, performance scores are low with regards to both prevention and health care quality. They are also characterized by comparatively high consumption of tobacco and alcohol.

Type 2 – *Performance- and primary-care-oriented public systems* (**Finland**, Japan, New Zealand, **Norway**, Portugal, South Korea and **Sweden**) are public funded systems. The state has a strong role in regulating access to health care and in the payment of medical specialists. Primary care has high priority, with a comparatively high level of primary care doctors compared with specialists. The system is characterized by high performance in prevention (particularly regarding smoking) and high scores on the quality index.

Type 3 – *Regulation-oriented public systems* (Canada, **Denmark**, **Italy**, Netherlands, **Spain** and **United Kingdom**) are primarily public funded health care systems. Countries in this system have a medium level of resources and low levels of out-of-pocket payments. This system has the highest level of access regulation and limits choice to providers. Moreover, Type 3 has a lower priority of primary care, as well as a lower performance in both prevention and quality of care than Type 2.

The Baltic and Central/Eastern European countries (**Estonia**, **Hungary**, **Poland** and Slovakia) are all clustered together in Type 4 (*Low-supply and low performance mixed systems*). These countries are mostly public funded health care systems with low levels of financial and human resources (i.e. both in terms of health expenditure and doctors), high levels of out-of-pocket payments and strong access regulation. This type also has the lowest level of primary care orientation, as well as low performance on prevention and quality of care.

Type 5 – *Supply- and performance-oriented private systems* (**Switzerland** and United States) are health care systems with a strong role of private financing and out-of-pocket payments. Public resources are in the majority, with high supply coming from high health care expenditure. Access to health care is regulated by cost sharing regulations, such as deductibles.[25] This type has a medium performance on prevention and high performance on quality of care.

Table 2.5: Types of health care systems (2019 findings).

Type 1: Supply- and choice-oriented public systems	Type 2: Performance- and primary-care-oriented systems	Type 3: Regulation-oriented public systems	Type 4: Low-supply and low performance mixed systems	Type 5: Supply- and performance-oriented private systems
Australia Austria Belgium Czech Republic France Germany Iceland Ireland Luxembourg Slovenia	Finland Japan New Zealand Norway Portugal South Korea Sweden	Canada Denmark Italy Netherlands Spain United Kingdom	Estonia Hungary Poland Slovakia	Switzerland United States

Source: Reibling et al. (2019).

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[25] Deductibles and co-payments are types of out-of-pocket payments. A deductible is a fixed amount that individuals pay before their health insurance starts to pay. Deductibles are usually paid once a year. A co-payment is a fixed amount that individuals pay each time they get a particular type of health care service. After the deductible is paid, they usually pay only a co-payment for covered services (Davis, 2020).

Although health care systems are a component of both welfare regimes and political systems, there is no full overlap between the country classifications of welfare regime types, political system types and the health care system types as constructed by Wendt (2009). This underlines the relevance of focusing on more detailed dimensions of welfare states. However, it is also important to focus on more detailed dimensions of health. It can be argued that amenable mortality is a more objective and concrete health outcome that is more precisely linked to health care systems. This is because amenable mortality refers to premature deaths which are treatable through medical intervention, and which should not occur in the presence of timely and effective health care (Gay, Paris, Devaux, & de Looper, 2011; Nolte & McKee, 2003, 2008).

In a study of 19 OECD countries, all countries except the United States have witnessed that amenable mortality has improved more rapidly during the last few decades than other forms of mortality (Nolte & McKee, 2008). However, there are strong variations among European countries in the pace with which this decline occurred, as well as in the current level of amenable mortality (Gay et al., 2011; Nolte & McKee, 2008). The concept of amenable mortality was originally developed to measure the quality of medical care (Rutstein et al., 1976). We therefore expect variations in amenable mortality between types of health care systems.

2.6.9 Summary of objectives

The first objective is to examine the magnitude and variation of socioeconomic inequalities in access to health care in terms of a) unmet needs, b) GP and specialist visits, c) informal care, and d) alternative health care across European countries. These will be addressed by Papers I – IV in turn. The second objective looks at the findings in all these articles combined in a coherent way, by examining whether the magnitude of educational inequalities in health care utilization varies systematically between welfare regimes. The third and fourth objectives address the main limitations of my second objective, by defining more ‘sensitive’ determinants and outcome measures. Welfare regimes are replaced by health care systems (which is a more sensitive regime typology in relation to health care as a determinant) and health care utilization is replaced by mortality amenable to health care (which may be interpreted as a more precise measure of health care). I will first examine the magnitude and variation of educational differences in mortality amenable to health care among European countries (third objective), and then how this variation can be understood by differences in European health care systems (fourth objective). These two objectives are addressed in Paper V. The final objective further strengthens the coherence of the thesis by combining survey data from the ESS (Papers I – IV) with register data from the DEMETRIQ project (Paper V). It addresses whether educational inequalities in mortality amenable health care (based on Paper V) can be understood according to patterns of health care utilization (based on results from Papers I – IV). In other words, do countries with larger inequalities in health care utilization also have larger inequalities in amenable mortality? If correlations between these levels of inequalities are observed, it may suggest that inequalities in the access to health care could translate into inequalities in morbidity and mortality.

3 Data and Methods

This chapter provides an overview of the data and methods used in this thesis. The study is two types of data sources: the seventh round of the European Social Survey (ESS) (Papers I – IV) and the project 'Developing Methodologies to Reduce Inequalities in the Determinants of Health' (DEMETRIQ) (Paper V). All statistical analyses in Papers I – IV were conducted using Stata 14.1. Section 3.1 and 3.2 will give a presentation of the respective data sources. The subsequent sections will present the variables (3.3-3.6) and methods (3.7) used in the analyses.

3.1 European Social Survey (ESS)

The first data source is the seventh round of the European Social Survey (ESS), which was developed as part of this PhD project. ESS is a cross-sectional social survey that has been conducted biannually across Europe since 2001. The ESS is designed to chart and explain the interactions between Europe's changing institutions and the attitudes, beliefs and behaviour patterns of its diverse populations (Eikemo et al., 2017; Fitzgerald & Jowell, 2011). The survey consists of a core module with questions (around 100 items in all) repeated in every round and two rotating modules, each including up to 30 items. Each rotating module covers a single academic and/or policy concern within Europe. The Questionnaire Design Team (QDT) developed a rotating module for the purpose of this dissertation. The rotating module is entitled 'Social inequalities in health and their determinants' (which will be referred to as the 'health module' for the sake of simplicity) and was fielded in 2014 and 2015 (European Social Survey, 2014a). While the core module includes the socio-demographic variables used in this study, the health module includes questions on health care use and health status.

The rationale behind the health module was to improve the understanding of how and why social inequalities in health persist (Eikemo et al., 2016). It was argued that more nuanced health outcomes and a broader set of health determinants needed to be examined. To improve explanations, there was also a need to have a more complete set of questions about the social determinants of health and how they may vary spatially – across and within – the countries of Europe (Eikemo et al., 2017). While previous health surveys often included a variety of health outcomes and determinants, they did not have sufficient data on the social stratification systems of societies, including rich data on living conditions. Moreover, there was no sociological survey with sufficient data on a variety of behavioural/lifestyle factors and health outcomes (such as specific chronic conditions). Against this background, the QDT developed the health module to be integrated into the ESS (Eikemo et al., 2016), which already has and still will contribute to the understanding of social inequalities in health in Europe (Eikemo et al., 2017).

The data collection rests on random probability sampling, based on face-to-face interviews with individuals aged 15 and above living in private households. Response rates ranged from 31% in Germany to 68% in the Czech Republic and were overall similar to previous rounds of the ESS (Eikemo et al., 2017). The health module included 21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom (Table 3.1). Data on Latvia was not yet released when this study was conducted.

The health module includes a broad range of morbidity indicators, including several self-reported physical health problems. Furthermore, it includes a large variety of social determinants of health related to factors like behavioural and psychosocial factors, access to health care and employment conditions.

Table 3.1: Overview of countries that are included in Papers I, II, III and IV.

Paper Country	Paper I	Paper II	Paper III	Paper IV
Austria	*	*	*	*
Belgium	*	*	*	*
Czech Republic	*	*	*	*
Denmark	*	*	*	*
Estonia		*	*	*
Finland	*	*	*	*
France	*	*	*	*
Germany	*	*	*	*
Hungary	*	*	*	*
Ireland	*	*	*	*
Israel	*	*		*
Lithuania	*	*	*	*
Netherlands	*	*	*	*
Norway	*	*	*	*
Poland	*	*	*	*
Portugal	*	*	*	*
Slovenia	*	*	*	*
Spain	*	*	*	*
Sweden	*	*	*	*
Switzerland	*	*	*	*
United Kingdom	*	*	*	*
Total N	**28 879**	**29 637**	**28 406**	**33 371**

Source: European Social Survey, Round 7 (2014).

To identify specific health outcomes and determinants to include in the health module, the QDT relied on the social health model (Dahlgren & Whitehead, 1991) and reviews on the social determinants of health, such as the WHO Commission on Social Determinants of Health (World Health Organization, 2008). The QDT assigned priority to potential important health determinants identified in national reviews, such as housing conditions, use of alternative health care and informal care, which had not been included in previous cross-national surveys. In addition, priority was given to concepts that could be measured using a limited list of items, given the module limit of 30 items. Finally, the QDT piloted questions that were not part of the core module to assess their prevalence, social distribution and association with health (Eikemo et al., 2017). Determinants that demonstrated the strongest associations and without other measurement problems were then included. For further descriptions of the background, the questionnaire design, testing and validation of our health module, see Appendix.

3.2 Developing Methodologies to Reduce Inequalities in the Determinants of Health (DEMETRIQ)

The second types of data stems from the project ‘Developing Methodologies to Reduce Inequalities in the Determinants of Health’ (DEMETRIQ). DEMETRIQ had three objectives, in which the first aimed ‘to develop, evaluate and refine methodologies for assessing the effects of social economic and health policies on the pattern and magnitude of health inequalities among socioeconomic groups’. The second objective was ‘to assess the differential health effects by socioeconomic group of “natural policy experiments” in the fields of unemployment and poverty reduction; tobacco and alcohol control; and access to education and preventive health care’. The third objective was to synthesize the evidence from the findings of the first and second objectives and ‘to actively engage users in the research to promote effective exchange of knowledge for policy and practice’ (Mackenbach & Whitehead, 2015: 7; DEMETRIQ, 2018; CORDIS, 2015). The DEMETRIQ project was developed because of the need to strengthen the evidence related to different policies, in order to identify the most effective ways to reduce health inequalities in different European countries. Therefore, the data source seized the opportunities offered by ‘natural policy experiments’.

The DEMETRIQ project collected, harmonized and analysed data on trends in health inequalities from several countries (17 countries for mortality, 21 countries for self-reported health issues) over a period between two and four decades. These data present an overview of general trends in health inequalities. The data distinguish between mortality by cause of death and self-reported morbidity and risk factors (Mackenbach & Whitehead, 2015). Because of existing data sharing agreements, all analyses were conducted by Erasmus Medical Centre Rotterdam, which coordinated the project. In Paper V, we used mortality data for 21 European populations. The datasets included four Nordic countries (Denmark, Finland, Norway and Sweden), seven Western European populations (Austria, Belgium, England & Wales, Scotland, France and Switzerland), four Southern European populations (Barcelona, Basque Country and Madrid (Spain) and Turin (Italy)), four Central/Eastern European countries (Czech Republic, Hungary, Poland and Slovenia) and two

Baltic countries (Estonia and Lithuania) (Table 3.2). The data covered the entire national, regional (Madrid, the Basque Country) or urban (Barcelona and Turin) populations.

Table 3.2: Overview of countries and regions that are included in Paper V.

Nordic	Western European	Southern European	Central/Eastern European	Baltic
Denmark Finland Norway Sweden	Austria Belgium England & Wales Scotland France Switzerland	Italy (Turin) Spain (Barcelona) Spain (Basque Country) Spain (Madrid)	Czech Republic Hungary Poland Slovenia	Estonia Lithuania

3.3 Health care utilization variables

3.3.1 Unmet need

In Paper I, unmet need was operationalized through four binary variables, which were subjected to separate analyses. *Overall unmet need* was assessed by the question: ‘In the last 12 months, were you ever unable to get a medical consultation or the treatment you needed for any of the reasons listed on this card?’ Respondents answering yes were characterized as having overall unmet need. Respondents were coded as having unmet need due to *availability* if they indicated any of the following reasons for unmet need: waiting list too long, no appointments available, or the treatment needed was not available nearby. Respondents were coded as having unmet need due to *accessibility* if they indicated they could not pay for services. Respondents were coded as having unmet need due to *acceptability* if they indicated that they were unable to get a medical consultation because they could not take time off work, or had other commitments (Chen & Hou, 2002; Sibley & Glazier, 2009). The operationalization differs somewhat between previous studies, as we did not have specific data on transportation (accessibility) and health knowledge and attitudes (acceptability). In Paper IV, we distinguished between respondents who reported unmet need and those who reported no unmet need.

3.3.2 Visits to GP and (medical) specialists

Visits to GP or (medical) specialists (Papers I, II and IV) were based on the question: 'In the last 12 months, with which of the health professionals on this card have you discussed your health?' GP or medical specialist use was dummy coded as binary variables in separate analyses.

3.3.3 Provision of informal care

Informal caregiving (Paper III) was defined as a positive answer to the question whether one spends any time looking after or giving help to family members, friends, neighbours or others because of long-term physical ill health or disability, long-term mental ill health or disability, or problems related to old age. In addition, intensive caregivers were identified as those who reported to spend 11 hours a week or more on this.

3.3.4 Use of alternative health care

Use of alternative health care (Papers I, IV) was based on the question: 'In the last 12 months, which of the treatments on this card have you used for your own health?' Possible responses were acupuncture, acupressure, Chinese medicine, chiropratics, osteopathy, homeopathy, herbal treatment, hypnotherapy, massage therapy, physiotherapy, reflexology and spiritual healing. In Paper I, we distinguished between those who reported no alternative treatments and those who reported one or more alternative treatments. In Paper IV, the following seven treatments were analysed: acupuncture, acupressure, chiropractics, osteopathy, homeopathy, herbal treatment and reflexology (Table 3.3).

Table 3.3: Overview of alternative treatments included in Paper IV.

Acupuncture and acupressure
Acupuncture and acupressure represent a family of procedures that involve the stimulation of anatomic points, a component of the major Asian medical traditions (Briggs, 2015). Acupuncture is the stimulation of special points on the body, usually by the insertion of fine needles. Acupressure involves firm manual pressure (using finger, hand, elbow, foot, and/or acupressure band) on selected acupuncture points (Zollman & Vickers, 2008a; Lee & Frazier, 2011).

Chiropractics
Chiropractic care involves the adjustment of the spine and joints to alleviate pain and improve general health. The treatment is primarily used to treat back problems, musculoskeletal complaints and headaches (Briggs, 2015).

Osteopathy
Osteopathy is a form of manual therapy that emphasizes physical manipulation of the muscles and bones to relieve pain, restore function and promote optimal function of the tissues of the body (Franke, Franke, & Fryer, 2014; Synovitz & Larson, 2020: 652; Briggs, 2015). Osteopathic physicians use a range of manual techniques collectively referred to as osteopathic manipulative treatment (OMT), such as soft tissue stretching, spinal manipulation and exercise prescription. The treatment is characterized by a holistic approach to the patient, and OMT may be applied to many regions and tissues of the body, sometimes remote from the symptomatic area and the clinical judgement of the practitioner (Franke et al., 2014; Posadzski & Ernst, 2011).

Homeopathy
Homeopathy is a therapeutic method that uses preparations whose effects when administered to healthy individuals correspond to the manifestations of the disorder (symptoms, clinical signs, pathological states) in sick individuals (Ernst, 2002). Homeopathy is based on two main principles. According to the first principle that 'likes cure like', substances that are capable of provoking certain symptoms in an otherwise healthy body can also act curative on similar symptoms in a sick person (Lockie, 2006: 18). For example, the homeopathic remedy *Allium cepa* is made of onion. In a healthy person, contact with raw onion typically causes watery eyes, stinging and irritation around the eyes and nose, as well as a nasal discharge. This remedy may be prescribed to patients with hay fever, especially if both nose and eyes are affected (Zollman & Vickers, 2008c). According to the second principle, the remedies are prepared by a process of serial dilution and succussion (vigorous shaking). The more times this process of dilution and succussion is performed, the greater the 'potency' of the remedy (Zollman & Vickers, 2008c).

Herbal treatment
Herbal medicine, or plant-based therapies, is the use of medicinal plants for prevention and treatment of diseases (Firenzuoli & Gori, 2007). The aim of herbal treatment is usually to produce persisting improvements in well-being (Zollman & Vickers, 2008b). Despite certain similarities, there are three important differences between herbal medicine and conventional pharmacotherapy (i.e. therapy using pharmaceutical drugs). First, herbal medicine uses whole plants, generally as unpurified plant extracts containing several different components. Second, several different herbs are often used together (polypharmacy). Third, diagnostic principles are based on treating 'underlying causes' of disease. Practitioners may prescribe herbs aimed at correcting patterns of dysfunction rather than targeting the presenting symptoms. However, many practitioners prescribe remedies symptomatically as well, such as giving a remedy to aid sleep in a patient with chronic pain (Vickers, Zollman, & Lee, 2001).

Reflexology
Reflexology (also known as 'zone therapy') is defined as a holistic healing technique that aims to treat the individual as an entity, including the body, mind and spirit (Dougans, 2016: Chapter 1). Reflexology is based on the principle that reflex areas in the soles of the feet and the palms of the hands are connected to all parts of the body, including the internal organs. By applying specific pressure strategies on the foot or hand, it may be possible to affect the whole body (Gunnarsdottir, 2010, 2018).

The responses were grouped into two categories of CAM use (physical and consumable), in addition to one overall measure, combining the two categories. The physical group refers to treatments that involve physically manipulating the client's outer body. Here, we included acupuncture, acupressure, chiropractics, osteopathy and reflexology. In the consumable group, the partaker ingests something to promote health or well-being. This group included homeopathy and herbal treatment. Respondents could mark having used more than one treatment. The three categories of CAM use are illustrated in the Venn diagram (Figure 3.3).

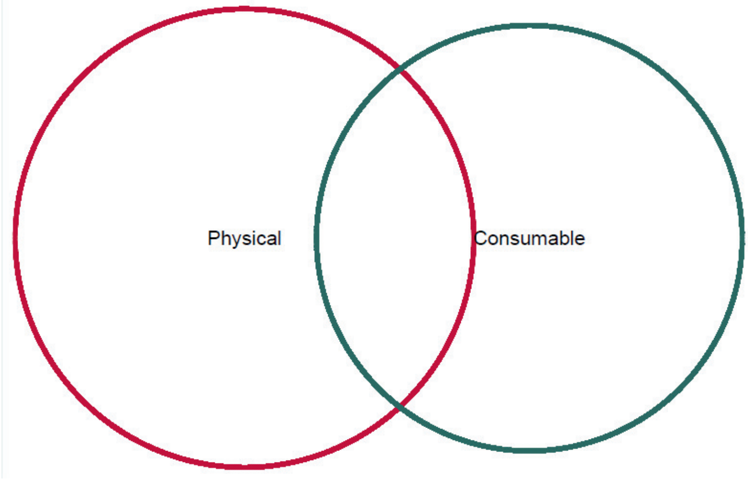

Figure 3.3: Venn diagram of the three categories of CAM.

3.4 Mortality amenable to health care

Paper V compared educational inequalities in mortality amenable to health care in Europe. Causes of death classified as amenable to health care were coded according to the International Classification of Diseases (ICD)-10 (Stirbu et al., 2010; AMIEHS, 2011) (Table 3.4). This included some infectious diseases (e.g. pneumonia/influenza); some types of cancer; some conditions that require acute, often operative care (e.g. appendicitis and peptic ulcer); some cardiorespiratory conditions (e.g. hypertension, asthma, heart disease and cerebrovascular disease), and some other conditions.

Table 3.4: Causes of death amenable to health care according with ICD10 codes.

Cause of death	ICD10 codes
HIV/ AIDS	B20-B24
Tuberculosis	A15–A19, B90
Other infectious and parasitic diseases	A00-B99
Cancer of colon-rectum	C18–C21
Cancer of cervix uteri	C53
Cancer of testis	C62
Hodgkins lymphoma	C81
Leukemia	C91-C95
Rheumatic heart disease	I00–I09
Hypertension	I10–I15
Other heart disease	I30-I52
Cerebrovascular disease	I60–I69
Pneumonia/ influenza	J10–J18
Asthma	J45–J46
Appendicitis, hernia, cholecystitis and lithiasis	K11.5, K35-K38, K40-K46, K80, K81, N20
Peptic ulcer	K27
Prostate hyperplasia	N40
Maternal deaths, conditions originating in the perinatal period	O00-O99
Congenital heart disease	Q20-Q28

Table reproduced from Rydland et al. (2020).

Sources: Stirbu et al. (2010), AMIEHS (2011).

3.5 Independent individual-level variables

3.5.1 Health status

Self-reported health

In Papers I – IV, health outcomes were measured by using different indicators of health outcomes from the ESS. Self-reported health was constructed based on the question: 'How good is your health in general?' Possible responses were 'very good', 'good', 'fair', 'bad' and 'very bad'. In Paper I, this variable was dichotomized into 'good' health ('very good', 'good' and 'fair') versus 'poor' health ('bad' and 'very bad'). The variable was dichotomized into 'good' health ('very good' and 'good') versus 'poor'/ 'less than good' health ('fair', 'bad' and 'very bad') in Papers II and IV. In Paper III, we used the original five-point scale with higher values reflecting better health.

Ideally, it would be good for the comparability if self-reported health had been coded in the same way in the respective papers. However, sensitivity analyses conducted by Eikemo and colleagues (2008a) showed that the main pattern between welfare regimes did not change when 'fair' was defined as 'good' health.

In social medicine, it has become common practice to dichotomize health status, and thus 'fair health' is often defined as 'poor health' (Eikemo et al., 2008a: 2289). It may be difficult to determine whether the distance between the response categories is equal. This could be a reason for using a dichotomized health variable in the analysis. This practice also allows for an interpretation of effects in terms of the risk of poor health, and facilitates comparability with other measures of morbidity, as most of these are measured as the presence or absence of certain types of illness or complaints (Huijts, 2011: 26).

Depressive symptoms

In Papers I and III, depressive symptoms were measured by using an eight-item version the Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977). This was a sum score of eight items asking how often respondents had felt or behaved the following in the past week: felt depressed, felt everything was an effort, had restless sleep, were happy, felt lonely, enjoyed life, felt sad and could not get going. Response categories ranged from 'none of the time', 'some of the time', 'most of the time' to 'all of the time'. In Paper I, anyone scoring over 10 on the 24-point scale was coded as having depressive symptoms. The CES-D 8 scale has been shown to be a reliable and valid indicator across gender and countries in Europe (Van de Velde, Bracke, Levecque, & Meuleman, 2010).

Non-communicable diseases

ESS collected data on 14 self-reported non-communicable diseases (NCDs): heart/circulatory problems, high blood pressure, back pain, arm/hand pain, foot/leg pain, allergies, breathing problems, stomach/digestion problems, skin conditions, diabetes, severe headaches, cancer, obesity and depression. Data were collected on the first 11 of these conditions by providing respondents with a list of conditions and asking them to indicate which they had experienced in the last 12 months. The presence of NCDs was operationalized as a summary measure, indicating whether respondents had none, one or two or more NCDs (Paper I).

Longstanding health problem

For longstanding health problem, people were asked if they were asked if they were hampered in daily activities in any way by any longstanding illness or disability, infirmity or mental health problem. Possible responses were 'yes, a lot', 'yes, to some extent' and 'no'. In Paper IV, respondents were grouped into two categories: those who had a longstanding health problem and those who did not.

3.5.2 Gender and age

Demographic background variables included gender and age. Gender was dummy coded, with female assigned the value 1 (Papers I – IV). In Paper V, analyses were conducted separately for women and men.

Age was measured in various age groups. Paper V included respondents aged 35 to 79 years. In line with previous studies using earlier ESS rounds, Papers I – IV included respondents aged 25 to 75 years. Respondents below the age of 25 have often not yet completed their education. Therefore, the inclusion of these respondents would affect the adjustment for socioeconomic background. Meanwhile, it could be argued that respondents over the age of 75 represent a very selective group of relatively healthy individuals (Huijts, Monden, & Kraaykamp, 2010). The inclusion of all age groups would therefore yield selectivity problems.

3.5.3 Education, financial strain and occupational status

In the ESS, respondents' highest level of education was measured with country-specific variables. These variables were already harmonized in the original data by the ESS team into seven categories according to the International Standard Classification of Education (ISCED) (UNESCO, 1997). From the seven categories, we coded an education variable with three categories: lower secondary or less education (ISCED I and II; 'low' education), upper secondary or advanced vocational training (ISCED IIIa, IIIb and IV; 'middle' education) and tertiary education (ISCED V1 and V2; 'high' education).

The operationalization of financial strain was based on the question: 'Which of the descriptions on this card comes closest to how you feel about your household's income nowadays?' Those who answered either 'Finding it difficult on present income' or 'Finding it very difficult on present income' were coded as experiencing financial strain. Those who answered 'Living comfortably on present income' or 'Coping on present income' were coded as having no financial strain (Papers I and II). In Paper IV, we grouped respondents into three categories: those finding it difficult or very difficult to manage on present income, those coping on present income and those living comfortably on present income.

Occupational status was measured by asking respondents to describe their main activity in the last seven days. Possible answers were paid work, unemployed, permanently sick or disabled, doing housework, currently under education and doing community or military service. In Paper I, those who were currently under education and doing community or military service were excluded from the analysis. In Paper IV, we excluded the respondents who were currently under education, doing community or military service, were unemployed and reported 'other'. In Paper III, occupational status was measured in seven categories: full-time job (35 hours a week or more), part-time job (less than 35 hours a week), housework (including looking after children or other persons), unemployed, retired, disabled (including permanently sick) and under education. Those in community or military service were excluded from the analysis.

In Paper II, occupation was operationalized according to the European Socioeconomic Classification (EseC) scheme (Rose & Harrison, 2007; Harrison & Rose, 2006; Leiulfsrud et al., 2010). The ESeC classification classifies people according to their positions within labour markets and production units, with particular focus on their employment relations. We used the scheme's established three class model to categorize respondents: higher occupational class (professionals, managers), intermediate class (clerical, skilled workers, self-employed with no or a small number of employees) and working class (service, sales workers and unskilled workers combined).

3.5.4 Social networks

Social networks are a composite measure based on two separate questions (Paper II). The first measure relates to the frequency of social meetings (labelled 'social network'). The second measure concerns the number of close confidants and the quality of social meetings (labelled 'social support'). For the frequency of social meetings, the question asked was how often respondents met socially with friends, relatives or colleagues. The response categories 'once a week', 'several times a week' and 'every day' were coded as high frequency of social meetings, while the values 'never', 'less than once a month', 'once a month' and 'several times a month' were coded as low frequency of social meetings. For the measurement of social support, respondents were asked how many people they could discuss intimate and personal matters with. Those who reported more than three confidants were contrasted with those who had less.

Based on these measures of social network and social support, we distinguished between three levels of social networks. Respondents having a high frequency of social meetings and reporting over three close confidants were categorized as having a highly supportive social network. Those who either met less frequently or had fewer than three close confidants were categorized as having a moderately supportive social network. Finally, respondents who reported a low frequency of social meetings and had fewer than three close confidants were classified as having a low-support social network.

3.5.5 Place of residence and immigrant status

In Paper I, the classification of rural and urban areas was based on the question: 'Which phrase on this card best describes the area where you live?' The response categories 'a country village' and 'a farm or home in the countryside' were defined as rural, while 'a big city', 'the suburbs or outskirts of a big city' and 'a town or a small city' were defined as urban. For the measurement of immigrant status (Paper I), those reporting not being born in their country of residence were characterized as immigrants. These group were compared to anyone born in their country of residence.

3.5.6 Relationship status and the presence of children in household

Relationship status (Paper III) was measured by distinguishing five groups. First, two groups of people with a partner were distinguished: (1) married people, and (2) people who are cohabiting with a partner (without being married). Then, three groups of unmarried people without a partner were distinguished: (3) divorced or separated, (4) widowed, and (5) single, never married persons. The presence of children in household (Paper III) was based on the question: 'Have you ever had any children of your own, step-children, adopted children, foster children or a partner's children living in your household?' Possible answers were 'yes' and 'no'. We coded this as a binary variable with children or no children in household.

3.5.7 Religiosity

Religiosity (Paper III) was measured by asking respondents whether they considered themselves as belonging to[26] a particular religion or denomination.[27] Possible answers were 'yes' and 'no'. We coded this as a binary variable.

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[26] The expression 'belonging to' refers to identification and not official membership (European Social Survey, 2014b).

[27] The term denomination is commonly defined as a branch of the Christian Church (Hornby, 2005: 407), or a large mainstream religious organization which does not claim to be official or state sponsored (Griffiths et al., 2017: 339). In the ESS, these country-specific religions or denominations on the follow-up question were given: Roman Catholic, Protestant, Eastern Orthodox, other Christian denomination, Jewish, Islamic, Eastern religions and other non-Christian religions (European Social Survey, 2014b).

3.5.8 Opinion of health care services

For measuring the opinion of health care services (Paper IV), respondents were asked what they thought about the overall state of health services in their country. The responses were distributed on a scale from 0 (extremely bad) to 10 (extremely good). Respondents who ranked their satisfaction 4 or lower were categorized as having an overall low opinion of health services. Those responding with the values of 5 or higher were classified as having an overall average or high opinion of health care services.

3.6 Independent country-level variables

3.6.1 Total health expenditure per capita

Total health expenditure per capita (Paper IV) was measured in US dollar per head of the population (World Bank, 2014a). Total health expenditure indicates the amount of money a society invests on average in the health of its citizens. This covers the expenditure for activities directly related to health care, as well as administering the health care system (Wendt, 2009). Total health expenditure per capita provide information on the financial capacity of the health care system to provide the population with access to necessary health care (Wendt, 2014).

3.6.2 Out-of-pocket payments

Out-of-pocket payments (Papers I, IV) was measured as a percentage of total health expenditure for the most recent year (World Bank, 2014b; World Health Organization, 2016). The share of patients' co-payments indicates the privatization of risk and the financial burden placed on the individual patient in the case of sickness (Hacker, 2004; Wendt, 2014). Therefore, a higher share of out-of-pocket payments represents a barrier to entry the health care system, especially for low-income groups.

3.6.3 Physician density

Physician density (Papers I, IV) was measured per 1000 of the population for the most recent year (Central Intelligence Agency, 2014; World Bank, 2014c). This indicator was included as a measure of the overall availability of the health care system.

3.6.4 Gatekeeping

An *access regulation index* is an institutional indicator for analysing patients' access to health care provision. This indicator captures whether patients have a free choice of doctors or whether they have to sign onto a GP's list for a longer period of time (which is labelled 'gatekeeping') (Reibling & Wendt, 2011; Rico, Saltman, & Boerma, 2003). A variable for gatekeeping (Paper IV) was constructed based on data from the OECD (Reibling & Wendt, 2012). A policy brief for the European Commission (Masseria, Irwin, Thomson, Gemmill, & Mossialos, 2009) provided supplementary data for the missing values of OECD's report.

3.7 Methods

3.7.1 Multilevel logistic regression

In Papers I, III and IV, we used multilevel logistic regression to account for the hierarchical structure of the data. The principle that data are ordered hierarchically means that some units of analysis can be considered as a subset of other units (Kreft & de Leeuw, 1998: 1; Steenbergen & Jones, 2002: 219). In our analyses, the individual respondents (level 1 units) are a subset of countries (level 2 units). We calculated odds ratios (OR) of reporting different types of health care utilization for countries nested within Europe. This was a pooled dataset of 21 countries. Furthermore, a multilevel model allows the possibility of examining whether variables at the country-level of analysis influences different types of health care utilization, in addition to variables at the individual level.

The purpose of multilevel analysis is to account for variance in a dependent variable measured at the lowest level of analysis by considering information from all levels of analysis (Steenbergen & Jones, 2002: 219). This means that observations at the lowest level are affected by the higher levels. Therefore, the observations are not truly independent. Rather, they are clustered, and to some extent, duplications of each other (Kreft & de Leeuw, 1998: 9; Steenbergen & Jones, 2002: 220). Observations that are close in in space and time will be more similar compared to observations that are more distant in space and time. Therefore, respondents from the same country would be more similar than respondents from other countries, inter alia due to a shared history, culture and experiences. Shared contexts cause dependency among observations (Kreft & de Leeuw, 1998: 9).

In Papers I and IV, we included out-of-pocket payments and physician density as country-level variables. In addition, Paper IV included country-level variables for total health expenditure per capita and gatekeeping (for a description of the country-level variables, see section 3.6).

In Paper I, analyses were first carried out on the overall unmet need variable and then on the specific reasons for unmet need (i.e. availability, accessibility and acceptability). We used a step-by-step approach, first estimating the null model. Second, the explanatory indicators at the individual level were added stepwise: demographic factors (gender and age), economic factors (education, financial strain, occupational status, place of residence and immigrant status), health care use and health status indicators. Finally, the country-level indicators were included in the analysis.

In Paper III, the analyses were built up in three parts. First, we calculated the prevalence rates of informal caregiving and intensive informal caregiving in each of the 20 countries included. Second, we estimated the effects of eight determinants (gender, age, relationship status, educational level, employment status, self-reported health, religiosity, mental health) on the odds of being an (intensive) informal caregiver. Moreover, we conducted separate analyses for men and women and tested gender differences in a full interaction model. Third, we performed linear multilevel regression on mental well-being in the context of (intensive) informal caregiving, controlling for demographic and socioeconomic variables. We stratified the analyses by gender and tested differences in a full interaction model.

In Paper IV, we first examined overall CAM use. Second, the different treatments were dichotomized into physical and consumable subgroups. We used intraclass correlation (ICC) to determine the explained variance of group-level variables, presented as a percentage of explained between-country variance in the models where country-level variables were included.[28]

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[28] The formula is $(1-(ICC_m/ICC_b))*100$, where ICC_m indicates the ICC of the model where a country-level variable has been included, and ICC_b, the ICC of the baseline comparison model without the group-level variable.

3.7.2 Predicted probabilities

In Paper II, we used logistic regression analyses to estimate the predicted probabilities per country of visiting a GP or specialist. We examined the independent effect of four social indicators (educational level, occupational status, level of financial strain and size and frequency of social networks) after mutual adjustment. This approach made it possible to disentangle to what extent each SEP marker constituted a pathway on its own right to inequalities in health care utilization, without being dependent on unfavourable socioeconomic conditions driven by other SEP indicators. Results were reported by adjusted risk ratios (ARRs), which were calculated from predicted probabilities, adjusted for need (self-reported health), age and gender.

The results show the ARRs of GP and specialist utilization for the following contrast groups: (1) a high versus low educated group, (2) a high vs. a working-class occupational group, (3) a high scoring vs. a low scoring social networks group, and (4) the financially strained vs. the financially comfortable. To test the robustness of the results, we performed additional analyses for three contrast groups: (1) a high vs. middle educated group, (2) a high vs. middle class occupational group, and (3) a high scoring vs. a middle scoring social networks group.[29] The ARRs of these latter contrast groups were comparatively similar to the ARRs of the high–low contrast groups.

3.7.3 Statistics on mortality amenable to health care

Paper V used data on mortality amenable to health care (amenable mortality) for 21 European populations, covering time periods between 1998 and 2006, depending on country (see S1 Table in Paper V). All analyses were conducted separately for men and women aged 35 to 79 years (age interval depending on country) and age-standardized in accordance with the European Standard Population (Ahmad et al., 2001).

Individuals with unknown educational attainment were omitted from the analyses. The magnitude of relative educational inequalities in amenable mortality across countries and health care systems in Europe was calculated by relative indices of inequality (RII). RII was estimated by means of Poisson regression. RII is a regression-based measure that accounts for the distribution of the

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[29] See Appendices in Paper II: Figure A1 in Appendix 1, Tables A1 and A2 in Appendices 2 and 3.

population by educational groups using rank of educational attainment as a dependent variable (Mackenbach & Kunst, 1997). The educational rank was calculated over all three educational groups (low, middle and high) in accordance with the ISCED education categories defined in section 3.5.3. The RII represents the risk of death at the lowest educational level as compared to the highest educational level in the population. Values larger than 1 indicate a disadvantage for the low educated, values smaller than 1 a disadvantage for the high educated. The magnitude of absolute educational inequalities was calculated by Slope Index of Inequality (SII), a regression-based measure that takes into consideration the entire distribution of education. The values of SII indicate differences in predicted values between low and high educated. Positive values indicate a disadvantage for the low educated, negative values a disadvantage for the high educated.

The health care system typology was based on a classification by Reibling and colleagues (2019). To test the applicability of the different typologies, meta-analyses and analysis of variance (ANOVA) was performed on RII and SII estimates. By using meta-analyses and ANOVA test, it was possible to examine if and how health care systems could explain between-country differences in inequalities and whether any health care systems had higher inequalities.

Meta-analyses are common in systematic reviews and aim to synthesize data from multiple studies (Neyeloff, Fuchs, & Moreira, 2012). In Paper V, we employed meta-analysis techniques to calculate pooled estimates for each health care system type. Each country estimate was weighed with its inversed variance to calculate effect summary with standard errors and confidence intervals. Since the inequality rates were estimated from different populations, we calculated random effects models when heterogeneity was not too low. When performing ANOVA analyses, we used F-tests to compare the RII and SII means of the health care systems, and to determine whether between-group variance was larger than within-group variance. Meta- and ANOVA analyses utilize tests of statistical significance. However, with a small sample size at the country-level, estimates are uncertain and should be interpreted with caution (Sterne, Cox, & Smith, 2001). Therefore, we avoided using these analyses as tests of whether differences between health care system types were significant or non-significant.

4 Summary of papers and synthesis of results

4.1 Summary of Paper I

The article ‘Subjective perceptions of unmet need for health care in Europe among social groups: Findings from the European social survey (2014) special module on the social determinants of health’ is co-authored with Per Stornes, Liubov V. Borisova, Courtney L. McNamara and Terje A. Eikemo. This study examines what factors are associated with unmet need, as well as how reasons for unmet need are distributed across socioeconomic and demographic groups in Europe.

This study was based on data from the seventh round of the European Social Survey. The analysis sample included respondents aged between 25 and 75 years in 20 countries. We used multilevel logistic regression. Self-reported unmet need measured whether respondents had been unable to get medical consultation or treatment in the last 12 months. Reasons for unmet need were grouped into three categories: availability, accessibility and acceptability. Health status was measured by self-reported health, non-communicable diseases and depressive symptoms.

The results show that two-thirds of all unmet need were due to waiting lists and appointment availability. Women and young age groups reported more unmet need. We found no educational inequalities, while financial strain was found to be an important factor for all types of unmet need in Europe. All types of health care use and poor health were associated with unmet need. Low physician density and high out-of-pocket payments were found to be associated with unmet need due to availability.

We conclude that even though health care coverage is universal in many European welfare states, financial strain appeared as a major determinant for European citizens’ access to health care. This may suggest that higher income groups are more able to bypass waiting lists compared to lower income groups. European welfare states should, therefore, intensify their efforts in reducing barriers for receiving care.

4.2 Summary of Paper II

The article ‘Exploring the differences in general practitioner and health care specialist utilization according to education, occupation, income and social networks across Europe: findings from the European social survey (2014) special module on the social determinants’ is co-authored with Mirza Balaj, Per Stornes, Adam Todd, Courtney L. McNamara and Terje A. Eikemo. Despite extensive literature in this area, previous studies have mainly studied GP and specialist use by income (e.g. van Doorslaer et al., 2006) or education (e.g. Stirbu et al., 2011). In this article, we use the theory of fundamental causes as a guiding principle to identify four social markers that may be linked to GP and specialist utilization (educational level, occupational status, level of financial strain and size and frequency of social networks). Fundamental cause theory stresses that higher SEP ‘embodies an array of resources, such as money, knowledge, prestige, power, and beneficial social connections, that protect health no matter what mechanisms are relevant at any given time’ (Phelan et al., 2004: 265). The use of health care is an important mechanism by which people can protect and promote their health.

This study was based on data from the seventh round of the European Social Survey. The analysis sample included respondents aged between 25 and 75 years in 20 European countries and Israel. Health care utilization was measured according to self-reported use of GP or specialist care within 12 months. We employed logistic regression models to estimate the predicted probabilities per country of visiting a GP or a specialist. Analyses tested four social markers: income (financial strain), occupational status, education and social networks.

We observed a cross-national tendency that lower SEP groups were less likely to use specialist services, even in countries where they had higher or equal probability of GP utilization. Moreover, in countries where higher SEP groups used more GP services, there were comparable levels of inequalities in specialist care utilization. This was the case for three social markers (education, occupational class and social networks), while the pattern was less pronounced for income (financial strain).

To conclude, there are significant inequalities associated with GP and specialist health care use across Europe – with higher SEP groups more likely to use health care specialists, compared with lower SEP groups. In the context of health care specialist use, education and occupation appear to be particularly important factors.

4.3 Summary of Paper III

The article 'Informal care in Europe: findings from the European Social Survey (2014) special module on the social determinants of health' is co-authored with Ellen Verbakel (first author), Stian Tamlagsrønning, Lizzy Winstone and Terje A. Eikemo. Against the background of a rising demand for informal care in Europe, this study sets out to provide descriptive information by gender on (1) prevalence rates of (intensive) informal caregiving, (2) characteristics of (intensive) informal caregivers, and (3) consequences of (intensive) informal caregiving in terms of mental well-being.

This study was based on data from the seventh round of the European Social Survey. The analysis sample included respondents aged between 25 and 75 in 20 countries. We used multilevel logistic regression techniques. Informal caregiving was defined as a positive answer to the question whether one spends any time looking after or giving help to family members, friends, neighbours or others because of long-term physical ill health or disability, long-term mental ill health or disability, or problems related to old age. In addition, we identified intensive caregivers as those who reported to spend 11 hours a week or more on this. The selection of determinants was mainly based on the Informal Care Model. We included indicators for people's attitudes (do I want to) and perceived barriers (can I) towards providing informal care. In addition, we included demographic determinants that are often associated with caregiving.

On average, 34.3% of the population in 20 European countries were informal caregivers and 7.6% were intensive caregivers (meaning that they were providing care for minimum 11 hours a week). Countries with high numbers of caregivers had low numbers of intensive caregivers. Caregiving was most prevalent among women, those aged between 50 and 59 years old, non-employed – especially those doing housework – and religious persons. Determinants of providing care hardly differed by gender. Caregivers, especially female and intensive caregivers, reported lower mental well-being than non-caregivers.

In conclusion, our results suggest support for both crowding-in and crowding-out effects of the welfare state. Middle-aged women may become increasingly time squeezed as they are likely to be the first to respond to higher demands for informal care, while they are also the major target groups in employment policies aiming for increased labour market participation. Caregivers, and especially female and intensive caregivers, report lower levels of mental well-being. Supportive policies, such as respite care or training and counselling, may therefore be needed to sustain informal care as an important resource of our health care systems.

4.4 Summary of Paper IV

The paper 'The use of complementary and alternative medicine (CAM) in Europe' is co-authored with Erling R. Landet, Courtney L. McNamara and Terje A. Eikemo. The aim of this article is to examine the determinants of CAM use at the individual and country-level. Specifically, we examine the determinants of CAM use among individuals according to socioeconomic and demographic characteristics, health status, health care utilization and opinion of health care services. To our knowledge, studies thus far have not comprehensively examined why CAM use is more prevalent in some countries compared to others. This article does so by adding an institutional perspective.

This study was based on data from the seventh round of European Social Survey. We applied multilevel logistic regressions to analyse data on respondents aged 25 and above in 21 European countries (including Israel). We examined whether respondents had used any of the seven different treatments in the past 12 months: acupuncture, acupressure, chiropractics, osteopathy, homeopathy, herbal treatment and reflexology. The responses were grouped into two categories of CAM use (physical and consumable), in addition to one overall measure, combining the two categories. In this study, we included four country-level variables: total health expenditure per capita, out-of-pocket payments, physician density and gatekeeping.

At the individual level, CAM use was more common among women and those with higher education. Financial strain and employment status were found to be related to physical and overall CAM use, but not consumable CAM use. Doctor visits were the strongest predictor for all types of CAM use. While self-reported health did not show a significant relation to any CAM use, having a longstanding health problem was positively related to all types of CAM use. At the country-level, health expenditure per capita was positively related to overall and physical CAM use (explained between-country variance around 22% and 69% respectively).

In conclusion, resources appear to be common predictor for CAM use. At the individual level, resources may influence CAM use through an out-of-pocket payment for the wished treatment, making the less resourceful less equipped to seek it. At the country-level, greater resources may be related to how well CAM is integrated into conventional health care systems.

4.5 Summary of Paper V

The paper 'Educational inequalities in mortality amenable to healthcare. A comparison of European healthcare systems' is co-authored with Håvard T. Rydland (first author), Terje A. Eikemo, Tim Huijts, Clare Bambra, Claus Wendt, Ivana Kulhánová, Pekka Martikainen, Chris Dibben, Ramunė Kalėdienė, Carme Borrell, Mall Leinsalu, Matthias Bopp and Johan P. Mackenbach. These authors represent a group for the NORFACE HiNEWS project and the DEMETRIQ consortium, with additional members of the DEMETRIQ consortium contributing to the analysis.

Educational inequalities in health and mortality in European countries have often been studied in the context of welfare regimes or political systems. More recently, the need to consider the influence of national level factors has been acknowledged. We argue that the health care system is the national level feature of welfare states that is most directly linkable to health outcomes. Furthermore, we argue that mortality amenable to health care is a health outcome with a clearer and stronger connection to state or health care intervention than other measures of health and mortality. From this perspective, we aim to answer two main research questions: (1) To what extent does the strength of educational differences in mortality amenable to health care vary among European countries? (2) To what extent can these cross-national variations be explained by differences in European health care systems?

This study uses data on mortality amenable to health care for 21 European populations, covering men and women aged 35 to 79 years, and time periods spanning from 1998 to 2006. ISCED education categories are used to calculate relative (RII) and absolute inequalities (SII) between the highest and lowest educated. The health care system typology is based on a classification by Reibling and colleagues (2019). Meta-analysis and ANOVA tests are used to see if and how health care systems can explain between-country differences in inequalities and whether any health care system types have higher inequalities.

All countries and health care system types exhibited relative and absolute educational inequalities in mortality amenable to health care. The low-supply and low performance mixed health care system type had the highest inequality point estimate for the male and female population, while the regulation-oriented public health care systems had the overall lowest. Due to data limitations, results were not robust enough to make substantial claims about typology differences.

This article aims at discussing possible mechanisms connecting health care systems, social position and health. Results indicate that factors located within the health care system are relevant for health inequalities, as inequalities in mortality amenable to medical care are present in all health care systems. Future research should aim at examining the role of specific characteristics of health care systems in more detail.

4.6 Making a synthesis of the results from an institutional perspective

Papers I – IV, which examine socioeconomic inequalities in health care utilization, address objective one. Paper V, which examines educational inequalities in health care-sensitive mortality, address objectives three and four.

This thesis also provides a unique opportunity to see the combined value of the results of all articles from an institutional perspective. I have done this by asking two questions. All five papers have contributed to the synthesis, which helps me address these additional objectives. First, do countries that share similar institutional arrangements cluster in terms of the prevalence of health care utilization (second objective)?

To test this, I have made a scatter plot showing coordinates of the prevalences of health care utilization among lower educated on the x-axes and the rate ratio (prevalence among the low educated divided by the prevalence of the high educated) on the y-axes. According to Lundberg and colleagues (2008), these are very effective ways of showing how countries perform in terms of inequality. The purpose is to see if there are clusters of countries. The number 1 on the Y-axis indicates that there are no differences between high and low educated persons for a particular health care utilization. The results (Figures 4.1 – 4.3) do reveal some patterns by welfare regimes, some more apparent than others. For informal care, there is a similar use among educational groups. For the Nordic countries, the extent of use is also very similar. For alternative health care, the Nordic countries show a very similar pattern. I have presented an overview of overall prevalences in Table 4.1.

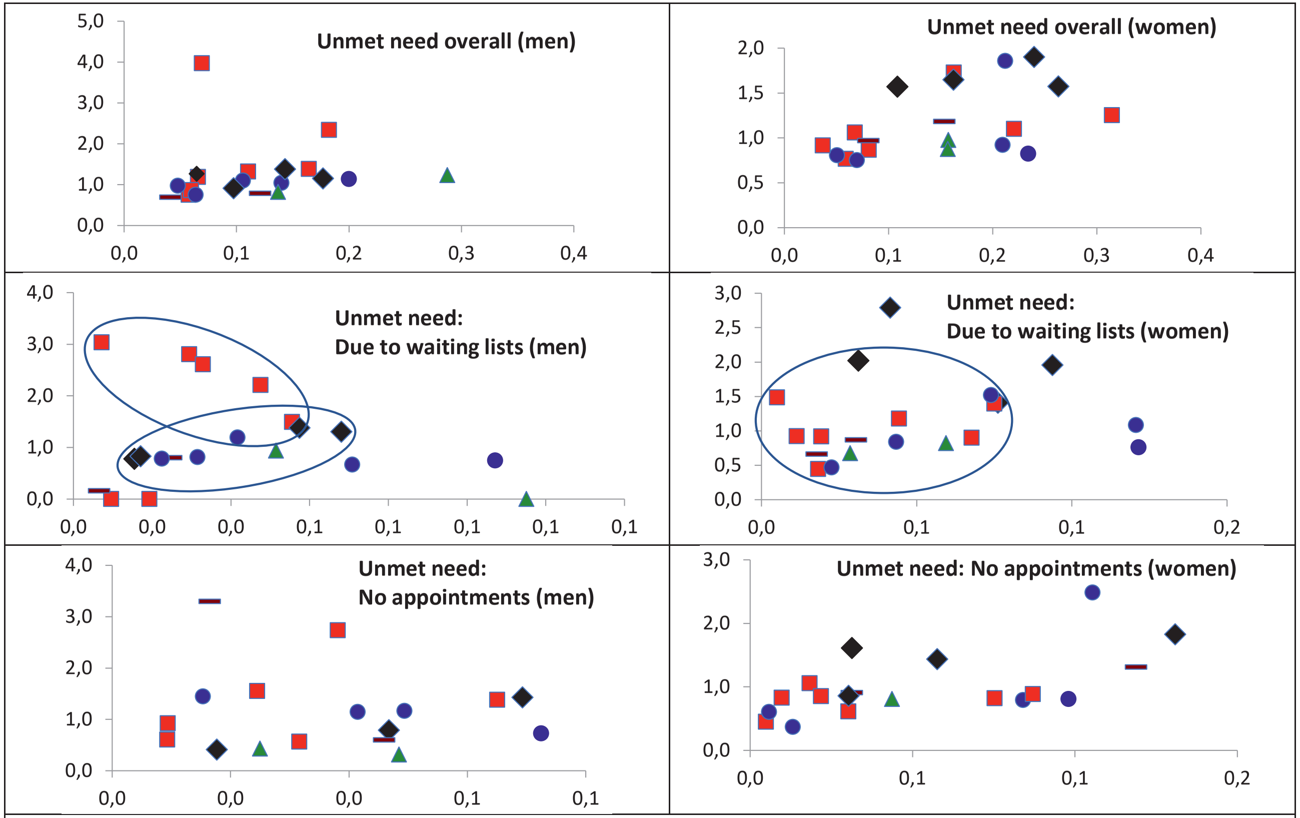

Figure 4.1: Box plots showing prevalence rates of unmet needs for health care among lower educated (x-axes) and rate ratios of unmet needs between low and high educated (y-axes) and in European countries clustered into five welfare regimes.

Notes: ◆ Nordic, 🟥 Bismarckian, ▬ Anglo-Saxon, ● Eastern European, ▲ Southern European.

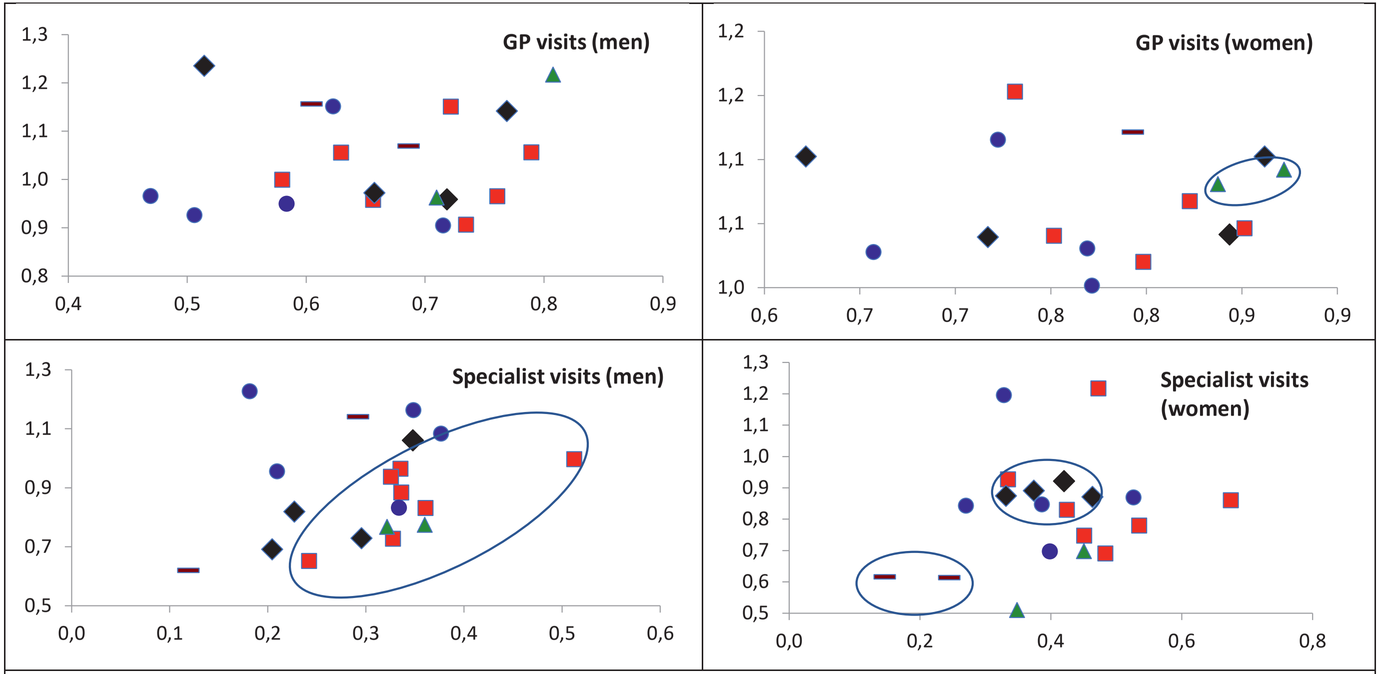

Figure 4.2: Box plots showing prevalence rates of GP and specialist visits for health care among lower educated (x-axes) and rate ratios of such visits between low and high educated (y-axes) in European countries clustered into five welfare regimes.

Notes: ◆ Nordic, 🟥 Bismarckian, ▬ Anglo-Saxon, ● Eastern European, ▲ Southern European.

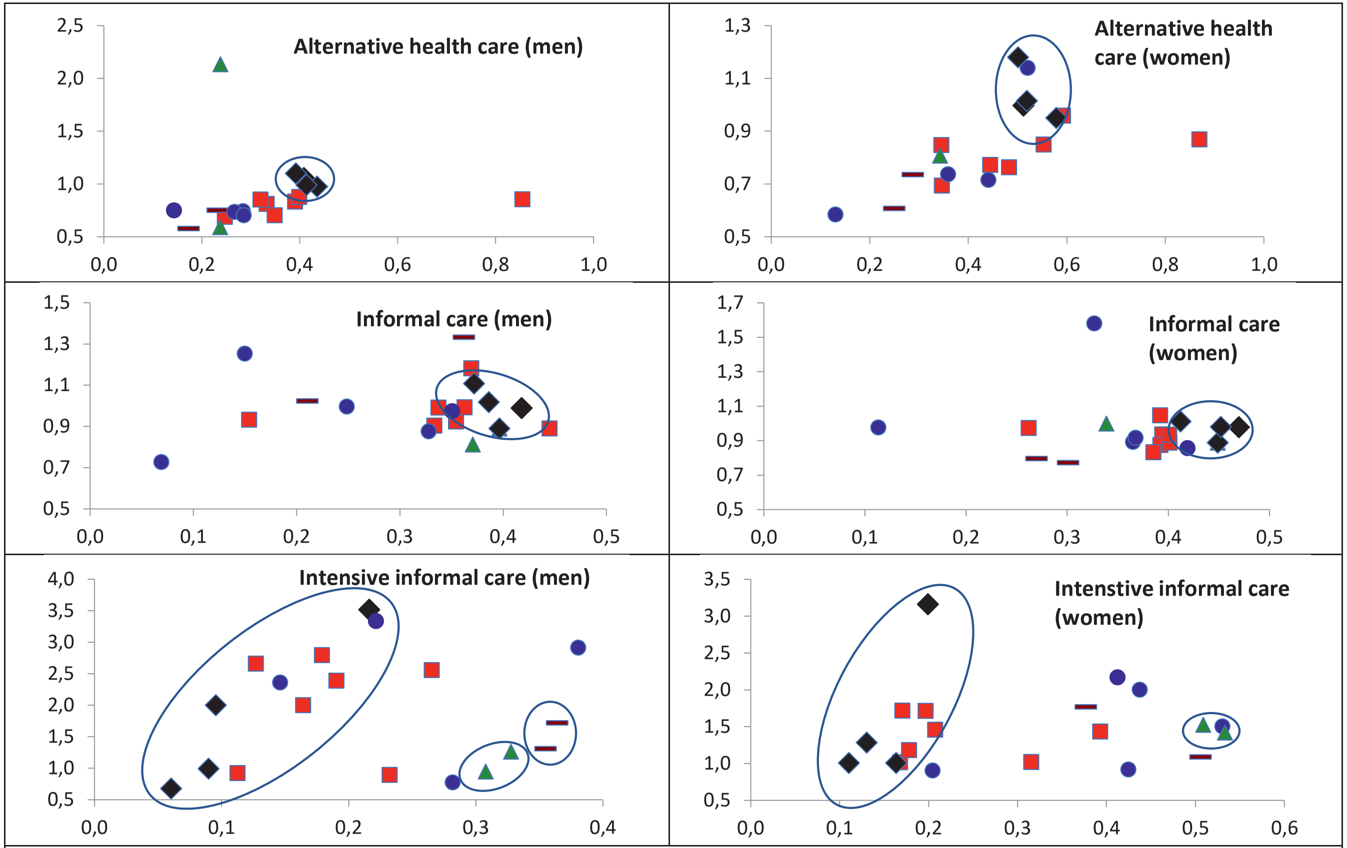

Figure 4.3: Box plots showing prevalence rates of informal care and alternative health care among lower educated (x-axes) and rate ratios of such care between low and high educated (y-axes) in European countries clustered into five welfare regimes.

Notes: ◆ Nordic, 🟥 Bismarckian, ▬ Anglo-Saxon, ● Eastern European, ▲ Southern European.

Table 4.1: Health care utilization by welfare regime.

		Unmet need overall	*Unmet need: Waiting list*	*Unmet need: No appoint. avail.*	*Visited GP*	*Visited specialist*	*Used alternative health care*	*Provide informal care*	*>10 hours of informal care/week*
Social Democratic/Nordic									
Denmark	M	5.8	2.0	2.2	75.9	35.6	35.3	40.0	16.2
	F	8.0	2.9	1.8	83.2	41.4	44.8	46.1	16.6
Finland	M	16.9	6.5	5.9	68.1	35.0	39.3	39.7	10.5
	F	22.0	7.5	9.7	71.5	44.6	51.8	45.5	12.6
Norway	M	11.3	4.6	4.1	75.0	24.8	33.7	34.9	8.2
	F	16.1	5.9	4.8	85.0	30.0	42.9	45.1	11.8
Sweden	M	8.2	1.6	2.0	51.6	27.6	36.2	39.5	7.1
	F	12.9	2.8	3.0	63.1	37.4	45.9	39.4	16.5
Conservative/Bismarckian									
Austria	M	4.1	1.8	2.3	72.4	41.5	35.4	18.1	22.0
	F	6.0	1.8	3.1	82.0	55.1	44.7	25.4	31.0
Belgium	M	9.0	2.3	2.0	77.4	38.3	30.0	36.3	15.7
	F	11.5	4.0	1.5	85.7	51.0	37.2	39.4	21.1
France	M	15.0	4.1	3.7	80.2	40.1	35.9	37.4	14.6
	F	21.7	5.2	5.8	85.9	51.1	46.9	39.8	20.4
Germany	M	13.4	4.3	4.6	80.1	55.3	38.9	32.1	15.2
	F	19.0	5.9	7.4	83.3	69.3	54.7	37.1	19.9
Switzerland	M	4.8	0.4	0.9	66.4	36.2	39.7	32.8	13.0
	F	8.1	1.3	1.8	74.9	45.7	56.7	41.8	16.9
Netherlands	M	3.8	1.1	0.5	65.2	39.3	34.1	31.9	20.8
	F	4.0	0.7	0.6	76.1	46.7	39.0	38.1	18.2

Continued

Table 4.1 (continued): Health care utilization by welfare regime.

		Unmet need overall	*Unmet need: Waiting list*	*Unmet need: No appoint. avail.*	*Visited GP*	*Visited specialist*	*Used alternative health care*	*Provide informal care*	*>10 hours of informal care/week*
Liberal/Anglo-Saxon									
Ireland	M	5.6	1.9	1.5	61.7	18.4	21.9	21.7	29.0
	F	7.8	3.4	2.2	74.2	20.0	29.7	30.1	41.3
United Kingdom	M	10.9	2.2	4.9	72.8	29.9	24.3	29.4	33.0
	F	14.9	3.2	10.3	78.9	33.9	32.1	31.0	30.1
Israel	M	15.9	10.8	7.5	76.3	55.1	22.3	35.5	19.2
	F	22.2	13.1	11.1	85.2	64.3	27.8	38.7	31.4
Eastern European									
Czech Republic	M	6.2	1.3	1.5	70.0	31.8	24.9	31.6	16.5
	F	6.3	2.2	1.1	76.5	39.0	33.4	37.1	37.7
Estonia	M	15.4	9.7	4.6	65.6	39.7	29.8	26.5	25.1
	F	19.9	10.7	8.3	77.6	57.0	46.3	35.8	39.1
Hungary	M	4.6	1.6	1.6	59.0	26.7	10.3	5.4	28.6
	F	6.7	3.2	2.2	69.6	33.3	14.6	9.9	38.4
Lithuania	M	11.3	5.2	5.1	52.4	21.1	29.0	16.7	27.8
	F	15.1	6.0	7.6	71.7	29.4	45.0	25.1	46.5
Poland	M	18.6	10.1	7.2	63.6	40.7	16.3	32.8	18.2
	F	25.8	10.3	12.0	77.2	48.4	19.7	38.5	37.6
Slovenia	M	7.9	4.5	0.2	75.0	37.3	27.9	30.0	18.0
	F	8.4	4.0	0.8	79.9	42.0	32.6	34.6	18.7

Continued

Table 4.1 (continued): Health care utilization by welfare regime.

		Unmet need overall	*Unmet need: Waiting list*	*Unmet need: No appoint. avail.*	*Visited GP*	*Visited specialist*	*Used alternative health care*	*Provide informal care*	*>10 hours of informal care/week*
Southern European									
Portugal	M	18.7	6.9	4.7	77.9	35.1	22.9	35.0	33.1
	F	18.6	3.2	7.1	83.4	38.2	19.8	33.1	43.3
Spain	M	11.7	4.1	3.0	74.5	42.2	22.3	23.3	29.4
	F	13.1	5.1	3.8	83.9	52.7	29.9	32.5	42.2

Notes: ESS post-stratification weights have been applied for country-level analysis. Both post-stratification and population weights have been applied for analysis pooling data across countries or where countries are grouped regionally to give all countries weight proportional to population size in pooled analysis. To make results comparable, we need to know what the results would look like if we assumed that age distributions were identical in all countries. To achieve this, we have applied the standard epidemiological technique of direct age standardisation, which involves weighting up or down the unstandardised (crude) prevalence rates for five-year age groups in each country to a common standard. We have weighted the age groups in accordance with the European Standard Population (ESP) of 2013 (Eurostat & European Commission, 2013). Respondents were considered to have serious depressive symptoms if they scored 10 or more out of the maximum of 24 points on the depression scale constructed from the eight items measuring mental well-being that are presented in section 3.5.1 (score categories on each of these eight items ranged from 0 to 3).

The next question, which addresses my fifth objective, asks if there is a pattern in which countries with smaller inequalities in health care utilization also have smaller inequalities in amenable mortality. There is an added value of testing this because health care plays a key role in the social distribution of health, illness and death. If there is a lack of access to good quality health care in lower socioeconomic groups, this could translate into larger educational inequalities in mortality. The evidence on this point, however, is inconclusive and in particular for high-income countries with publicly financed health care systems (Plug et al., 2012).

Another related factor that may contribute to health inequalities is the unequal *use* of health care services by socioeconomic groups. Such differences are widely reported (Adamson, Ben-Shlomo, Chaturvedi, & Donovan, 2003), and they also vary between welfare regimes (Frie et al., 2010). Moreover, people in a lower socioeconomic position are less likely to use preventive health services (Veugelers & Yip, 2003), but they tend to be more intensive users of general practitioners, mainly due to a higher disease prevalence (Lemstra, Mackenbach, Neudorf, & Nannapaneni, 2009). Higher socioeconomic groups, on the other hand, report significantly more specialist contacts, even when considering the generally poorer health of lower socioeconomic groups (Droomers & Westert, 2004; Mielck, Kiess, von dem Knesebeck, Stirbu, & Kunst, 2007).

A number of possible explanations for such disparities have been suggested, including the general material perspectives and systematic differences by socioeconomic position in the interpretation of symptoms and perception of the need for health care, in line with cultural-behavioural approaches (Adamson et al., 2003). Despite the evidence that lower socioeconomic groups are more frequent users of health care, adjusted for need, little empirical evidence exist on the contribution of health care factors to inequalities in mortality at the population level (Plug et al., 2012). A study by Stirbu et al. (2010) examined educational variations in mortality from conditions considered to be amenable to medical intervention, but they could not provide any certainty about whether these inequalities really reflect inequalities in access or quality of health care services. On the one hand, we could expect smaller educational inequalities in mortality amenable to health care in the universal coverage health care system type. This is mainly due to the strong emphasis on equal access to health care and because of the very low levels of private out-of-pocket payments. On the other hand, the empirical evidence on this point is less convincing. However, previous analyses have to our knowledge not yet analysed such educational differences by health care systems.

To test this, educational inequalities in mortality amenable to health care were associated with educational inequalities of health care utilization (unmet need, GP/specialist use, informal care and alternative health care). Figures 4.4 – 4.6 present significant results (other results not shown).[30] The graphs show both measures of Relative Index of Inequality (RII) and Slope Index of Inequality (SII) (Mackenbach & Kunst, 1997). For a definition and description of RII and SII, see pp. 74-75. Levels of RII and SII for health care utilization were calculated for three educational groups (low, middle and high), with separate estimates for men and women. The main finding shows a strong and significant correlation between educational inequalities in intensive informal care and the magnitude of educational inequalities in amenable mortality, which is consistent both among men and women. Even if we cannot draw causal conclusions based on this test, also because the survey data are more recent than the mortality data, it highlights further need of research into the health consequences of informal care as a social determinant of health.

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[30] Country abbreviations: AT (Austria), BE (Belgium), CH (Switzerland), CZ (Czech Republic), DE (Germany), DK (Denmark), EE (Estonia), ES (Spain), FI (Finland), FR (France), HU (Hungary), IE (Ireland), IL (Israel), LT (Lithuania), NL (Netherlands), NO (Norway), PO (Poland), PT (Portugal), SI (Slovenia), SE (Sweden), UK (United Kingdom).

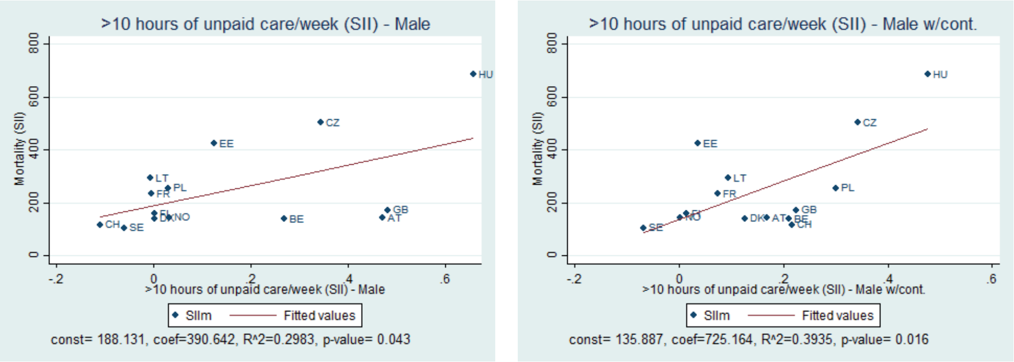

Figure 4.4: Associations between absolute estimates of educational inequality in amenable mortality and absolute educational inequalities in intensive informal care (men).

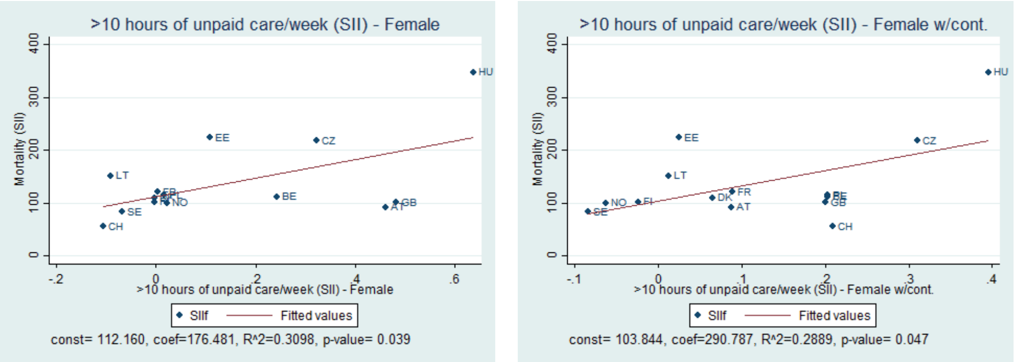

Figure 4.5: Associations between absolute estimates of educational inequality in amenable mortality and absolute educational inequalities in intensive informal care (women).

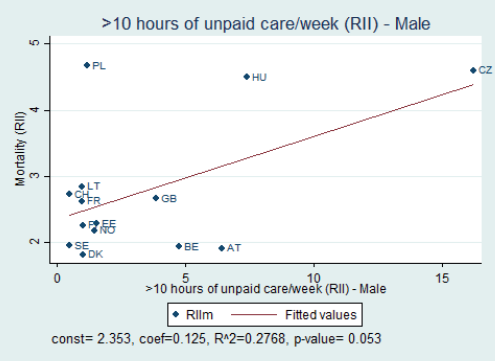

Figure 4.6: Associations between relative estimates of educational inequality in amenable mortality and relative educational inequalities in intensive informal care (men).

5 Discussion

The overarching aims of this study were to (1) identify barriers, both found at the individual level and at the institutional level, for health care use in European countries, and (2) identify the role of health care as a determinant of health and health inequalities between countries with different health care systems. The research questions presented in this thesis will help address these points. The discussion concerns socioeconomic inequalities in conventional and non-conventional health care, both at the individual and contextual level. I will discuss the main findings and contextualize them from an institutional perspective using welfare state theory. Inequalities between health care systems will also be discussed. Finally, I will highlight some methodological issues related to the data source and methods used in this thesis.

5.1 Conventional health care utilization

Unmet need for health care and the use of specialists were negatively related to socioeconomic position. Thus, the more resources people have available, the less they are able to see their needs met and the less are they accessing specialists. I found the opposite pattern for GP use. At the country-level, it was demonstrated that countries do cluster by welfare regime. However, the clustering was far more apparent for non-conventional health care use than for conventional health care use. This may imply that welfare regimes are more sensitive for determinants outside the conventional health care system. Moreover, I could not find an association between the magnitude of inequality in conventional health care (need and utilization) and mortality amenable to health care. I will now discuss these findings in more detail.

5.1.1 Individual level

In terms of comparing the findings of Paper I to previous literature, it should be pointed out that research on unmet need for health care has mainly been conducted in the United States (e.g. Diamant et al., 2004; Mollborn et al., 2005; Pagán & Pauly, 2006; Shi & Stevens, 2005) and Canada (e.g. Chen & Hou, 2002; Sibley & Glazier, 2009; Guend & Tesseron, 2009; Allin et al., 2010; Gibson et al., 2019). More limited research in Europe could be explained by the fact that health care coverage is universal in many European countries (Bambra, 2005a). Consequently, the barriers for receiving care, such as costs, are lower in Europe compared with the United States (Allin et al., 2010). In Europe, most studies have been limited to specific countries (e.g. Cavalieri, 2013; Pappa et al., 2013; Connolly & Wren, 2017; Yardim & Under, 2018). There are fewer studies that cover a large group of European countries, aiming to identify the main factors associated with unmet need (e.g. Allin & Masseria, 2009a, 2009b; Baert & De Norre, 2009; Detollenaere, Hanssens, Vyncke, De Maeseneer, & Willems, 2017; Reeves, McKee, Mackenbach, Whitehead, & Stuckler, 2017; Quintal, Lourenço, Ramos, & Antunes, 2019; Ramos, Quintal, Lourenço and Antunes, 2019).

Previous research on unmet need has produced somewhat mixed and inconclusive results. This has also depended on which countries have been examined. Studies have found that unmet need is reported among those with lower income (Chen & Hou, 2002; Koolman, 2007) and poor health status (Sibley & Glazier, 2009; Gibson et al., 2019). In addition, women (Allin & Masseria, 2009b), younger people (Marshall, 2011), unemployed (Åhs & Westerling, 2006) and individuals without insurance coverage (Reschovsky, Kemper, & Tu, 2000; Sibley & Glazier, 2009) tend to report higher rates of unmet need. Mixed results have been found for people with different education levels (Chen & Hou, 2002; Sibley & Glazier, 2009; Allin & Masseria, 2009b), place of residence (Aday & Andersen, 1981; Law et al., 2005; Allin et al., 2010) and immigrant status (Wu, Penning, & Schimmele, 2005; Kooman, 2007). In Paper I, we found that unmet need for health care is related to the lack of resources. In accordance with previous studies, unmet need was higher among certain groups in the population, such as women, younger people, those living in rural areas, those with financial strain, those with poor health status and those with greater use of health care services.

There was a persistent negative association between age and unmet need. The fact that the elderly are at lower risk of unmet need seems contra intuitive, but this has also been demonstrated in previous studies (Marshall, 2011; Allin et al., 2010; Chaupain-Guillot & Guillot, 2015; Röttger, Blümel, Köppen, & Busse, 2016; Bataineh, Devlin & Barham, 2019). Ramos and colleagues (2019) emphasize that the higher prevalence of health care needs is, in most countries, accompanied by a decrease in unmet need for those in need. This may be explained by better performance of most health care systems in dealing with the elderly population. Alternatively, it could be related to personal characteristics, namely that the older population have more time at disposal when seeking health care (Röttger et al., 2016). Some studies have also shown that younger people have higher expectation of health care services (Cohen, 1996). Furthermore, young people may be more likely to experience barriers stemming from a lack of knowledge about health care resources and have a different assessment of symptoms (Marshall, 2011). A different explanation is that age could weaken the memory of contacts with the health care system in the past 12 months (Raina, Torrance-Rynard, Wong, & Woodward, 2002), possibly underestimating unmet need among older people.

Financial strain seemed to be a more important determinant than education as a marker of socioeconomic position, as there was no significant association between education and overall need. While this was in accordance with the findings by Chen and Hou (2002), other studies demonstrated mixed findings on this relationship. In Europe, lower education was slightly associated with unmet need (Allin & Masseria, 2009b). In contrast, higher education was associated with unmet need in Canada (Sibley & Glazier, 2009). In our study, the descriptive results also demonstrated very small differences in unmet need among educational groups. Our interpretation is that inequality in unmet need does not manifest itself in terms of education at the pooled European level. However, this may not be the case for all the individual countries included in the analysis.

Financial strain had a substantial influence on all types of unmet need. This is a valuable finding, also because in Europe, few studies have examined the association between income and different types of unmet need. Two European studies found a relationship between income related to accessibility (Allin & Masseria, 2009b) and availability (Hernández-Quevedo, Masseria, & Mossialos, 2010) respectively. In comparison, no associations between income and availability were found in Canada (Chen & Hou, 2002; Sibley & Glazier, 2009), which also has universal health care.

Based on these findings, financial strain may be associated with unmet need in Europe beyond not being able to pay for health care directly. In addition, accessibility includes indirect costs related other dimensions of access (Israel, 2016). Risk factors linked to availability and acceptability are therefore interrelated with accessibility. These risk factors are amplified when households at the same time experience financial restrictions (Israel, 2016; Levesque, Harris, & Russell, 2013). Transportation costs, travel time and waiting time are clearly regarded as opportunity costs by patients. They also reduce patients' satisfaction with the affordability of health care (Penchansky & Thomas, 1981). People with more financial resources may be more able to bypass waiting lists compared to lower income groups. Moreover, those with financial strain could be less able to take time off work. Groups with low income have been found to be more exposed to fear of loss of income, and a higher degree of job insecurity (Sverke, Hellgren, & Näswall, 2006), which could in turn have consequences for their health care seeking behaviour. Therefore, accessibility should not only be conceptualized as the ability to pay for treatment. It should also imply that individuals are able to receive timely health care according to need without the risk of impoverishment (Israel, 2016; Kutzin, 2000).

There are also complementary explanations for the associations between financial strain and unmet need. There may be individuals who can afford to buy health care, but systematically choose to spend most of their budgets on other goods and services. Therefore, it can be difficult to distinguish between what is affordable and what is not. In principle, affordability refers to the income situation of individuals. At the same time, personal decisions on whether heath care is affordable also reflect subjective preferences (Schokkaert, Steel, & Van de Voorde, 2017; Bundorf & Pauly, 2006). In addition, there may be individuals who could afford health care, but for some reason choose not to. Future analyses could benefit from distinguishing further between different types of reasons for unmet need. As an example, the reason 'wanted to wait and see if problem got better on its own' (EU-SILC data) appeared to be more frequent in some countries compared to others (Baert & De Norre, 2009).[31] However, in the ESS questionnaire this reason was not included in the list of alternatives. Although it could be incorporated into the alternative response category 'other', further differentiation of reasons could provide more nuances in the research on unmet need for health care. This would nevertheless be subject to the availability of data.

In Paper II, we used the fundamental cause theory as a guiding principle to identify four social markers that may be linked to GP and specialist utilization (educational level, occupational status, level of financial strain and size and frequency of social networks). The main finding was a tendency that lower SEP groups were less likely to use specialist services, even in countries where they had higher or equal probability of GP utilization. Moreover, in countries where higher SEP groups used more GP services, there were comparable levels of inequalities in specialist care utilization. This was the case for three social markers (education, occupational class and social networks), while the pattern was less pronounced for income (financial strain).

Therefore, the study found that people from higher SEP groups are more frequent users of secondary care, even for the same level of need as lower status groups. We hypothesise that this is because they have more flexible resources available that can help them obtain such care to a

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[31] EU-SILC: European Union Statistics on Income and Living Conditions.

larger extent compared with lower SEP groups. The fact that inequalities in health care use may be stemming from the availability of resources could explain why we find larger socioeconomic inequalities in mortality for amenable causes of death in Europe, as compared to less preventable causes (Mackenbach et al., 2015; Phelan et al., 2004).

Inequalities in specialist use were larger compared with GP use, which is in line with the findings that those with higher SEP use more specialist care (for a systematic review of GP and specialist utilization, see Lueckmann et al., 2021). In our study, we found that lack of resources (in terms of education and occupation) was associated with lack of specialist use. One explanation for this finding is that people encounter barriers in access to specialist care. For example, access barriers to specialists may be related to geographic accessibility and the rurality of low SEP groups (Ulubaşoğlu & Cardak, 2007). Waiting times and travel distance represent opportunity costs for patients (Penchansky & Thomas, 1981), and may be more important in visiting specialists, because they are often distributed regionally more widely compared to GPs (Ulubaşoğlu & Cardak, 2007).

In addition, studies have suggested that different information, preferences and choices among patients are relevant explanations with respect to who they wish to consult in the health care system (Lueckmann et al., 2021; Stirbu et al., 2011). A GP could be perceived as more trustworthy, familiar and capable of discussing a disease with a patient. Therefore, people with lower education may feel less challenges regarding communication problems (e.g. language, terminology, information gap) with their long-time GPs, and may prefer to visit them instead of specialists (Verlinde, De Laender, De Maesschalck, Deveugele, & Willems, 2012; Terraneo, 2015). On the other hand, people with high SEP may be more interested in visiting a specialist because they wish to consult with someone who possesses special knowledge within a specific field of competence. Such preferences may be associated with knowledge about the health care system, which could be related to resources like education.

Based on their review, Lueckmann and colleagues (2021) were not able to conclude whether socioeconomic inequalities in specialist care utilization could be explained by need, access barriers to specialists, different information, or different preferences and patient choices. Nevertheless, these factors provide complementary explanations why these inequalities exist.

In Paper II, our study did not demonstrate conclusive findings with respect to social networks and health care utilization. Previous studies have found that social network and social support are associated with the decision to utilize health care services, reflecting initial contact with the health care system (Deri, 2005; Kouzis & Eaton, 1998). However, we did not find strong evidence for this in Paper II. A possible reason could be that personal networks does not relate to superior access to health care. A necessary precondition may be that the social connections within the network have good access to resources. Moreover, social network does not always provide social support (Heaney & Israel, 2008: 190). Further research should, therefore, investigate how the ‘quality’ and type of social network (e.g. friends vs. family members) influences health care utilization.

A surprising finding was that the smallest inequalities in specialist use were found between the financially comfortable and the financially strained. These findings therefore stand in contrast to those for unmet need (Paper I), where financial strain represented a major determinant for the (limited) access to health care in Europe. They also stand in contrast to previous literature (e.g. van Doorslaer et al., 2006). One reason for this is that income may constitute the least flexible indicator of SEP, because income is a temporal resource, which could be reduced or lost during the life course. In comparison, education may represent a more permanent resource, which once acquired, cannot be lost in the same way (although its value may be reduced as time goes by). Although education, occupation and income are interwoven markers of socioeconomic position (cf. Arntzen, 2002), it appears that income is contingent upon educational and occupational status to gain better access to specialist care services. Based on the work of Bourdieu (1986), the accumulated resources of money, knowledge, prestige, power and social connection together constitute a form of ‘health care system capital’. In a study of financial accessibility of health care, health care system knowledge demonstrated to be particularly important in combination with low income (Israel, 2016). In this context, education represents an important resource because knowledge of an illness is a predisposing factor for visiting health care providers (Levesque et al., 2013). Individuals must become aware of a medical issue and perceive it as a problem, before visiting a specialist. It is by then that cost-related issues can become relevant.

In our study, education stands out as a particularly important indicator of health care utilization. Previous studies have also indicated that education is a stronger determinant of health care use compared with income and employment status (Habicht & Kunst, 2005; Halldórsson, Kunst, Köhler, & Mackenbach, 2002). For example, a study by Stirbu et al. (2011) found educational inequalities in all countries after controlling for self-reported health. Higher education is consistently associated with better wages, more knowledge, more prestige, more power and more valuable social connections. Furthermore, education as an overall indicator appears to be an important predictor for health care utilization. This is underlined by the findings that the smallest inequalities were found between health care utilization and financial resource. The benefits of education may also be relevant for occupation. However, our results indicate that the occupational hierarchy does not work as an equally strong predictor for health care utilization.

5.1.2 Contextual level

Paper I included two country-level variables: physician density per 1000 people and out-of-pocket payments as a percentage of total health expenditure. We only found a significant association for these variables for unmet need related to availability. Held together with the findings on financial strain and availability, the results suggest that low-income groups could be at higher risk of delayed or unavailable health care due to higher out-of-pocket payments. High physician density may moderate the influence of out-of-pocket payments.

Moreover, the results suggest that physician density and out-of-pocket payments are not associated with overall unmet need. When looking at unmet need by physician density in different countries (Table A1 in Paper I), Poland has the lowest density (2.22) and the highest unmet need (22.4). In contrast, Portugal has a high density of physicians (4.10) and a high level of unmet need (18.4). In terms of out-of-pocket payments (Table A2 in Paper I), Netherlands has the lowest level of payments (5.22) and the lowest level of unmet need (4.3). However, France has the second lowest level of out-of-pocket payments (6.34), but also represents one of the highest levels of unmet need (19.2).

In a study by Chaupain-Guillot and Guillot (2015), which was based on EU-SILC-data, the authors found that higher out-of-pocket payments were associated with higher unmet need. However, in line with Paper I, they did not find any evidence related to density of physicians and dentists. The authors point out that this finding is not very surprising. After all, this indicator is measured at the country-level, yet the availability of physicians and dentists can vary greatly between regions. Using data from EU-SILC (2008–2013), Elstad (2016) examined income inequality and unmet need for health care in Europe during the Great Recession.[32] Unmet need was analysed due to costs, waiting times and travel difficulties. GDP per capita was used to analyse the countries' overall economic levels. The S80/S20 ratio indicated the country's level of income inequality.[33] The study showed an association between income inequality and access to health care. However, this association occurred only among the disadvantaged groups of the population (those with both relatively low income and health problems). Furthermore, a decline in GDP had more severe effects on health care access in inegalitarian countries compared to countries with less income inequality. This was the case both for the disadvantaged and for other parts of the population. Therefore, smaller income inequalities could be beneficial for protecting health care access during times of crisis. Other studies have suggested that social allowance policies can improve the financial accessibility of health care, both among low-income families (Israel, 2016) and elderly people (Reeves et al., 2017).[34]

Physician density and out-of-pocket payments have been the main country-level variables included in some European studies (Chaupain-Guillot & Guillot, 2015; Israel, 2016; Fjær, Stornes, Borisova, McNamara, & Eikemo, 2017). However, as has been shown, the results are unclear. Therefore, it is difficult to categorize groups of countries based on these variables. A worthwhile approach is provided by Ramos and colleagues (2019), which breaks down the ordinary measure of unmet need for different countries in Europe. This provides some hints on which countries are at the same level of need and unmet need.

To further understand the relationship between conventional health care use (and needs) and socioeconomic resources, I have examined patterns between welfare regimes. The regimes do not cluster according to overall need (apart from rather large inequalities among women in the Nordic regime), but there are interesting patterns when we distinguish between different reasons for unmet needs. For example, inequalities in unmet needs among women due to long waiting

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[32] The Great Recession refers to the economic downturn from 2007 to 2009, after the bursting of the US housing bubble and the collapse in financial markets across the world (Investopedia, 2020; Bambra, 2011: 38-39).

[33] The 80/20 ratio is the ratio of total income received by the 20% of the population with the highest income (top income quintile), to that received by the 20% of the population with the lowest income (lowest income quintile) (Eurostat, 2021).

[34] Social allowance refers to means-tested benefits that are available for households which are grouped into certain categories (e.g. lone-parents), or which qualify through their low household income (Immervoll, 2010; Israel, 2016).

lists seem to be largest in the Nordic regime (see Figure 4.1 and Table 4.1). This finding may provide another explanation as to why the Nordic countries do not have smaller social inequalities in health than many other European countries (for women, but not for men). Although the Nordic welfare states aim at providing equality of the highest standards for all their citizens, many studies have demonstrated that socioeconomic inequalities in morbidity and mortality are not among the smallest in these countries as compared with other European regions and welfare regimes (Mackenbach et al., 1997, 2008; Cavelaars et al., 1998; Kunst, Groenhof, & Mackenbach, 1998; Mielck et al., 2007; Eikemo, 2009). This is often regarded as a counter-intuitive finding because welfare state provision mediates the extent and impact of the socioeconomic position on health (Eikemo & Bambra, 2008). Also, the Nordic regime is characterized by universal welfare arrangements, with relatively generous welfare transfers and aiming for full employment (Esping-Andersen, 1990: 27-28; Kautto et al., 1999, 2001; Eikemo & Bambra, 2008). However, the goal of obtaining full employment could be part of the reason for this finding, since this would add to the double burden among women: they are both working and taking care of the families. Because of this, lower educated women may have more unmet needs as compared to lower educated men. However, this finding is not observed among men in this welfare regime. The fact that inequalities are smaller among men is supported by the fact that social inequalities in morbidity are smaller among men than among women.

Interestingly, I find the opposite pattern for the Bismarckian regime. Among women, the lower educated had the smallest inequalities, as well as the lowest prevalence of unmet need. This is difficult to explain, but we do know that the regime emphasizes the role of the family as a producer of welfare. The regime promotes a model with the man as the main breadwinner (Lewis, 1992; Esping-Andersen, 1999). Women are encouraged to stay at home while their children are small, e.g. by receiving tax deductions and other family related payment bonuses (Svallfors, 1997). This could perhaps result in a smaller burden among lower educated women.

The relatively large inequalities in unmet needs among men (due to long waiting lists) could be related to the fact that the Bismarckian welfare regimes are characterized by status-differentiating welfare programmes. Here, benefits are often earnings-related, administered through the employer and geared towards maintaining existing social patterns (Eikemo & Bambra, 2008). If lower educated men have poorer working conditions and employment relationships than higher educated men, then this could result in larger inequalities in the Bismarkian regime.

It could also be stressed that the role of the market is marginalized in this regime. In terms of de-commodification, the Bismarckian welfare regime lies between the low de-commodifying Anglo-Saxon regime and the highly de-commodifying Nordic regime (Bambra, 2011: 32). In accordance with the principle of 'subsidarity', the state will only interfere when the family's capacity to service its members is exhausted (Esping-Andersen, 1990: 27).

Concerning specialist visits, I observed that the Eastern European regime clustered less favorably than other regimes (particularly among men). It seems to be difficult for people to access more advanced health services in this regime. This could be because these countries have gone through extensive economic and political developments and have implemented extensive social reforms through the 1990s (Kovács, 2002). In the last decades, they have seen the end of the universalism associated of the communist welfare state (which may have had a health equalizing effect) and a shift towards policies of marketization and decentralization associated with the Anglo-Saxon welfare regime (Eikemo & Bambra, 2008). There is a strong dependency on family and other informal ties for support and health care (Huijts, Perkins, & Subramanian, 2010). Compared to other member states of the European Union, there is only a limited health care service provision and the overall health of the population is relatively poor (European Communities & World Health Organization, 2002).

I also want to highlight that a very low proportion of people in Anglo-Saxon welfare regime (except Israel) seems to be able to access specialist services (particularly for women). In the Anglo-Saxon welfare regime, the market is a primary mechanism in the distribution of goods and services in welfare policy. The degree of welfare state provision is minimal, aimed to prevent social deprivation. Social transfers are modest and often have strict entitlement criteria. Means-testing is used among recipients and benefit receipts are often associated with stigmatization (Esping-Andersen, 1990: 26). The role of the market is encouraged, passively by guaranteeing only a minimum, and actively, by subsidising private welfare schemes (Esping-Andersen, 1990: 26-27). In consequence, the Anglo-Saxon welfare regime minimises the de-commodification effects of the state welfare and restricts social rights. There is a basic equality among the state welfare recipients within the Anglo-Saxon system, but it is an equality of poverty (Bambra, 2011: 29). Although many benefits are universal, their value is so little that there is a clear division between those who can and those who cannot have additional welfare support through their position in the labour market. This leads to a potential increase in the gap between those who rely on state aid and those who can afford private provision (Esping-Andersen, 1990: 27; Bambra, 2011: 29; Bambra & Eikemo, 2008).

This supports our finding from Paper I that financial strain represents the main obstacle to European citizens' access to necessary health services. Moreover, this suggests not only to focus on accessibility and cost-related factors that influence health care (such as out-of-pocket payments), but also financial inequalities related to availability (e.g. waiting lists) and acceptability. Still, even though there are socioeconomic inequalities in conventional health care needs and health care utilization, these inequalities do not seem to be related to amenable mortality.[35]

It should still be highlighted that *inequalities* in access to specialists are low in the Anglo-Saxon regime. Although the countries have the general characteristics of the Anglo-Saxon welfare states when it comes to social transfers, e.g. use of means-testing, strict entitlement criteria and low replacement rates (Esping-Andersen, 1990), they do not take a traditional Anglo-Saxon market based approach to the provision of health care services (Bambra, 2005a, 2005b). Thus, health care is provided by the National Health Service (NHS) with similar coverage rates and low levels of private health care expenditure as in the Nordic countries (Bambra, 2005a, 2005b). It is possible that the provision of highly de-commodified health care services would mediate the effect of the traditional Anglo-Saxon social policy on health and health inequalities (Eikemo et al., 2008a).

5.2 Non-conventional health care utilization

The key finding concerning non-conventional utilization health care is that women were more prevalent among those providing informal care and among those using alternative forms of health care. I did not find a consistent pattern concerning socioeconomic position. Those with less resources were more frequent providers of informal care, but they were at the same time less frequent users of CAM. However, there were interesting clusters of countries belonging to different welfare regimes. Most notably, women in Nordic regimes clustered most favorably in terms of informal care, while women in the Southern European welfare regime held the worst

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[35] The graphs on conventional health care and amenable mortality are not shown. For a description of the significant results, see Figures 4.4 – 4.6.

position. Moreover, there was a significant association between inequalities in informal care and inequalities in amenable mortality. I will now discuss these findings in more detail.

5.2.1 Individual level

The findings show mixed results for the level of resources people have, and how frequently they provide informal care (Paper III). On the one hand, middle and higher educated people were more likely to provide care than lower educated people. This finding is also partly in line with a SHARE study showing that children with higher education are more prone to help their parents (Brandt, Haberkern, & Szydlik, 2009).[36] A different finding is that people with higher education give (and receive) more support to friends, while those with lower education give more support to family members (Komter & Vollebergh, 1998; Liebler & Sandefur, 2002). This exchange may be based on a reciprocity norm. A reciprocal relationship indicates that children who expect an inheritance or who are currently receiving financial transfers from a parent are more likely to provide help (Brandt et al., 2009; Silverstein, Conroy, Wang, Giarrusso, & Bengtson, 2002). Even though higher educated people may be informed of rights and entitlements to care (Haberkern & Szydlik, 2010), they do also perform caring task themselves.

On the other hand, non-employed persons, especially those who reported housework as their main activity, were more likely to provide informal care than those working full-time. Rates did not differ between part-timers and full-workers. This finding is also in line with another SHARE study that examined children's care of older parents in Europe (Haberkern & Szydlik, 2010). Parents were less likely to receive help from children that were either working full-time or part-time. These groups seem to have less time for care work. The same determinants for providing informal care were present both for men and women.

It was also more common for persons with children and low self-reported health to be caregivers. These differences are possibly related to time availability and caregiving norms. The normative climate in Europe has a clear north-south divide, with individualistic values and public responsibility norms in Northern Europe, and famialism and norms of filial obligations[37] in Southern Europe (Geerts & Van den Bosch, 2012). Some countries are characterized by a

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[36] SHARE: Survey of Health, Ageing and Retirement in Europe.

[37] Filial obligations are the obligations experienced by adult children to meet their older parents' physical and emotional needs (Marks & Kang, 2016).

famialist culture with emphasis on family ties, and moral obligations to help family members (Verbakel, 2018; Kalmijn & Saraceno, 2008; Reher, 1998).

Informal caregiving may have negative consequences for health and well-being. According to previous studies (Pinquart & Sörensen, 2003; Verbakel, 2014), informal caregivers have poorer mental health than non-caregivers. Reduced mental well-being are particularly strong for intensive caregivers, and stronger for female caregivers than male caregivers. However, the provision of informal care to others can also give a positive feeling (Broese van Groenous & de Boer, 2016), but the caregiving effect is not particularly strong in the context of mental health. It has been indicated that the negative effects are stronger than the positive ones. Because intensive caregiving is burdensome, a situation where many caregivers provide a little care each may be more sustainable for the health care system (Verbakel, 2018).

As was also the case for informal care, CAM use is more common among women (Paper IV). This has also been demonstrated in previous research (Kemppainen et al., 2018; Bishop & Lewith, 2010; Sharp et al., 2018b). We know that women report more unmet need (Fjær et al., 2017), use more health care services (Green & Pope, 1999) and have poorer health (Matthews, Manor, & Power, 1999). However, women are still more frequent users of CAM, compared to men, when controlling for all these factors. This may indicate differences in values and personality traits between men and women. For example, women are reported to be more in favour of complementary practices, displaying a strong propensity to 'shop for health'. Therefore, they tend to adopt various remedies, partly in association with each other, with the intention of achieving the possible benefits (Furnham & Forey, 1994; Furnham & Kirkcaldy, 1996).

Moreover, a study of alternative health care conducted with older adults in Italy illustrates some interesting gender differences in terms of health care utilization: 79% of people who used only CAM were female, 72% of people who used both CAM and conventional health care were female, 61% of people using only conventional health care were female, while 46% of people using no health care were female (Buono, Urciuoli, Marietta, Padoani, & De Leo, 2001). These findings suggest that although women are more likely than men to use any type of health care, this tendency may be amplified for CAM use.

The finding that CAM use was more common among certain socioeconomic groups in the population, such as the higher educated, those with less financial strain and among the employed, requires some attention. It means that resources matter. A possible implication when those with more resources use more health services, is increasing inequalities in health. Our findings are mostly in agreement with previous research (Eisenberg et al., 1998; Kelner & Wellman, 1997; Astin, 1998; Kemppainen et al., 2018), which also highlights the importance of individual resources. Social groups that are better off, may want to take more control of their own situation and health issues (Wiles & Rosenberg, 2001). This also seems to resonance with the notion that educated people wishes to take more command over their life situation, also by challenging traditional school medicine (Astin, 1998). However, they are not necessarily better informed about the effectiveness of the various treatments (Wiles & Rosenberg, 2001).

We did not find an association between self-reported health and CAM use. This contrasts some previous research (Hanssen et al., 2005). Meanwhile, having a longstanding health problem was related to all types of CAM use. As for self-reported health, our sensitivity analyses showed that poor health was related to greater CAM use, before controlling for longstanding health problems, unmet need and visits to health care practitioners. This implies that self-reported health is an underlying factor for predicting CAM use. This result is in line with findings from Kemppainen and colleagues (2018), who also find poor health to be a predictor for greater CAM use. We also observed that people who had visited a GP or specialist were more likely to use CAM. These results harmonized with a study which found that a quarter of those who had used a type of CAM in the past year were referred by a conventional health care practitioner (Barnes, Powell-Griner, McFann, & Nahin, 2004). Another study showed that although users of alternative health care visited conventional medical practitioners almost twice as much as non-users, they still reported much higher levels of unmet need for health care (Paramore, 1997). This supports the finding that use of alternative health care appears as a complement rather than an alternative to conventional health care (Druss & Rosenheck, 1999).

5.2.2 Contextual level

There were remarkable variations between countries belonging to different welfare regimes. The Nordic countries had high numbers of caregivers but low numbers of intensive caregivers, whereas the opposite pattern was found in Central and Eastern Europe. This can be related to the crowding out or crowding in effects of welfare states (Brandt et al., 2009). Generous welfare states can contribute to taking up a caring role (crowding in), while they can also take away the necessity of intensive caregiving (crowding out). This point in the direction of what has been termed ‘mixed responsibility’, ‘specialization’, ‘complementation’ or ‘functional differentiation’ between the family and the state (e.g. Litwak, 1985; Chappell & Blandford, 1991; Motel-Klingebiel, Tesch-Roemer, & Von Kondratowitz, 2005; Daatland & Lowenstein, 2005). Professional providers perform technological tasks that are more challenging and intensive, while the children tend to give voluntarily, less intensive and less burdensome help. The finding illustrates the division of labour between state and family, thereby supporting the task-specific model (Litwak, 1985) on the societal level.

The Nordic regime had the highest number of less intensive informal care. We could speculate that this is a favourable position, as it may involve substantial elements of social support towards the receiver of informal care without a too high workload. The fact that these countries were favourable placed regarding intensive care may be related to the comparatively higher health expenditure in these countries. Moreover, in the Nordic countries, there are no legal obligations to provide support relatives with informal care. Those in need receive public transfers regardless of whether they have relatives who can pay for their help and care (Haberkern & Szydlik, 2010). There are also different opinions in Europe whether the state or the family should be responsible for the care and support of elderly people. In the Northern countries, most people believe that the state should be the main provider of care. Normative obligations for mutual support between relatives are low, and parents do not expect their children to provide intensive informal care (Haberkern & Szydlik, 2010).

A key finding is that men and women in the Southern welfare regime (and to some degree also people living in the Anglo-Saxon welfare regime) were the most intensive care givers in Europe, which was particularly the case for women. This supports the fact that the Southern regime should be included as a separate regime (Ferrera, 1996; Bonoli, 1997; Bambra, 2007b). The Southern welfare states are described as ‘rudimentary’ because they have a fragmented system of welfare provision, where the income maintenance schemes range from the meagre to the generous. Welfare services, and particularly the health care system, provides only limited and partial coverage (Eikemo & Bambra, 2008). Moreover, there is a strong reliance on the family and charitable sector (Ferrera, 1996). In the Southern European countries, close family members are obliged to finance the costs of care if the person in need cannot pay. Public services are available only when the relatives cannot afford to pay for the services (Gori, 2000: 263ff.). In terms of opinion, care is regarded as a family matter in the Mediterranean and most

Central European countries (Daatland & Herlofson, 2003; 137ff.; European Commission, 2007: 66ff.).

Above all, the fact that the Southern European regime is characterised by the family as welfare provider implies that there is an additional burden for women. This is a possible explanation of the unfavourable Southern European clustering among women. It is also disturbing that there was a significant relationship between the magnitude of socioeconomic inequalities in informal care and socioeconomic inequalities in mortality amenable to health care. Informal care seems to carry the welfare provided in Southern Europe, but it is at the same time detrimental for the health of its populations.

In Paper IV, we found that CAM use was best predicted by health expenditure, which indicates that a welfare regime typology should be complemented by a contextual variable approach. For example, health expenditure demonstrated a high explained variance for physical treatments, while being non-significant for consumable treatments. This difference may be explained by institutional arrangements that regulate CAM use, including which treatments are reimbursed through health insurances and integrated into the conventional health care system. This explanation is in line with findings from Kemppainen et al. (2018), who found that CAM use varied greatly between countries. They also highlight regulations that govern CAM use in some countries. For example, in Germany and Switzerland, some types of CAM treatments are covered by health insurance (Joos, Musselmann, & Szecsenyi, 2011; Klein, Torchetti, Frei-Erb, & Wolf, 2015). In Austria, where CAM use is high, medical students are offered several courses of lectures and practical training in CAM methods (Brinkhaus et al., 2011).

To a large degree, countries with high or low health expenditure have not integrated consumable treatments like homeopathy or herbal treatment into the health care system (World Health Organization, n.d.). Acupuncture and acupressure are both physical treatments that have been integrated or reimbursed in countries with high health expenditure. Higher integration is therefore closely related to health expenditure, which explains 69% of the variation in physical CAM use. One previous study showed that health expenditure was best explained by GDP (Hitiris & Posnett, 1992), suggesting that the national economy of countries represents an underlying factor when diverse CAM treatments are made available to the public.

5.3 Inequalities between health care systems

There was a weak patterning of countries according to welfare regimes for conventional health care. In contrast, I could observe a much stronger patterning of countries according to non-conventional health care. This may imply that welfare regime classifications are not capturing health care system components of welfare states sufficiently. A further implication of this is that we should consider alternative clusters to capture inequalities in health care utilization that are within the responsibility of the health care system. This is what we did in Paper V. This paper compared educational inequalities in amenable mortality between different health care systems in Europe. Here, we found larger inequalities in low-supply and low performance mixed types compared to other health care systems. These health care systems have fewer monetary resources at their disposal. This finding is also in accordance with a study demonstrating that higher health care expenditures are associated with smaller inequalities in amenable mortality, both in absolute and relative terms (Mackenbach et al., 2017). This suggests that more generous health care funding provides some protection against inequalities in amenable mortality. In addition, general provision and access to health care is lower in the low-supply and low performance mixed systems than in the other health care system types.

It was more surprising that we did not find any significant inequality differences between health care system types with different levels of access regulation and choice control. From a theoretical point of view, equal access to health care and equal treatment by health professionals should be relevant in ensuring that educational groups are exposed to the same risk of mortality amenable to health care. This may imply a high degree of public responsibility for health care costs, which from a materialist view enables low-SEP groups to receive sufficient care. In addition, a relatively strong regulation of access to health care may ensure that SEP groups benefit equally from the health care system, regardless of mere payment. Access regulation may prevent high-SEP groups from using their resources, such as knowledge or social connections, to gain benefits from the health care system and thus potentially increasing socioeconomic inequalities in health. Following Lundberg (2008: 1105), the resources ultimately affecting socioeconomic inequalities in health can be generated and mediated ‘within the family, in the market and also through the welfare state’. However, we could not find any empirical evidence supporting these arguments in terms of educational differences in amenable mortality between systems with different access regulation.

Previous studies have also shown that socioeconomic inequalities in health care are present in both universal non-universal health care systems, and these exist regardless of the type and financing of health care systems (Forrest, Adams, Wareham, Rubin, & White, 2013; Schröder, Richter, Schröder, Frantz, & Fink, 2016). This universal pattern indicates that lower SEP groups 'encounter barriers that are common in all countries, and thus lie beyond the national structure of the health care system' (Stirbu et al., 2011: 5). One factor that can produce health inequalities is unequal *use* of health care by different socioeconomic groups (Adamson et al., 2003). A general pattern is that people in lower socioeconomic positions use more primary health care, while higher socioeconomic groups use significantly more specialist care, even though they generally are in better health. Research has identified at least three mechanisms for how socioeconomic position can influence the outcomes of GP consultations, independent of health status: (1) social distance between the doctor and patient, influencing the communication, (2) class-related differences in health knowledge and beliefs, influencing health related behaviour, and (3) the professional control and power of the doctor, influencing the consultation, although social class differences among patients may mediate the interaction between the doctor and the patient (Boulton, Tuckett, Olson, & Williams, 1986; Scott, Shiell, & King, 1996). However, Vikum, Johnsen and Krokstad (2013) point out that no or few studies have examined socioeconomic inequalities in patient experiences with GP-patient interaction in a strict gatekeeping system and their association with referrals to specialist care.

Social inequalities in primary and specialist care utilization also vary across countries and between welfare regimes (Lemstra et al., 2009; Droomers & Westert, 2004; Mielck et al., 2007; Frie et al., 2010). Different explanations for this phenomenon have been suggested (for an overview, see Vikum, 2014). The first explanation is that physicians may be more concerned about high SEP patients (Elstad, 2018). GPs may actively or passively discriminate against patients with a low SEP and refer them to specialists less frequently, regardless of need. There are also socioeconomic differences in terms of how patients and doctors communicate (Verlinde et al., 2012). Some studies have suggested inequalities in the intensity and quality of care patients received in general practice (Gjelsvik, Holmås, & Monstad, 2009; Selmer, Sakshaug, Skurtveit, Furu, & Tverdal, 2009). Moreover, patients with low education and patients living in less affluent areas are more likely to receive shorter primary care consultations. They are also more likely to experience their physician as less empathic (Brekke, Holmås, Monstad, & Straume, 2018; Mercer et al., 2018). Therefore, the interaction between the doctor and the patient is likely to vary by socioeconomic position. This may also be explained by the social distance between the doctor and the patient, or differences stemming from the professional control and power of the doctor (Boulton et al., 1986; Scott et al., 1996). These differences could result in referrals that are socially unevenly distributed.

The second explanation is that low SEP patients are less able to ‘work the system’ and pressure their physicians to prescribe more care compared to high SEP patients. Patients with high education (or their relatives) can use their networks, bureaucratic competence and other resources in order to achieve more care (Elstad, 2018). In addition, patients with high education and high income may be better informed about their treatment options (Nilssen et al., 2016). Perceived patient pressure has been identified as a strong independent explanation of doctor behaviours (Little et al., 2004). Studies have shown that a share of the referrals by GPs to specialists may be judged as medically inappropriate (O’Donnell, 2000). According to Little and colleagues (2004), a significant minority of referrals (around 20%) was considered by the GPs as slightly needed or not needed at all. The flexibility of some of the GPs in responding to the patients’ apparent demands may increase socioeconomic inequalities in referrals.

The third explanation is that the interpretation of symptoms, as well as perception of the need for health care, are closely associated with socioeconomic position. Therefore, fewer conditions meriting referral may be discovered among low SEP persons because GPs are utilized for different reasons among high and low SEP groups (Vikum, 2014). Previous studies have found educational differences in the willingness to seek health care for different clinical scenarios (Adamson et al., 2003; Frie et al., 2010). This suggests that there may be educational differences in why GPs are utilized in the first place. Socioeconomic differences in the willingness or ability to discuss medical issues with the GP, could also result in inequalities in referrals, even though the utilization of GPs is distributed equally in the population (Vikum, 2014). This mechanism is also in accordance with the findings that people in lower SEP groups are more likely to visit GPs for medical issues that are resolved without needing referral to a specialist (Vikum et al., 2013).

The fourth explanation is socioeconomic differences in health care preferences and patient choices (Lueckmann et al., 2021) (see also p. 97). This may be a result of social and cultural variation in health expectations (Bago d’Uva, Lindeboom, O’Donnell, & van Doorslaer, 2011; Sen, 2002), as well as different perceptions about the risks and benefits of medical treatment (Katz, 2001). Furthermore, the perceived role in health care varies between SEP groups

(Präg, Wittek, & Mills, 2017; Schröder, Fink, & Richter, 2018). Patients with lower SEP tend to delegate responsibility to health care professionals. Consequently, patients with lower education are more likely to adapt to the 'paternalistic' or 'doctor-centred' model of relationship. In comparison, patients with higher education are more likely to favour the 'egalitarian' or 'patient-centred' model of relationship (Präg et al., 2017). They tend to feel more responsible for treatment, focusing more on disease management or actively involving their GP (Schröder et al., 2018). Further qualitative studies may be more promising for investigating social variations in patients' health care knowledge, preferences and choices (Goddard & Smith, 2001). However, this will be costly to perform on a large scale.

In line with previous research, our results indicated that inequalities in amenable mortality existed in all study countries and health care system types. The type characterized by low resources and strong access regulation had the highest inequality point estimate. However, results were not robust enough to make substantial claims about typology differences. Furthermore, our data did not allow us to determine whether these inequalities stem from inequalities in access, in utilization, or in quality of health care services.

5.4 Methodological issues, strengths and limitations

This thesis should be interpreted in the light of some strengths and limitations. All the articles using survey data are based on data from the health module of the European Social Survey. Even though the ESS maintains a high standard of data collection, the survey is subject to issues related to cross-national survey research. In cross-country comparisons, comparability between data is important. As an example of comparability issues, there are variation in response rates between countries. In the seventh round of ESS, the response rates varied considerably across countries, ranging from 31% in Germany to 68% in the Czech Republic (Eikemo et al., 2017). Therefore, the data available may not have captured the whole population and are not likely to be entirely representative of the populations of the countries studied. Moreover, the ESS may suffer from non-response, which could be selective on dimensions like income and education. Nevertheless, evidence from earlier ESS rounds suggests that non-response bias tends to be small (Stoop, Billiet, Koch, & Fitzgerald, 2010). However, there are data limitations as the survey only covers the non-institutionalized population. This means that, for instance, people who live in institutional homes for the elderly or other types of senior housing facilities will be excluded from the sample. Thus, health care utilization among certain groups of the population is likely to be underrepresented.

As ESS data are only based on self-reports, there may be cultural differences between European countries. This could also limit some of the perspectives on health and health care use. For example, studies have found that evaluations of self-reported health may be sensitive to cultural background and context (Jylhä, Guralnik, Ferrucci, Jokela, & Heikkinen, 1998). The health expectations and health evaluations of respondents may vary according to their national and cultural background. In addition, the concepts of unmet need, informal care and CAM are likely to be open to different interpretations, depending on cultural context and background. Direct cultural comparisons of self-reported health outcomes and health care utilization should be made with caution. The strength of Papers I – IV, however, is that all questions were collected from the same survey, asking the same questions within the same period.

ESS is based on cross-sectional design. Thus, data on health outcomes and health care utilization are collected simultaneously. Because of this, it is not possible to infer causality between the variables (Cavalieri, 2013; Eikemo et al., 2017). The direction of causality could also be confounded.[38] For example, the relationship between unmet need for health care and the health status variables could suffer from reverse causality. Unmet need could worsen health conditions and affect self-reported health status. Despite limitations related to causality, the ESS has included a comprehensive sample from many countries in Europe and represents an important tool for conducting cross-national research on social determinants and health.

The measurement of unmet need (Paper I) does not include additional clinical assessments whether a patient has received appropriate medical treatment. However, it could be argued that patients are able to identify shortcomings in their experience with health care (Allin et al., 2010). Even though self-assessments are inherently subjective, several studies have shown that self-reported health is strongly correlated with more objective measures of health, such as mortality (Idler & Benyamini, 1997; Heistaro, Jousilahti, Lahelma, Vartiainen, & Puska, 2001; DeSalvo, Bloser, Reynolds, He, & Muntner, 2006). Thus, self-reported health can be considered

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[38] Confounding can be explained as *confusion of effects*. This definition implies that the effect of one variable is mixed with the effect of another variable, resulting in a bias (Rothman, 2012: 136).

as an indicator that captures the objective physical and mental condition on the one side, and the subjective evaluation of individuals' general health status on the other (Jylhä, 2009). Furthermore, the predictive power of self-reported health for morbidity and mortality is considered to be equally strong across socioeconomic groups (Burström & Fredlund, 2001; van Doorslaer & Gerdtham, 2003; Huisman, van Lenthe & Mackenbach, 2007; Dalen, Huijts, Krokstad & Eikemo, 2012).

Among different measures of health care utilization, we used a binary variable on whether respondents visited a GP or specialist within the last 12 months (Paper II). This only captures a limited aspect of actual health care utilization. Clearly, a person using a GP or health care specialist every week should be considered differently to a person using such services once every year. The division of labour between GP and specialists also varies between countries (e.g. in some countries GPs have extended training enabling them to consult with patients who would have otherwise required referral to a specialist). As we have only examined a limited aspect of health care utilization, we cannot draw conclusions on the quality of health care. Even though high SEP groups are more likely to use specialist care, this type of health care is not necessarily better compared to GP use. More care may not always be better, leading to a prolonged life and being a cause of the social gradient in mortality. The complexity of these matters is illustrated by the discussion of protecting patients from overtreatment (Franks, Clancy, & Nutting, 1992). The results should therefore be interpreted with caution. Despite these limitations, the findings could have important implications for policy makers across Europe regarding health care access.

For informal care (Paper III), the ESS provide little information on the caregiving situation, except for time intensity. Time is a relevant measure, as time spent on informal care competes with time for other activities, such as employment, housework, childcare and leisure. However, it is also relevant to know about what types of caregiving tasks are performed, the severity of care recipients' health problems, the relationship to the care recipient (i.e. is care provided to parent, partner, child, neighbour or other), and whether the provision of care is shared with other informal caregivers or professionals (Verbakel, 2018). Therefore, the results only provide crude descriptions. Moreover, the concept of informal care could have different interpretations across cultures in Europe. Because looking after family members is more common and integrated into familialist cultures, it may not always be labelled as informal care. Finally, people who cannot speak the main language of a country (or one spoken by at least 5% of the population) are excluded from the survey (Häder & Lynn, 2007: 38). Therefore, ethnic minorities are likely to be underrepresented. This may affect the prevalence rates of informal caregiving because this type of health care is suggested to be more common among minority groups (Navaie-Waliser et al., 2001).

For CAM use, our study (Paper IV) comes with different limitations. A general issue concerns the cross-sectional data, which means that we cannot draw conclusions with regards to causal relationships. For example, dissatisfaction with the health care system may influence people to use CAM, but the causal relationship might also go the other direction. Moreover, our study did not include all known CAM treatments, which may result in underestimation of CAM use rates. Furthermore, the ESS data only measure whether respondents have used CAM in the previous year and does not provide information on the frequency of CAM use. Therefore, it is not possible to distinguish between the single use of CAM therapy compared to more frequent use.

In Paper II, a challenge was the operationalization of variables in the context of fundamental cause theory. Indicators of social networks were combined with indicators of socioeconomic position (education, income and class), both termed as ‘social markers’ and referred to as ‘higher SEP groups’. On the one hand, this may be confusing in terms of conceptual clarity, as social networks are not commonly included as an indicator of socioeconomic position. On the other hand, the aim was to study the importance of ‘flexible resources’, to test the fundamental cause theory and to study groups that have different levels of material and non-material resources compared to others (cf. Krieger, 2001; Kawachi, Subramanian, & Almeida-Filho, 2002). While both represent types of resources, it is important to emphasize that social networks should not be used to categorize people in a particular socioeconomic group.

Furthermore, the two indicators that measure social networks combine social support and social network. Together, social network and social support describe the structure, processes and functions of social relationships. Social support is one of the important functions of social relationships. The term social network refers to the web of different social relationships that may provide social support (Heaney & Israel, 2008: 190). While the concepts of social network and social support could be distinguished from each other, a pragmatic aim was to construct a composite measure that could capture both the frequency and quality of social meetings.

In terms of the control variables included in the articles, we used financial strain in Papers I, II and IV. Household income is available in the ESS data and represents a more objective measure of income. Nevertheless, there are advantages of using financial strain compared to household income, both methodologically and theoretically. A major limitation with household income concerns the high non-response rates related to this variable (Kuhn, 2019). Thus, income can be difficult to measure accurately in social surveys. In comparison, financial strain is easy to measure, explain and simple to interpret (Blekesaune, 2013). It has also been shown to be more strongly associated with health outcomes compared to objective measures of household income (Wildman, 2003). The importance of financial strain is particularly relevant for measures of mental health (Weich & Lewis, 1998; Dunn et al., 2008).

Ringen (1988) argues that self-assessment of living standards are more direct measures of economic situation compared to objective measures of income. Thus, household income, particularly measured at one point in time, may not adequately capture the current living standards that people are experiencing. Besides looking at income itself, it could be important to account for the demands placed on that income. This is likely to depend on the wider context in which people live (Shaw, Benzeval, & Popham, 2014). For example, the welfare state arrangements in a country may reduce deprivation for those on lower incomes (Ringen, 1988). Because the redistributive role of welfare services varies much across societies, an exclusive focus on objective income measures can provide an incomplete picture (Whelan & Maître, 2010: 320). As measures of financial strain can capture adequacy of income, these may be more closely associated with welfare regimes compared to household income (Shaw et al., 2014; Whelan & Maître, 2010). While the operationalization of 'financial strain' (Papers I, II) and 'coping on income' (Paper IV) is slightly different, both have been found to be associated with health care utilization.

The approach of classifying countries into typologies or regimes has been subject to debate, especially in the aftermath of Esping-Andersen's (1990) welfare regime typology (for an overview, see Abrahamson, 1999). The general elements of critique also apply to the typologies of health care system types (Paper V) and varying country classifications that have been proposed during the last decades (e.g. Wendt et al., 2009; Burau & Blank, 2006; Moran, 1999; Freeman & Frisina, 2010; Burau, Blank, & Pavolini, 2015; Wendt, 2019). Typologies can be understood as a form of 'social scientific shorthand' (Ragin, 1987: 149) that capture a broad range of variables and interrelated dimensions. This form of simplification represents both the strengths and the limitations of typologies. Moreover, typologies always depend on which dimensions are emphasized or de-emphasized in the operationalization. Therefore, the selection of indicators and their theoretical justification is essential to health care system typologies. Providing a correct definition and operationalization of indicators can be difficult. Apparently similar programs and policies may be differently organized. However, the health care system typologies first developed by Wendt (2009), and later followed up by Reibling and colleagues (2019), is to our knowledge the most comprehensive typology, aiming to include the most important aspects of health care systems.

In view of the clustering of countries in Paper V, Lundberg (2008) has speculated about the conceptual and methodological problems involved when one attempts to relate international variations in complex welfare state structures on the one hand to mortality, ill health or health inequalities on the other. For example, specific policies could be closely related to specific health outcomes, such as the association between parental leave and infant mortality, with breastfeeding as a possible intervening factor (Lundberg et al., 2008: 1638). Additionally, differences in coverage, generosity, availability and quality of social cash transfers or services could yield different results on public health outcomes. It also remains unclear whether welfare regimes in general are more likely to affect certain public health outcomes, and how political power and political forces affects what welfare resources states provide to their citizens. This is not to say that party politics are of no interest, but if researchers want to contribute to improve public health policies, we should be able to tell what kind of policies work or not, not what kind of parties people should vote into the government (Lundberg, 2008). Additionally, researchers should be more specific in choosing health outcomes that are most likely to be affected by the national context.

The approach of using welfare regimes and political systems to explain cross-national variation in socioeconomic health inequality has encountered criticism (Lundberg, 2008, 2010; Tapia Granados, 2010). One argument is that one needs to specify which welfare state characteristics are of importance for public health outcomes (Lundberg, 2008). On the one hand, the studies of Navarro and Shi (2001) and Borrell et al. (2009) demonstrate that educational health differences are smaller in social democratic systems than in other political systems. On the other hand, Borrell and colleagues stress that there are substantial variability among countries within the same political tradition: ‘When contextual variables of welfare state, income inequalities, and wealth were taken into account, educational-level inequalities diminished in all political traditions (except the liberal tradition), and the differences became smaller' (Borrell et al., 2009: 336).

In line with this observation, welfare regimes face different types of theoretical criticism, including that existing theories and classifications are based on single aspects of the welfare state (e.g. cash-transfer systems) (Lundberg, 2008). Besides, welfare regimes assume that diverse welfare resources are organized similarly within clusters of countries (Lundberg, 2008). Moreover, it is assumed that welfare states are stable over time, despite policies changing. Welfare regimes are not established for most low- and middle-income countries (Pega et al., 2013). In terms of concepts and measurements, the welfare regime approach also faces challenges. Firstly, welfare regimes may be too broad to capture health relevant aspects of the political context. Secondly, the application of relatively static welfare regime concepts may fail to capture important changes of a country's social policies over time. Third, the approach fails to incorporate potentially important time dimensions (e.g. lag effects of policy) (Pega et al., 2013). A review of welfare regimes and health research concluded that the empirical evidence does not consistently support regime theory (Brennenstuhl, Quesnel-Vallée, & McDonough, 2012). Moreover, the authors of the review concluded that 'measurement of policy instruments or outcomes of welfare regimes may be more promising for public health research than the use of typologies alone' (Brennenstuhl et al., 2012: 397).

Linking public health outcomes to politics may also be problematic for similar reasons. Lundberg (2008) has stressed that if politics indeed matter, it could be the institutions, the programmes and the resources they provide to citizens that matter, not the label attached to the government parties. Research on macro-level explanations for cross-national differences in socioeconomic health inequality can be strengthened. Therefore, more detailed information on the specific aspects of welfare regimes or political systems most prone to influence health are needed. Furthermore, there is a need to link specific country-level mechanisms to specific health outcomes rather than general indicators of health or mortality.

In Paper V, our classification of causes of death was based on previous cross-national comparisons of amenable mortality (e.g. Stirbu et al., 2010; AMIEHS, 2011; Nolte & McKee, 2011; Kinge, Vallejo-Torres, & Morris, 2015). A general issue when studying cause-specific mortality is misclassification of causes of death (Kunst et al., 1998). However, this should not be a substantial problem as misclassification is most likely to happen within, and not between, the categories analysed. Causes of death would have to vary systematically by educational attainment and country to affect the results.

Finally, there is some debate about the concept of amenable mortality. Gay et al. (2011) demonstrate that studies use different criteria to classify causes of death as being amenable to health care (e.g. Nolte & McKee, 2008; Tobias & Yeh, 2009). In Paper V, we classified ischemic heart disease and heart failure as non-amenable to health care. Some scholars have argued that the impact of medical treatment on these causes of death is unclear, while the association with lifestyle factors such as smoking, alcohol consumption and obesity is strong (Nolte & McKee, 2008).

The applied definition of amenable mortality and the indicators used to construct a typology can also be conflicting. For example, consumption data on alcohol and tobacco are used to measure health care prevention performance, while mortality directly related to lifestyle patterns was excluded from the analyses. Variation in countries' performance in preventing smoking and alcohol use may therefore not be reflected in the mortality rates. On the other hand, Reibling et al. (2019) included these indicators as proxies. They are therefore meant to indicate general preventive care performance. In addition, only mortality *directly* attributed to smoking and alcohol use was excluded. We included causes of death *indirectly* associated with lifestyle, which in turn could be related to the performance of a country's preventive services.

The concepts of amenable mortality and health care systems offer both advantages and disadvantages when combining several dimensions in one classification. Originally, amenable mortality was developed to measure the quality of medical care (Rutstein et al., 1976). An important aim was to distinguish those forms of mortality that a more effective health care system could deal with compared to causes of death that were difficult to influence through government intervention. However, this still leave the question unanswered which specific causes of death are most easily countered by health care system reform. It also remains unclear which type of amenable mortality demonstrates the largest variation across countries.

In addition, classifications of amenable mortality may hide variation between the different causes of death, both within and across countries. Because of ambiguous operationalizations and evidence, Nolte and McKee (2004) have suggested that amenable mortality rather should be treated as a starting point for further research and an indicator of concern. The analysis in

Paper V may suffer from crude divisions of mortality. We argue that these steps were necessary for the cause of overview and comparison. They also provide a point of departure for discussing how health care systems may produce health inequalities. Future research could derive more specific policy recommendations based on empirical analyses focusing on specific aspects of health care systems and detailed forms of amenable mortality. This will require the availability of rich data at the individual level as well as the national level for a large number of countries.

6 Conclusion

This thesis has demonstrated that there are significant socioeconomic inequalities in conventional and non-conventional health care in Europe (first research question). In terms of unmet need for health care, financial strain appeared as a major determinant for access to health care in Europe. A majority of the unmet need was related to waiting lists and appointment availability. For GP and specialist utilization, it was found that higher SEP groups were more likely to use health care specialists, compared with lower SEP groups. For health care specialist use, education and occupation appeared to be particularly important factors. Providing informal care was more common among the unemployed and persons with low self-reported health. Meanwhile, use of alternative health care was more common among higher socioeconomic groups, such as those with higher education, those with less financial strain and among the employed.

I have found that socioeconomic inequalities in health care utilization, particularly concerning non-conventional health care, vary between welfare regimes (second research question). In particular, the prevalence of informal care was very high in the Southern European regime, which probably reflects the extent to which it is reliant on the family (and women) as a provider of welfare.

I found that welfare regime classifications were more sensitive to non-conventional health care than to conventional health care. This may imply that welfare regimes are less useful in studying dimensions of health care that are integrated in the health care systems of countries. This is supported by the fact that there were inequalities in mortality amenable to health care between different types of health care systems (fourth research question). The low-supply and low performance mixed health care systems had the highest inequalities, while the regulation-oriented public health care systems had the lowest. However, socioeconomic inequalities amenable to health care were observed in all European countries (third research question), implying that there is not any health care system in Europe that can fully protect its citizens against such inequalities.

I also observed a significant association between patterns of informal care between socioeconomic groups and the magnitude of educational inequalities in mortality amenable to health care. This was observed both among men and among women (fifth research question).

This underlines a need for future research related to the health consequences of informal care as a social determinant of health, particularly in family-oriented welfare states. Inequalities in health care utilization should be continuously monitored in Europe and European welfare states should continue their efforts in maintaining equal access to health care.

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Paper I

SUBJECTIVE PERCEPTIONS OF UNMET NEED FOR HEALTH CARE IN EUROPE AMONG SOCIAL GROUPS: FINDINGS FROM THE EUROPEAN SOCIAL SURVEY (2014) SPECIAL MODULE ON THE SOCIAL DETERMINANTS OF HEALTH

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Subjective perceptions of unmet need for health care in Europe among social groups: Findings from the European social survey (2014) special module on the social determinants of health

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Background: Unmet need can be defined as the individually perceived subjective differences between services judged necessary to deal with health problems and the services actually received. This study examines what factors are associated with unmet need, as well as how reasons for unmet need are distributed across socioeconomic and demographic groups in Europe. **Methods:** Multilevel logistic regression models were employed using data from the 7th round of the European Social Survey, on people aged 25–75. Self-reported unmet need measured whether respondents had been unable to get medical consultation or treatment in the last 12 months. Reasons for unmet need were grouped into three categories: availability, accessibility and acceptability. Health status was measured by self-reported health, non-communicable diseases and depressive symptoms. **Results:** Two-thirds of all unmet need were due waiting lists and appointment availability. Females and young age groups reported more unmet need. We found no educational inequalities, while financial strain was found to be an important factor for all types of unmet need for health care in Europe. All types of health care use and poor health were associated with unmet need. Low physician density and high out-of-pocket payments were found to be associated with unmet need due to availability. **Conclusion:** Even though health care coverage is universal in many European welfare states, financial strain appeared as a major determinant for European citizens' access to health care. This may suggest that higher income groups are able to bypass waiting lists. European welfare states should, therefore, intensify their efforts in reducing barriers for receiving care.

Introduction

Access to health care is a fundamental determinant of health.[1] Because of this, a key guiding principle in European welfare states is that access to health care, understood in the context of whether people *in need* of medical care receive it or not,[2] should be the same for all people regardless of their social position in society.[3,4]

The concept of *unmet need* is a subjective measure of access to health care. Carr and Wolfe[5] define it as '*the differences between services judged necessary to deal appropriately with health problems and services actually received*'. When health care systems measure equality of access in terms of whether the appropriate medical treatment has been given for the condition in question, this disregards the subjective component of care in terms of patient perceptions. We conceive of *overall unmet need* as the subjective perception of not receiving appropriate medical help.

Research on unmet need has mainly been carried out in the US[6–9] and Canada.[10,11] Research from Europe is largely unavailable, which could be reflected by the fact that health care coverage is universal in many European countries,[1] and the barriers for receiving care, such as cost, are lower in Europe compared with the US.[12]

Previous research has produced somewhat mixed and inconclusive results. Different studies have reported different population groups reporting higher unmet need, such as women, people with poor health status, younger people, higher educated, lower income groups, unemployed, non-immigrants, urban residents and individuals without insurance coverage.[10,11,13–16]

It is still unclear to what extent citizens of European countries in (subjective) need of medical care are not getting their warranted treatment across social groups. This article aims to shed further light on this under-researched concept in a European context. We do this by classifying unmet need into three subcategories, based on the typology by Chen and Hou[10] and Sibley and Glazier.[11] *Availability* includes unmet need related to waiting lists, services not being available when required, and services not being available in an area. *Accessibility* refers to unmet need related to cost. *Acceptability* refers to not being able to take time off work or having other commitments.

Using the most recent European data available, this study examines what factors are associated with unmet need, as well as how reasons for unmet need are distributed across socioeconomic and demographic groups in Europe. In order to contextualize our results, we also control for country specific features of health systems which may be meaningful for unmet need, such as physician density and out-of-pocket (OOP) payments. As the focus is on types of unmet need across social groups, we do not delve on cross-country inequalities.

Methods

This study was based on data from the 7th round of the European Social Survey (ESS), fielded in 2014/15.[17] ESS is a bi-annual academically driven cross-national survey. For the first time, the survey contained a special rotating module on social determinants of health, in addition to the core questionnaire.[18] Our study included 27 879 respondents in 20 countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom. Estonia was excluded due to missing data on non-communicable diseases.

Data collection was based on face-to-face interviews with individuals aged 15 and above living in private households. In this study, we included respondents aged 25–75. Response rates ranged from 31% in Germany to 68% in the Czech Republic, and were overall similar to previous rounds of the ESS.[18] Individuals with missing data on study variables were excluded.

Study variables

Unmet need was operationalized through four binary variables, which were subjected to separate analyses. *Overall unmet need* was assessed by the question: 'In the last 12 months, were you ever unable to get a medical consultation or the treatment you needed for any of the reasons listed on this card?' Respondents answering yes were characterized as having overall unmet need. Respondents were coded as having unmet need due to *availability* if they indicated any of the following reasons for unmet need: waiting list too long, no appointments available, or the treatment needed was not available nearby. Respondents were coded as having unmet need due to *accessibility* if they indicated they could not pay for services. Respondents were coded as having unmet need due to *acceptability* if they indicated that they were unable to get a medical consultation because they could not take time off work, or had other commitments.[10,11] The operationalization differs somewhat between previous studies, as we did not have specific data on transportation (accessibility), and health knowledge and attitudes (acceptability).

Gender was dummy coded, with females assigned the value one. *Age* was measured in ten-year age dummy groups, with 25–34 as the reference. *Education* was measured as the highest level of completed education, according to the International Standard Classification of Education (ISCED). The low educational group included respondents with lower secondary or less education, the medium group upper secondary or advanced vocational education, and the high-group tertiary education (reference). Low-income groups were identified by the concept of *financial strain*, measured by those finding it difficult or very difficult managing on present income, with those coping or living comfortably as the reference. *Rurality* was measured by those reporting to be living in a country village or in the countryside, with those living in big cities, suburbs, town and small cities as reference. Those reporting not being born in their country of residence were characterized as *immigrants*, with the reference category being anyone born in their country of residence. *Occupational status* was measured by main activity last 7 days. The categories used were paid work (reference), unemployed, permanently sick or disabled, retired and finally those primarily doing housework or looking after children. Students and those in military service were excluded.

Health care use was measured by three binary variables, based on whether respondents indicated seeing (1) a *general practitioner* (GP), (2) a *medical specialist* or (3) *using alternative health care* in the past 12 months. The reference categories were no use in all cases.

In terms of *health status*, *self-reported health* was dichotomized, based on the question: 'How good is your health in general?' The responses 'very good', 'good' and 'fair' were coded as good health and used as reference, while 'poor' or 'very poor' health were coded as poor health.

Depressive symptoms were measured with the CES-D 8 depression scale.[19] This is a summated rating scale of eight items on how often over the past week respondents experienced symptoms associated with depression,[20] and has been validated as a screening tool. Values ranged from none or almost none of the time (0) to all or almost all of the time (3). Anyone scoring over 10 on the 24-point scale was coded as having depressive symptoms.

The presence of *non-communicable diseases* (*NCDs*)[20] was operationalized as a summary measure, indicating whether respondents had none (reference), one or two or more NCDs.

At the *macro level*, we controlled for two indicators. Physician density per 1000 of the population for the most recent year[21] was included as a measure of the overall availability of the health care system. Accessibility of the health care system was measured by the out-of-pocket payments as a percentage of total health expenditures for the most recent year.[22]

Statistical analysis

Logistic multilevel analyses with maximum likelihood estimation were performed in Stata 14. Two levels were used: individuals ($N = 27\,879$) and countries ($N = 20$). Analysis was first carried out on the overall unmet need variable and then on the specific reasons for unmet need (i.e. availability, accessibility and acceptability). A step-by-step approach was utilized whereby first, the null model was estimated. The explanatory indicators at the individual level were then added in the following sequence: demographics, economic, health care use and health status indicators. Finally, the second-level indicators were included in the analysis. For the three subtypes of unmet need, only the final models are shown.

Results

Descriptive results

Table 1a shows descriptive statistics for unmet need. The first column provides the distribution of the groups in the sample. The majority was in paid work, but almost a quarter were retired. The second column shows the prevalence of overall unmet need within the sample groups. Unmet need overall was at 12% and was relatively evenly distributed among age, gender and education. Unmet need was much higher in the financial strain group (18.2%), among the permanently sick and disabled (22.3%), and among users of health services (13–16%). Unmet need was also much more common among respondents with poor health (24.0%), depressive symptoms (22.7%) and those with more than one chronic condition (17.3%).

This pattern was very much the same for the subtypes of unmet need, shown in columns 3–5. Availability accounted for most of overall unmet need (8%). For accessibility (1.6% of total), financial strain (5%) and poor self-reported health (6.2%) and depressive symptoms (5.5%) had a strong association. There was also a notable reverse educational gradient where higher educated had less than half (0.9%) the unmet need than the lower (2.2%). For acceptability (2.8% total), it was notable that this was most common among those in paid work (3.7%). Note that as the subcategories were not mutually exclusive, they added up to 12.4%.

Table 1b summarizes the macro-variables. Out-of-pocket payments ranged from 5% to 31% of total health expenditure (mean 17.6%), and physician density ranged from 2.2 to 5 per 1000 (mean 3.5). Details on the macro variables are found in table A1 and table A2 in Appendix A.

Results from the regression analysis

We report odds ratios with one decimal (two for macro variables), with 95% confidence intervals in [brackets]. Three-decimal figures are available in the tables. We report 0.05 significance for individual level variables and 0.1 for macro-variables.

Overall unmet need

Table 2 shows the results from the stepwise analysis of overall unmet need. Overall unmet need must be read as a weighted average where availability accounted for around 67%, accessibility 13% and acceptability 23%, with a 3% overlap between subtypes.

Table 1(a) Bivariate distribution of sample, and prevalence of unmet need within groups

	Proportion of sample	Prevalence of unmet need within group			
		Overall	**Availability**	**Accessibility**	**Acceptability**
Total (N = 27.879)	*100.0*	*12.0*	*8.0*	*1.6*	*2.8*
Gender					
Male	47.3	10.1	6.5	1.1	2.6
Female	52.7	13.6	9.3	2.0	2.9
Age					
25–34	16.4	14.3	8.8	1.7	4.7
35–44	20.3	13.2	8.3	1.8	3.8
45–54	21.7	12.0	7.7	1.7	2.8
55–64	21.7	11.3	8.2	1.3	2.1
65–75	20.0	9.3	7.1	1.2	0.9
Education					
Low	22.4	12.0	8.0	2.2	2.1
Medium	51.6	12.0	7.9	1.6	2.9
High	26.0	11.8	8.3	0.9	3.1
Financial strain					
No strain	79.2	10.3	7,1	0.6	2.4
Strain	20.8	18.2	11.2	5.0	4.0
Urbanity					
Urban	63.9	12.8	8.5	1.7	3.0
Rural	36.1	10.5	7.1	1.3	2.4
Immigrant status					
Non-immigrant	88.9	11.7	7.9	1.5	2.6
Immigrant	11.1	14.0	9.1	2.2	4.3
Occupational status					
Paid work	60.8	11.7	7.4	1.1	3.7
Unemployed	5.8	14.9	8.6	4.1	2.4
Permanently sick or disabled	3.2	22.3	15.5	7.2	1.7
Retired	22.3	9.6	7.5	1.2	0.8
Housework	8.0	14.0	10.3	2.2	1.9
Health care use					
GP utilization					
No	25.2	6.9	4.1	0.9	1.4
Yes	74.8	13.7	9.3	1.8	3.2
Specialist utilization					
No	57.7	8.4	5.1	1.0	2.1
Yes	42.4	16.8	11.9	2.3	3.4
Alternative treatment					
None	63.2	9.5	6.1	1.3	2.3
One or more	36.8	16.1	11.2	2.0	3.4
Health status					
Self-reported health					
Good health	93.1	11.1	7.4	1.1	2.8
Poor health	6.9	24.0	16.6	6.2	2.9
Depressive symptoms					
No	87.2	10.3	7.1	1.0	2.5
Yes	12.7	22.7	14.5	5.5	4.4
Non-communicable diseases					
None	27.0	4.8	3.3	0.6	1.1
One	26.1	9.7	6.4	0.9	2.5
Two or more	46.9	17.3	11.5	2.5	3.8

Table 1(b) Summary of macro variables

	N	Mean	SD	Min	Max
Out-of pocket payments	27 879	17.61	7.26	5.22	31.27
Physician density	27 879	3.54	0.71	2.22	4.95

The coefficients for females remained positive and significant throughout the models. However, the odds ratios were reduced from around 1.4 [1.3–1.5] to 1.1 [1.1–1.2] in models 1–4. After controlling for all variables, females remained slightly more likely to report unmet need overall.

There was a persistent pattern whereby odds ratios for unmet need were reduced with age throughout all models. The effects attenuated somewhat when controlling for other factors, but the youngest age group remained at the highest risk of unmet need. In model 4, the oldest group had half the odds of unmet need compared with the reference group (0.5 [0.4–0.6]).

Education was not found to be associated with unmet need. There were slight educational differences in model 1, but these became insignificant and close to zero when controlling for other demographic and health factors.

Financial strain emerged as a strong predictor of unmet need. The odds ratios were reduced slightly from 1.9 [1.8–2.1] to 1.6 [1.5–1.8] when controlling for health.

Table 2 Multilevel logistic regression models for overall unmet need

Overall unmet need	Null model	Model 1	Model 2	Model 3	Model 4
Female^{a}		1.422***	1.379***	1.186***	1.135**
		[1.32,1.53]	[1.28,1.49]	[1.10,1.28]	[1.05,1.23]
Age 35–44^{b}		0.919	0.916	0.899	0.877*
		[0.82,1.03]	[0.82,1.03]	[0.80,1.01]	[0.78,0.99]
Age 45–54^{b}		0.818***	0.804***	0.739***	0.665***
		[0.73,0.92]	[0.71,0.90]	[0.66,0.83]	[0.59,0.75]
Age 55–64^{b}		0.744***	0.738***	0.646***	0.562***
		[0.66,0.84]	[0.65,0.84]	[0.57,0.73]	[0.49,0.64]
Age 65–75^{b}		0.595***	0.630***	0.539***	0.464***
		[0.52,0.68]	[0.53,0.75]	[0.45,0.65]	[0.39,0.56]
Low education^{c}		1.129*	0.896	1.051	0.965
		[1.01,1.27]	[0.79,1.01]	[0.93,1.19]	[0.85,1.09]
Medium education^{c}		1.154**	1.054	1.115*	1.080
		[1.05,1.26]	[0.96,1.16]	[1.01,1.23]	[0.98,1.19]
Financial strain^{d}			1.923***	1.926***	1.614***
			[1.76,2.10]	[1.76,2.11]	[1.47,1.78]
Rural domicile^{e}			0.865***	0.900*	0.900*
			[0.80,0.94]	[0.83,0.98]	[0.83,0.98]
Immigrant^{f}			1.129*	1.148*	1.153*
			[1.01,1.27]	[1.02,1.29]	[1.02,1.30]
Unemployed^{g}			1.006	1.041	0.994
			[0.86,1.17]	[0.89,1.22]	[0.85,1.17]
Permanently sick or disabled^{g}			2.087***	1.495***	1.006
			[1.74,2.50]	[1.24,1.79]	[0.83,1.22]
Retired^{g}			0.995	0.904	0.825*
			[0.85,1.16]	[0.78,1.06]	[0.71,0.96]
Houseworker^{g}			1.048	1.000	0.962
			[0.91,1.21]	[0.87,1.15]	[0.83,1.11]
GP visit^{h}				1.877***	1.601***
				[1.69,2.09]	[1.44,1.78]
Specialist visit^{i}				1.854***	1.554***
				[1.71,2.01]	[1.43,1.69]
Alternative treatment^{j}				1.591***	1.345***
				[1.47,1.72]	[1.24,1.46]
Poor self-reported health^{k}					1.328***
					[1.16,1.52]
Depressive symptoms^{l}					1.700***
					[1.53,1.89]
One NCD^{m}					2.061***
					[1.79,2.37]
Two or more NCDs^{m}					3.120***
					[2.74,3.55]
Constant	0.120***	0.110***	0.105***	0.0436***	0.0285***
	[0.095,0.150]	[0.085,0.140]	[0.081,0.140]	[0.033,0.058]	[0.022,0.038]
Variance	1.328**	1.338**	1.343**	1.326**	1.291**
	[1.11,1.59]	[1.11,1.61]	[1.11,1.62]	[1.11,1.59]	[1.09,1.52]
N	27 879	27 879	27 879	27 879	27 879
Akaike information criterion	19 755.86	19 600.44	19 295.00	18 649.75	18 123.01

Reference categories: (a) male, (b) age 25–35, (c) high education, (d) no financial strain, (e) urban domicile, (f) non-immigrant, (g) paid work, (h) no GP visit, (i) no specialist visit, (j) no alternative treatment, (k) good health, (l) no depressive symptoms, and (m) no NCDs.
$^{*}P<0.05$, $^{**}P<0.01$, $^{***}P<0.001$.

The unemployed, retired and houseworkers deviated very little from respondents in paid work in all models. The group of permanently sick and disabled was found to have higher odds of unmet need in models 1 and 2. This association disappeared completely when controlling for health care use and health status in models 3 and 4.

In model 4, the rural group had slightly lower odds (0.9 [0.8–1.0]) of unmet need, while immigrants had slightly higher (1.2 [1.0–1.3]). The association was persistent in all models.

In terms of health care use, both GP use (1.6 [1.4–1.8]) and specialist use (1.6 [1.4–1.7]) appeared as strong predictors of unmet need in model 4. It should be taken into account that GP use was very prevalent at around 75%, which means that the reference group of no GP use was very unlikely to have any unmet need. Specialist use was less prevalent at around 40%, which infers that most specialist use occurred in combination with GP use.

All the health status variables stood out as strong predictors of unmet need: Poor self-reported health (1.3 [1.2–1.5]), depressive symptoms (1.7 [1.5–1.9]), one NCD (2.1 [1.8–2.4]) and two or more NCDs (3.1 [2.7–3.6]). Note somewhat inflated confidence intervals for these measures. Also note that around half the sample had one chronic condition, and around one-fifth had two or more. People who reported good health were thus more unlikely to report unmet need.

Full models with macro variables: overall, availability, accessibility and acceptability

Table 3 shows the full models for overall unmet need and the three subcategories, with macro variables added. Here, we will report on the noteworthy differences between the subcategories in terms of the most influential variables. To illustrate the effect sizes in more concrete terms, marginal probabilities were calculated in Stata for selected items, based on overall unmet need in table 3 (see Appendix B).

Table 3 Multilevel logistic regression models for overall unmet need and each reason

Unmet need:	Overall	Availability	Accessibility	Acceptability
Female [a]	1.134**	1.157**	1.378**	1.026
	[1.05,1.23]	[1.05,1.27]	[1.11,1.71]	[0.88,1.20]
Age 35–44 [b]	0.877*	0.923	0.968	0.763**
	[0.78,0.99]	[0.80,1.07]	[0.71,1.32]	[0.63,0.93]
Age 45–54 [b]	0.665***	0.741***	0.672*	0.497***
	[0.59,0.75]	[0.64,0.86]	[0.49,0.92]	[0.40,0.61]
Age 55–64 [b]	0.561***	0.685***	0.484***	0.408***
	[0.49,0.64]	[0.59,0.80]	[0.34,0.69]	[0.32,0.52]
Age 65–75 [b]	0.464***	0.548***	0.482**	0.290***
	[0.39,0.56]	[0.44,0.68]	[0.30,0.77]	[0.19,0.45]
Low education [c]	0.965	0.906	1.093	0.989
	[0.85,1.09]	[0.78,1.05]	[0.77,1.54]	[0.77,1.27]
Medium education [c]	1.080	1.004	1.289	1.054
	[0.98,1.19]	[0.90,1.12]	[0.96,1.73]	[0.88,1.26]
Financial strain [d]	1.611***	1.310***	4.770***	1.681***
	[1.46,1.77]	[1.17,1.47]	[3.77,6.03]	[1.40,2.02]
Rural domicile [e]	0.900*	0.971	0.821	0.971
	[0.83,0.98]	[0.88,1.07]	[0.66,1.02]	[0.83,1.14]
Immigrant [f]	1.153*	1.125	1.087	1.478***
	[1.02,1.30]	[0.97,1.30]	[0.82,1.45]	[1.20,1.81]
Unemployed [g]	0.995	1.035	1.575**	0.438***
	[0.85,1.17]	[0.85,1.26]	[1.15,2.15]	[0.31,0.62]
Permanently sick or disabled [g]	1.006	1.185	1.625**	0.255***
	[0.83,1.22]	[0.95,1.48]	[1.13,2.34]	[0.15,0.44]
Retired [g]	0.824*	1.008	0.911	0.280***
	[0.71,0.96]	[0.85,1.20]	[0.60,1.39]	[0.18,0.42]
Houseworker [g]	0.962	1.138	1.110	0.384***
	[0.83,1.11]	[0.96,1.34]	[0.78,1.57]	[0.27,0.54]
GP visit [h]	1.601***	1.704***	1.197	1.921***
	[1.44,1.78]	[1.49,1.95]	[0.89,1.60]	[1.54,2.39]
Specialist visit [i]	1.554***	1.699***	1.527***	1.395***
	[1.43,1.69]	[1.54,1.88]	[1.22,1.91]	[1.19,1.64]
Alternative treatment [j]	1.346***	1.471***	1.152	1.091
	[1.24,1.46]	[1.33,1.62]	[0.93,1.42]	[0.93,1.28]
Poor self-reported health [k]	1.328***	1.286**	1.716***	0.969
	[1.16,1.52]	[1.10,1.50]	[1.30,2.26]	[0.71,1.33]
Depressive symptoms [l]	1.699***	1.474***	2.299***	1.589***
	[1.53,1.89]	[1.30,1.67]	[1.83,2.89]	[1.30,1.94]
One NCD [m]	2.065***	1.906***	1.750**	2.497***
	[1.80,2.37]	[1.62,2.25]	[1.17,2.62]	[1.91,3.27]
Two or more NCDs [m]	3.128***	2.730***	2.973***	3.649***
	[2.74,3.56]	[2.34,3.19]	[2.07,4.27]	[2.82,4.72]
Physician density	0.820	0.726(*)	0.982	1.026
	[0.61,1.10]	[0.50,1.05]	[0.67,1.43]	[0.78,1.35]
Out of pocket-payments	1.023	1.037(*)	1.013	1.017
	[0.99,1.05]	[1.00,1.08]	[0.98,1.05]	[0.99,1.04]
Constant	0.0386***	0.0244***	0.00129***	0.00566***
	[0.013,0.120]	[0.006,0.096]	[0.000,0.005]	[0.002,0.016]
Variance	1.244**	1.405**	1.315*	1.163*
	[1.08,1.43]	[1.12,1.76]	[1.06,1.63]	[1.04,1.31]
N	27 879	27 879	27 879	27 879
Akaike information criterion	18 123.01	13 875.74	3666.04	6358.86

Reference categories: (a) male, (b) age 25–35, (c) high education, (d) no financial strain, (e) urban domicile, (f) non-immigrant, (g) paid work, (h) no GP visit, (i) no specialist visit, (j) no alternative treatment, (k) good health, (l) no depressive symptoms, and (m) no NCDs.
(*)$P<0.1$, *$P<0.05$, **$P<0.01$, ***$P<0.001$.

Financial strain was found to be associated with all types of unmet need. The strongest association was related to accessibility (4.8 [3.8–6.0]), followed by acceptability (1.7 [1.4–2.0]) and availability (1.3 [1.2–1.5]). Respondents with financial strain were, therefore, more likely to report unmet need due to waiting lists, because no appointments were available, or if they were unable to get time off work or had other commitments. Note somewhat inflated confidence intervals for the strongest coefficients.

Occupational status was found to be associated with the three subtypes of unmet need to varying degrees. The unemployed had higher odds of problems with accessibility (1.6 [1.2–2.2]) and lower odds of acceptability (0.4 [0.3–0.6]). Although the sick/disabled suffered little unmet need overall, they were still at higher risk of problems with accessibility (1.6 [1.1–2.3]), much like the unemployed. These associations remained even after controlling for financial strain. Acceptability mainly represented a problem for those in paid work.

In terms of health care use, there was little variation between the types of unmet need. The exception was for accessibility, where there was no significant difference between GP users and non-users. The use of alternative treatments was mainly an issue in relation to availability (1.5 [1.3–1.6]).

In terms of health status, all measures of poor health were strongly associated with almost all types of unmet need. Noteworthy was that poor self-reported health had the strongest association with accessibility (1.7 [1.3–2.3]), which means that people with poor self-reported health were more likely to have problems with paying for health care. The same was found to be true of respondents with depressive symptoms (2.3 [1.8–2.9]). Even stronger associations were found among respondents with NCDs. Here, we can note that people with multiple NCDs had the highest coefficient for acceptability (3.6 [2.8–4.7]).

The results for physician density (0.7 [05–1.1]) and OOP payments (1.04 [1.0–1.1]) were significant at the 0.1 level for availability only. Marginal probabilities were calculated in Stata (results available upon request), showing that increasing physician density from 2.2 to 5 reduced the likelihood of availability-related unmet need by 5.8%. Increasing OOP payments from 5.2% to 31.3% resulted in a higher likelihood of unmet need by 6.3%.

Discussion

The aim of this study was to examine what factors are associated with unmet need, as well as how reasons for unmet need are distributed across socioeconomic and demographic groups in Europe. Like previous work in this area, we found overall unmet need to be greater among females,[23] older populations,[24] those living in rural areas,[25] those with greater use of health care services[23] and those with poor health status.[11] Overall, unmet need was also associated with financial strain. This finding aligns with work demonstrating greater unmet need among those in lower income groups.[26]

In contrast to a study from Canada,[15] we found that immigrants had slightly higher odds of reporting unmet need. We did not control for length of stay, however. The results could be due to different regulatory frameworks and demographic composition of migrants in Canada versus Europe. The results suggest that overall, immigrants to European countries experience higher subjective barriers in access to health care. Some barriers specific to migrants have been documented, such as legal, language and information barriers, as well as cultural differences.[27] There could be variation in unmet need within this group, due to effects of country of origin and destination.

We found no significant association between education and overall unmet need. This is in line with work by Chen and Hou.[10] However, other work on this relationship is somewhat mixed: Allin and Masseria[23] found that lower education was slightly associated with unmet need in Europe while Sibley and Glazier[11] found that higher education was associated with unmet need in Canada. Even in our descriptive results, there were very small bivariate differences in unmet need among educational groups. Our interpretation is that inequality in unmet need does not manifest itself along educational lines at the pooled European level. There is of course the possibility that this is not the case for all the individual countries included in the analysis.

Differences in findings may relate to studies' use of different measures of unmet need. For example, we found that occupational status had a rather slight association with overall unmet need. However, the results from the sub-category analyses reveal that this is in some cases due to contradictory effects of the different types of unmet need. The unemployed, for instance, were found to have higher odds of reporting problems with accessibility, and lower odds reporting problems with acceptability. The same was found for the permanently sick and disabled, who were more likely to experience problems of accessibility, but less of acceptability. The employed measure of unmet need can thus substantially impact findings.

In terms of the sub-category analyses, availability was found to be the most common reason for unmet need in our study, despite the fact that European countries mainly have universal health care systems. In Canadian studies by Sibley and Glazier[11] and Chen and Hou,[10] availability was ranked as the most common reason and the second most common reason for unmet need, respectively. In a European study by Allin and Masseria,[23] accessibility (i.e. cost) was the most common reason for unmet need. Health status, in the forms of poor self-reported health, depressive symptoms, and NCDs, was often found to be the strongest predictor of all types of unmet need. These results suggest that people with a higher degree of general need, measured by self-reported health, are more likely to experience a subjective feeling of not having their needs met, for a variety of different reasons.

In reference to the socioeconomic and demographic variables, financial strain was the only item to persistently and substantially influence unmet need across all subtypes, besides the older age groups. Few studies have investigated the relation between income and different types of unmet need at the European level. Allin and Masseria[23] found that people with lower income had high odds of reporting problems with accessibility. Hernández-Quevedo et al.[28] also found a relationship between income and unmet need due to availability. However, no associations between income and availability were found in Canada,[10,11] where health care is also universal.

These findings suggest that financial strain may be related to unmet need in Europe beyond not being able to pay for care directly. It could be that people with fewer financial resources are less able to bypass waiting lists compared with higher income groups. It could also be that those experiencing financial strain are less able to take time off work. Low-income groups have been shown to more affected by a fear of loss of income, and a higher degree of job insecurity,[29] which could affect their health care seeking behaviour.

We only found a significant association between OOP payments and physician density for availability. US studies have found that higher OOP payments are associated with higher unmet need.[30,31] Their findings may not be comparable with a European context because of fundamental differences in the organization of health care systems.[32] However, our results, held together with the findings on financial strain and availability, suggest that low-income groups could be at higher risk of delayed or unavailable care due to higher OOP payments.

Research on physician density and unmet need is lacking, but the results suggest that high physician density may moderate the influence of OOP payments, and that this association should be studied further.

Limitations

This study should be interpreted in the light of some limitations. The data obtained in this article are only based on self-reported unmet need and does not include additional clinical assessments whether a patient has received appropriate treatment. As previous studies have shown that individuals are better able to estimate their health status compared to others,[33] they could also be in a position to identify shortcomings in their experience with health care.[12] However, the question on unmet need is open to several interpretations, and is likely to be affected by cultural context and the respective health care systems of the respondents. Moreover, the question on unmet need has a time window of 12 months. This could affect the validity, as the possibility of unreliable recall is present. Ideally, it would also have been desirable to have a more objective measure of income, as financial strain only captures a limited aspect of financial situation. Finally, there are limitations related to small sample sizes, which makes it difficult to study cross-national variation for different reasons of unmet need between countries.

Conclusion

Even though health care coverage is universal in many European welfare states, financial strain appeared as a major determinant for European citizens' access to health care. This may suggest that higher income groups are able to bypass waiting lists. European welfare states should, therefore, intensify their efforts in reducing barriers for receiving care.

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Appendix A

Table A1 Unmet need by physician density

Country	Physician density*	Unmet need
Poland	2.22	22.4
Slovenia	2.54	8.5
Ireland	2.67	7.0
UK	2.81	14.3
Finland	2.91	17.1
Hungary	3.10	6.1
Netherlands	3.15	4.3
France	3.19	19.2
Israel	3.34	18.0
Denmark	3.49	6.6
Czech	3.71	7.1
Belgium	3.78	10.0
Germany	3.89	16.1
Sweden	3.93	10.0
Switzerland	4.05	6.0
Portugal	4.10	18.4
Lithuania	4.12	12.4
Norway	4.28	12.6
Austria	4.83	5.5
Spain	4.95	13.5

*: Physician density by 1000 population.

Table A2 Unmet need by out-of-pocket payments

Country	OOP*	Unmet need
Netherlands	5.22	4.3
France	6.34	19.2
UK	9.73	14.3
Slovenia	12.07	8.5
Germany	13.20	16.1
Denmark	13.36	6.6
Norway	13.61	12.6
Sweden	14.06	10.0
Czech	14,33	7.1
Austria	16.15	5.5
Ireland	17.66	7.0
Belgium	17.81	10.0
Finland	18.23	17.1
Poland	23.46	22.4
Spain	24.00	13.5
Hungary	26.59	6.1
Switzerland	26.80	6.0
Portugal	26.84	18.4
Israel	26.98	18.0
Lithuania	31.27	12.4

*: OOP: Out-of-pocket payments as percentage of total health expenditure.

Appendix B

Effect sizes of unmet need

The overall predicted unmet need is 11.5, not far from the sample mean of 12. If all other values are held at sample means, and we vary one parameter at a time, we get the following probabilities of unmet need:

Male	10.8
Female	12.0
Old age group	6.9
Younger age groups	13.1
Financially strained	15.1
Not strained	10.3
No GP use	8.3
GP use	12.3
No specialist use	9.5
Specialist use	13.6
No alternative treatments	10.1
Alternative treatments	13.1
Good health	11.2
Poor health	14.1
No depressive symptoms	10.6
Depressive symptoms	16.1
One NCDs	17.8
Two NCDs	17.4

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Paper II

EXPLORING THE DIFFERENCES IN GENERAL PRACTITIONER AND HEALTH CARE SPECIALIST UTILIZATION ACCORDING TO EDUCATION, OCCUPATION, INCOME AND SOCIAL NETWORKS ACROSS EUROPE: FINDINGS FROM THE EUROPEAN SOCIAL SURVEY (2014) SPECIAL MODULE ON THE SOCIAL DETERMINANTS OF HEALTH

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Exploring the differences in general practitioner and health care specialist utilization according to education, occupation, income and social networks across Europe: findings from the European social survey (2014) special module on the social determinants of health

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Background: Low socioeconomic position (SEP) tends to be linked to higher use of general practitioners (GPs), while the use of health care specialists is more common in higher SEPs. Despite extensive literature in this area, previous studies have, however, only studied health care use by income or education. The aim of this study is, therefore, to examine inequalities in GP and health care specialist use by four social markers that may be linked to health care utilization (educational level, occupational status, level of financial strain and size and frequency of social networks) across 20 European countries and Israel. **Methods**: Logistic regression models were employed using data from the seventh round of the European Social Survey; this study focused upon people aged 25–75 years, across 21 countries. Health care utilization was measured according to self-reported use of GP or specialist care within 12 months. Analyses tested four social markers: income (financial strain), occupational status, education and social networks. **Results**: We observed a cross-national tendency that countries with higher or equal probability of GP utilization by lower SEP groups had a more consistent probability of specialist use among high SEP groups. Moreover, countries with inequalities in GP use in favour of high SEP groups had comparable levels of inequalities in specialist care utilization. This was the case for three social markers (education, occupational class and social networks), while the pattern was less pronounced for income (financial strain). **Conclusion**: There are significant inequalities associated with GP and specialist health care use across Europe—with higher SEP groups more likely to use health care specialists, compared with lower SEP groups. In the context of health care specialist use, education and occupation appear to be particularly important factors.

Introduction

Equitable access to health care is an important principle in European welfare states. However, despite this principle, previous studies have shown that health care utilization is dependent upon income[1,2] and educational attainment.[3] Moreover, studies from Europe have shown that low socioeconomic position (SEP) tends to be linked to higher use of general practitioners (GPs),[4] while the use of health care specialists appears to be more common among those with higher SEP.[2] Even when this is adjusted for health need, those with higher SEP are still more likely to use a health care specialist.

The more frequent use of specialists among higher SEP groups may be seen as a public health paradox, since there is generally more need for health care among lower SEP groups. It has been suggested that higher SEP groups have more 'flexible resources', such as communication skills or social networks, which enable them to manoeuvre their way from primary to secondary care.[5,6] This, in turn, may translate into increasing socioeconomic inequalities in health. Identifying the underlying mechanisms behind this inverse care law[7] could, therefore, provide European welfare states with new tools to reduce the dependency between resources and care.

Although others have studied inequalities in health care use,[2,8,9] this body of work has not been able to explain the inverse relationship between health care specialist use and SEP. We, therefore, use the theory of fundamental causes as a guiding principle to identify social markers that are likely to be linked to health care use. Fundamental cause theory stresses that higher SEP 'embodies an array of resources, such as money, knowledge, prestige, power, and beneficial social connections, that protect health no matter what mechanisms are relevant at any given time'.[10] Indeed, the use of health care is an important mechanism by which people can protect and promote their health.

These resources may come into play with respect to the utilization of health care in different ways. First, 'money' could be used to purchase privatized care from specialists. Second, 'power' could be used in order to secure one's life circumstances.[11] For example, it is possible that people holding high job positions could access a health care specialist through employer agreements with specialist health care providers. Third, 'knowledge' about symptoms, diseases, patient rights, and of the health care system itself may vary by level of education. This assumption implies that those with more health system-relevant knowledge may be more capable of manoeuvring their way through the system to access a specialist. For example, in a free access system, this knowledge could be applied to identify and contact a specialist directly, thereby avoiding the primary care provider.[3] Next, 'prestige' could be defined as the general standing that an individual holds in the eyes of others.[12] Prestige is likely to have consequences for health care access,[11] either indirectly in the form of other resources like money, power, beneficial social connections or more directly, through what a person and/or the social environment believe an individual deserves from them. Finally, while we know that 'social networks' are beneficial for health through the social support they provide individuals, particularly through the strength of their ties, they can also be important through the breadth of their ties. For example, the accessibility of knowledge about symptoms, patient rights, the availability of specialists and even the identities of relevant specialists, can increase the likelihood of using a specialist. Thus, having family, friends, co-workers or even health personnel to seek help and advice from could help in coping and navigating through the health care system. Moreover, the personal social network may act as an informal gate keeper to the health care system by providing insight into personal experience and management of specific symptoms without the need for medical consultation.

Using data from the seventh round of the European Social Survey (ESS), we propose that SEP is a fundamental cause of inequality in health care utilization. Following from this, the overall aim of this study was to examine inequalities in GP and health care specialist use by educational level, occupational status, level of financial strain and size and frequency of social networks across 20 European countries and Israel. As indicated earlier, each of these indicators are associated with resources that can protect and promote health.

Data and methods

This study was based on data from the seventh round of the ESS.[13] We used data from participants aged 25–75 years, restricting our sample size to 31 971 participants. After deleting cases list-wise, our study included 29 637 respondents in 21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France Germany, Hungary, Ireland, Israel, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and UK. The response rates were overall similar to previous rounds of the ESS[14] and ranged from 31% in Germany to 68% in the Czech Republic. Individuals with missing data on study variables were excluded.

Study variables

The outcome variables were based on the question: 'In the last 12 months, with which of the health professionals on this card have you discussed your health?' GP or medical specialist use was dummy coded as binary variables in separate analyses.

Financial strain was measured by asking respondents how they felt about their household income. Those who reported that they found it 'difficult' or 'very difficult' living on their present income were coded as experiencing financial strain. These were contrasted with respondents stating that they were coping or living comfortably on their present income. Overall, more than 20% of respondents reported financial strain (table 1).

The European Socio-Economic Classification of occupation[15] was used to classify the occupational status of respondents. For this study, three categories were constructed: higher occupational class (professionals, managers), intermediate class (clerical, skilled workers, self-employed with no or a small number of employees) and working class (service, sales workers and unskilled workers combined). These groups were of fairly similar sizes (table 1).

Education was classified in three categories according to the International Standard Classification of Education. The lower educated category included respondents with less than upper secondary education, the middle group with upper secondary education, and the higher educated with tertiary education. Half of the respondents were classified in the middle group, while the other half were split between high and low (table 1).

Social networks were measured by combining two separate questions: first, on how often the respondents socially meet with friends, relatives or work colleagues; and, second, on how many people respondents perceive they can discuss intimate and personal matters with. This approach was done to capture both the depth and breadth of social networks. Respondents who attended social meetings between daily and once a week were classified as having a high frequency of social contact, while respondents who met several times a month or less were included under the low social contact group. Additionally, we distinguished respondents who reported more than three people with whom they could discuss intimate matters with from respondents who had less. Respondents reporting low frequency of social contact and few confidants were contrasted with respondents who had either few confidants but high frequency of social contact, or many confidants but low frequency of social contact, and with respondents with high frequency of social contact and many confidants. Around 25% were placed in the high level group, around 40% in the mid-level group and around 30% in the low level group.

As control variables, we adjusted for gender, age and self-reported health. Gender was dummy coded, with females assigned the value one. Age was measured in age dummy groups, including respondents from 25 to 75. Self-reported health was dichotomized, based on the question: 'How good is your health in general?' The responses 'very good' and 'good' were coded as good health and used as reference, while 'fair', 'poor' or 'very poor' health were coded as poor health.

Statistical analysis

Logistic regression analyses were applied to estimate the predicted probabilities per country of visiting a GP or a specialist. Analyses were performed using Stata 14.1. We examined the independent effect of each of the four indicators after mutual adjustment. Through this approach it was possible to disentangle to what extent each SEP marker constituted a pathway on its own right to inequalities in health care utilization without being dependent on unfavourable socioeconomic conditions driven by other social status indicators. Results are reported by adjusted risk ratios (ARRs), which were calculated from predicted probabilities, adjusted for need (self-reported health), age and gender. We report 0.1 significance for the included variables.

The results show the ARRs of GP and specialist use for the following contrast groups: a high versus low educated group, a high vs. a working class occupational group, a high scoring vs. a low scoring social networks group and, finally, the financially strained vs. the financially comfortable (note reverse coding on this last item, in which the strained are given the value 1). In order to test the robustness of the results, we performed additional analyses for three contrast groups: a high vs. middle educated group, a high vs. middle class occupational group and a high scoring vs. a middle scoring social networks group (see figure A1 in Appendix 1, tables A1 and A2 in Appendices 2 and 3). The ARRs of these latter contrast groups were found to be comparatively similar to the ARRs of the high–low contrast groups. In order to illustrate the relationship between relative and absolute measures of inequality, table A3 displays both measures in specialist use by education (see Appendix 4). These results indicate a clear association.

Results

Descriptive results

As illustrated by table 2, GP use was common among all respondents: overall, 75% of respondents stated they had visited a GP in the last 12 months. The use of health care specialist was less than GPs—with 40% of respondents reporting use within the last 12 months. There was a wide degree of variation between countries—both in terms of GP and specialist use. For example, in Sweden, GP use was <60%, whilst in France, it was over 80%. Greater variation was observed for the use of a specialist: in Ireland, Lithuania and Norway, specialist use was under 30%, whilst in Israel and Germany, it was over 60%. There are also notable differences in use by gender: overall, the use of specialists was >10% higher among females.

Table 1 Descriptive statistics for the pooled sample

	N	percent	(percent) GP utilization	(percent) specialist utilization
GP utilization				
Yes	22 126	74.7		
No	7511	25.3		
Specialist utilization				
Yes	12 690	42.8		
No	16 947	57.2		
Age				
25–59	20 777	70.1	71.3	39.1
60–75	8860	29.9	82.5	51.6
Gender				
Female	15 357	52.5	78.4	47.9
Male	13 867	47.5	70.5	37.1
Self-reported health				
Good health	20 084	67.7	69.6	35.0
Poor health	9553	32.2	85.4	59.1
Financial strain				
No	23 348	78.8	73.8	42.4
Yes	6289	21.2	77.8	44.3
Education				
High	7 923	26.7	72.4	46.4
Middle	15 553	52.5	74.4	42.2
Low	6 161	20.8	78.3	39.8
Occupational class				
High	10 810	36.5	74.1	47.0
Middle	7 893	26.6	74.2	42.9
Working class	10 934	39.9	75.6	38.6
Social networks				
High level	7 138	24.1	74.1	46.5
Moderate level	12 863	43.4	75.1	43.0
Low level	9 636	32.5	74.6	39.9

Regression results

Figure 1 presents the ARRs of reporting GP and specialist use in 21 countries according to our four social markers (see tables A4 and A5 in Appendices 5 and 6 for exact point estimates and significance testing). The countries are listed according to increasing ARRs (from left to right) of reporting GP visits. We report ARRs of GP and specialist use in parentheses.

GP use

According to our four markers of SEP, there were several inequalities around GP use. Education was found to be a significant predictor in 6 countries: in Portugal (0.5), Lithuania (0.6) and Ireland (0.7), the higher educated were less likely to use a GP, whilst in Estonia (1.4), Poland (1.4) and Slovenia (1.9), the higher educated were more likely to use a GP. When considering the other countries in the analysis, there was no clear pattern, with around half of countries reporting positive associations with education and GP use, and half reporting negative associations between education and GP use. ARRs varied between the magnitude of 0.4 and 2.

Those in higher occupations were less likely to use a GP in Germany (0.7), while the financially strained were more likely to use a GP in Ireland and Estonia (0.8), and less likely to use a GP in Belgium (1.4) and France (1.6). People with a high social networks score were less likely to use a GP in Poland (0.7), and more likely in Estonia (1.4). In terms of the insignificant results, ARRs related to financial strain were close to 1, and modest for occupation and social networks, with several outliers. ARRs were between 0.6 and 1.6 for occupation and financial strain, and between 0.7 and 1.4 for social networks.

Specialist use

There were significant inequalities in health care specialist use for most of the surveyed countries. The higher educated were more likely to use health care specialists in 11 countries (ARR 1.1–2.0); these were (in ascending order of ARRs): the UK, Sweden, Austria, Norway, Finland, the Czech Republic, France, Germany, Spain, Poland and Portugal. Poland (1.6) and Portugal (2.0) had the highest inequalities associated with specialist use and education. In terms of the insignificant results, the remaining countries all reported greater use of health care specialists among the higher educated.

Table 2 National prevalences of GP and specialist use

	GP utilization percent	Specialist utilization percent
Austria	78.1	49.7
Belgium	82.0	45.9
Czech Rep	74.6	35.7
Denmark	78.6	40.6
Estonia	72.6	51.3
Finland	68.4	42.3
France	83.0	49.9
Germany	81.7	64.1
Hungary	66.5	32.2
Ireland	70.8	19.3
Israel	82.2	61.9
Lithuania	69.3	27.8
Netherlands	72.1	44.6
Norway	79.0	29.8
Poland	70.4	47.9
Portugal	81.6	42.0
Slovenia	79.2	43.2
Spain	78.0	48.8
Sweden	56.0	35.6
Switzerland	68.7	41.4
UK	75.6	34,3
Pooled	74.7	42.8

Significant occupational inequalities in specialist use were found in 10 countries, where the higher occupations were more likely to report visits (ARR 1.1–1.4); these were (in ascending order of ARRs): Ireland, Sweden, Finland, Hungary, the Czech Republic, Estonia, Denmark, France, Switzerland and Austria). In terms of the

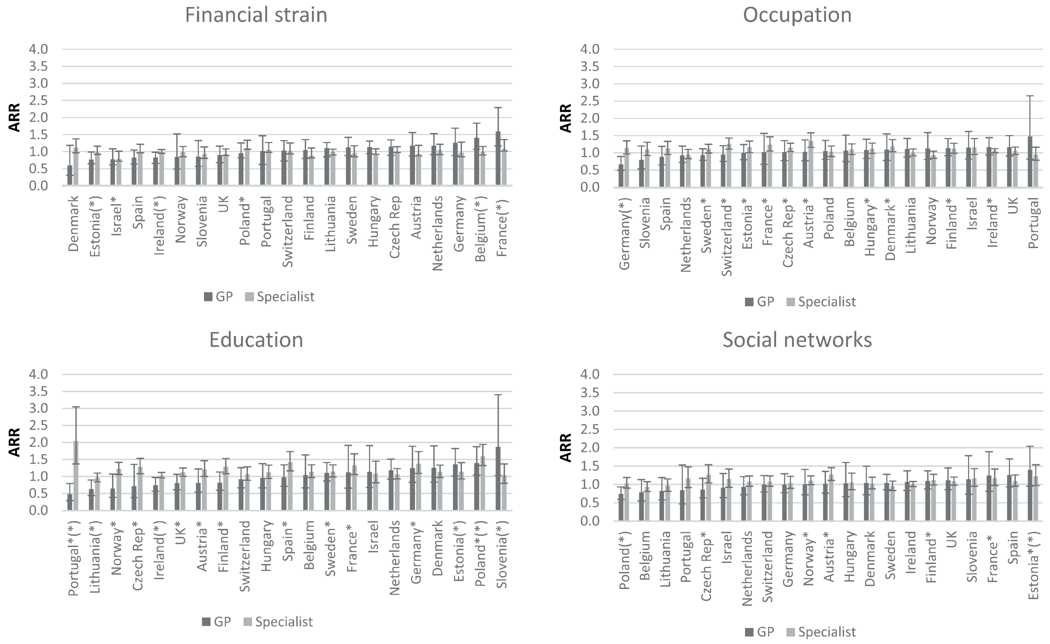

Figure 1 Inequalities (ARRs) in GP and specialist use by financial strain, occupation, education and social networks. Significant estimates marked ($P < 0.1$). (*) Significant results for GP use. * Significant results for specialist use

insignificant results, the majority of the remaining countries reported greater specialist use among those with higher occupations.

There were significant inequalities in specialist use associated with financial strain in two countries: Israel (0.8) and Poland (1.1). Respondents with a high social networks score were more likely to report specialist visits in six countries (1.1–1.3); these were (in ascending order of ARRs): Norway, Finland, France, Estonia, the Czech Republic and Austria). In terms of the insignificant results, there were no clear inequalities due to financial strain and social networks.

Some countries were notable for having inequalities across several markers: Austria, France, the Czech Republic and Finland all demonstrated significant inequalities for education, occupation and social networks.

Interestingly, considerable variation was found in the distribution of GP utilization among countries with higher inequality in specialist utilization. For instance, in more than half of the countries where the higher educated group was more likely to use specialist care, an inverse association was observed between education and GP utilization. Concerning occupation and social networks, GP utilization probability was equitably distributed in most of the countries that demonstrated significant inequalities in specialist utilization in favour of high SEP groups. Whereas in the few countries that GP utilization was more likely among high SEP groups, there was a more consistent positive association between SEP and specialist utilization.

Discussion

The main finding of this study was the observed tendency that countries with higher or equal probability of GP utilization by lower SEP groups had consistent higher probability of specialist care use among higher SEP groups. This was observed after adjusting for health need and was found to be the case for several countries for education (Portugal, Norway, the Czech Republic, the UK, Austria, Finland, Spain, Sweden and France), occupational class (Sweden, Switzerland, Estonia, France, the Czech Republic, Austria, Hungary and Denmark) and social networks (the Czech Republic, Norway, Austria and Finland), while this was not observed for financial strain. Moreover, countries with inequalities in GP use in favour of high SEP groups such as Poland, Estonia, Belgium and France tend to preserve a positive association between high SES and specialist utilization and in some instances demonstrated comparable levels of inequalities in specialist care utilization.

Therefore, independently of the distribution of GP utilization, across all countries and social markers (with exception of financial strain), people from higher SEP groups were more likely to use secondary care, even for the same level of need as lower status groups. We hypothesize that this is because higher SEP groups have more flexible resources available that can help obtain such care to a greater extent compared with lower SEP groups. The fact that inequalities in health care use may stem from the availability of resources may explain why we find larger socioeconomic inequalities in mortality for amenable causes of death in Europe, as compared with less preventable causes.[8,16]

Inequalities in specialist use were larger compared with GP use, which is in line with the overall picture that those with higher SEP utilize more specialist care. In particular, these inequalities were mainly related to education and occupation, which were demonstrated in around half of the countries. People in different SEP groups may have different preferences for who they consult with in the health care system.[3] For example, those with lower SEP may prefer to communicate with their GP compared with a specialist, as a GP could be perceived as more trustworthy and capable of discussing a disease with a particular patient; forming a relationship with a GP could be an important factor in this regard. On the other hand, people with high SEP may be more interested in consulting with a specialist because of the wish to consult with someone who possesses special knowledge within a specific field of competence. Such preferences may be associated with knowledge about the health care system, which may be related to resources like education. Further qualitative work, exploring different experiences for people accessing health care between high and low SEP groups across European welfare states would be valuable.

With regards to social networks, the findings were less conclusive. One possible reason might be that the size of one's personal network does not necessarily relate to superior access to health care, if the connections within the network do not have good access to resources themselves. Further research should, therefore, investigate how the 'quality' and type of social network (e.g. friends vs. family members) influences health care utilization.

Somewhat surprisingly, the least inequalities in specialist use were found between the financially comfortable and the financially strained. Given our findings—which are in contrast to previous literature (e.g. Van Doorslaer *et al.*[2])—it could be argued that income is perhaps the least flexible indicator of SEP. Although education, occupation and income are tightly interwoven markers of socio-economic position, it appears that income is contingent upon educational and occupational status to gain better access to specialist health services. Drawing on the work of Pierre Bourdieu,[17] we suggest that the accumulated resources of money, knowledge, prestige, power and social connections together constitute a form of 'health systems capital'. In this study, whenever a marker of inequality is significant, it depicts only its independent contribution to inequalities in access to health care. For individuals who are at the intersection of different social positions, the combination of these markers has a synergic effect on their probability of accessing health care. This effect could be positive or negative, depending on the accumulation of advantageous and disadvantageous positions, which seems especially to be the case for access to specialist care.

Education stands out in our study as a particularly important indicator of health care utilization. Previous studies have also indicated that education is a stronger determinant of health care use compared with income and employment status.[18,19] Indeed, a study by Stirbu *et al.*[3] showed that educational inequalities were present in all countries after adjusting for self-reported health. We acknowledge that higher education consistently yields better wages, more knowledge, more prestige, more power and more valuable social connections, but it appears that education as an overall indicator is important predictor for health care utilization—especially considering our findings that the fewest inequalities were found between utilization and financial resource. The benefits of education may also be true for occupation but, according to our results, it seems that the occupational hierarchy does not work as an equally strong predictor for health care use.

Austria, France, Czech Republic and Finland all demonstrated inequalities in specialist use for the markers education, occupation and social networks. With the exception of Czech Republic, these countries also seem to have a higher use of health care specialists. This could also point to system-related reasons, such as the organization of health care, expenditure, financing and access regulation.[20] Still, we were not able to find systematic variations between these factors and the degree of inequalities. Wendt and Kohl[21] have argued that there is only a weak correlation between the financial resources invested in a nation's health and the level of health employment, such as health care providers. It should be noted, however, that our study showed that Portugal, which has the lowest total health expenditure among our countries,[22] actually had the largest educational inequalities in specialist use. Portugal also has a relatively high level of private out of pocket (OOP) payments.[23]

Access regulation includes different dimensions, such as the remuneration of GPs, which can be paid fee-for-service (e.g. France), per capita (the number of patients on the list) (e.g. the UK), or by fixed salary (e.g. Portugal).[20] This is likely to affect the actual use of such services; e.g. a fee-for-service payment may set an incentive for doctors to see their patients often, while payment per capita or a fixed salary may give an incentive to reduce the number of patient visits.[23,24]. A second dimension relates to whether patients have free access to GPs or whether they have to sign onto a GP's list for a longer period, which is referred to as 'gatekeeping'.[23] Patients may also have varying options in different countries when consulting a specialist. They may have a free choice and direct access to a specialist, need a referral by a GP, or be able to skip the referral system by accepting a higher co-payment.[25] Concerning access regulation, there are differences between the respective countries regarding the difficulty of obtaining specialist health care services. In countries with a classic GP gatekeeping system (such as the UK, the Netherlands, Portugal, Denmark, Finland and Norway), a patient would need a GP referral to access a health care specialist; moreover, and more importantly, the GP would have to view this referral as appropriate. In other countries, patients can access health care specialists and secondary care (such as Belgium, France and Germany) without the need for a GP gatekeeper. There may be more equality—in terms of specialist health care use—by applying a strong gate keeping system with one such example being the use of clinical guidelines.[3,26] Indeed, in many countries, clinical guidelines are increasingly becoming a part of regular clinical practice; they have the aim of improving consistency of care.[27] Enabling systems to achieve this is important, as previous work has shown that patients with identical clinical problems can receive different care, depending on their individual circumstances.[28]

Based on the description of health care systems, there should at least be theoretical reasons to expect different health care use across Europe. However, none of the above-mentioned system characteristics seem to be able to explain the inequalities found in this study. Despite the different organization of health care systems, we found a pattern of different use of GPs and specialist care for people across different SEP indicators. This finding is in line with Stirbu *et al.*[3] and Van Doorslaer *et al.*,[2] who found a general pattern of differential access to primary and secondary care across different SEP groups. The universal pattern indicates that lower SEP groups 'encounter barriers that are common in all countries, and thus lie beyond the national structure and organization of the health care system'.[3]

Limitations

We acknowledge that this study uses survey data. Although the ESS maintains the highest standard of data collection, the survey is still prone to differences in response rates, and cross-cultural quality of questions. For a further discussion on the strengths and weaknesses of the ESS, see Eikemo *et al.*[14] We also acknowledge some methodological limitations in our work; e.g. the data used in our analysis utilized a binary variable on whether respondents have used a GP or health care specialist within the last 12 months, meaning only limited information is captured regarding actual health care use. Clearly, a person using a GP or health care specialist every week should be considered differently to a person using such services once every year. Other studies[1–3,29] have accounted for this by measuring the frequency of GP and specialist consultations within a 12-month period, which implies that our study is not entirely comparable to previous work. We also acknowledge that the division of labour between GP and health care specialists varies between countries (e.g. in some countries GPs have extended training enabling them to consult with patients who would have otherwise required referral to a specialist). As we have only examined a limited aspect of health care use, we cannot draw conclusions on the quality of health care. Even though high SEP groups are more likely to use specialist care, this type of health care is not necessarily better compared with GP use. More care may not always be better, leading to a prolonged life and being a cause of the social gradient in mortality. The complexity of these matters is illustrated by the discussion of protecting patients from overtreatment.[30] The results should therefore be interpreted with caution. Nonetheless, and despite these limitations, we are confident that our findings are robust and have important implications for policy makers across Europe regarding health care access.

Conclusion

There are significant inequalities associated with GP and specialist health care use across Europe—with higher SEP groups more likely to use health care specialists, compared with lower SEP groups; this finding was observed after controlling for health need. In the context of health care specialist use, education and occupation appear to be particularly important factors. Future work should seek to explore why these inequalities occur among the different health care systems.

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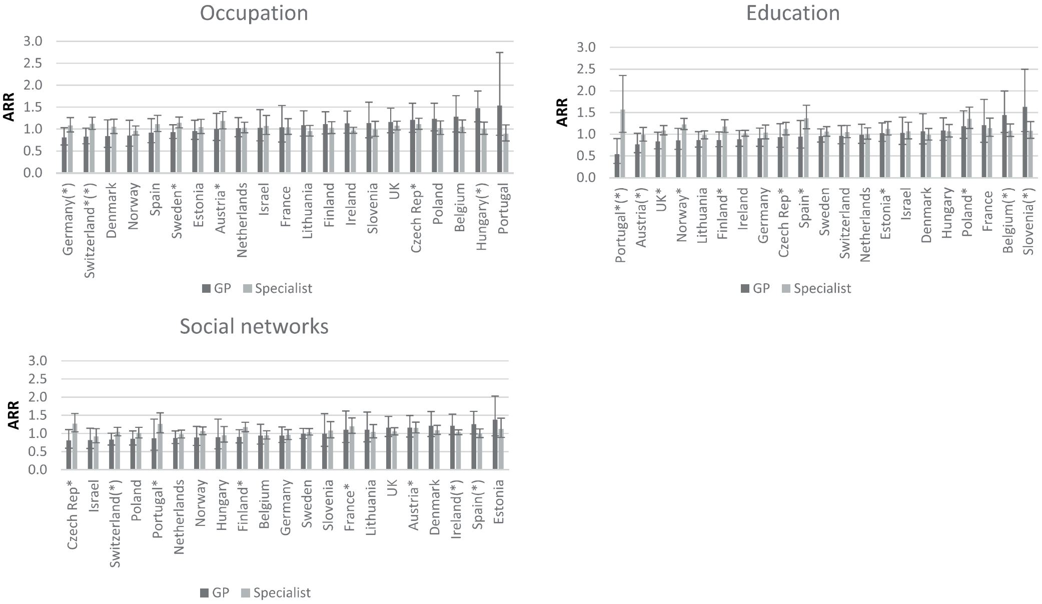
Appendix 1: ARRs (high-middle group)



Occupation

Education

Social networks

Figure A1 Inequalities (ARRs) in GP and specialist use by occupation, education and social networks (high-middle group). Significant estimates marked ($P < 0.1$). (∗) Significant results for GP use. ∗ Significant results for specialist use

Appendix 2: ARRs (high-middle group)

Table A1 Inequalities (ARRs) (90% CI) in GP use by occupation, education and social networks (high-middle group)

	Occupation	CI	CI	Education	CI	CI	Social networks	CI	CI
Austria	1.0	0.7	1.4	0.8∗	0.6	1.0	1.2	0.9	1.5
Belgium	1.3	0.9	1.8	1.4∗	1.0	2.0	0.9	0.7	1.3
Czech Rep	1.2	0.9	1.6	0.9	0.7	1.2	0.8	0.6	1.1
Denmark	0.8	0.6	1.2	1.1	0.8	1.5	1.2	0.9	1.6
Estonia	1.0	0.8	1.2	1.0	0.8	1.3	1.4	0.9	2.0
Finland	1.1	0.9	1.4	0.9	0.7	1.1	0.9	0.7	1.1
France	1.0	0.7	1.5	1.2	0.8	1.8	1.1	0.8	1.6
Germany	0.8∗	0.6	1.0	0.9	0.7	1.1	0.9	0.7	1.2
Hungary	1.5∗	1.2	1.9	1.1	0.9	1.4	0.9	0.6	1.4
Ireland	1.1	0.9	1.4	0.9	0.7	1.1	1.2∗	1.0	1.5
Israel	1.0	0.7	1.4	1.0	0.8	1.4	0.8	0.6	1.1
Lithuania	1.1	0.8	1.4	0.9	0.7	1.1	1.1	0.8	1.6
Netherlands	1.0	0.8	1.3	1.0	0.8	1.2	0.9	0.7	1.1
Norway	0.9	0.6	1.2	0.9	0.6	1.1	0.9	0.7	1.2
Poland	1.2	1.0	1.6	1.2	0.9	1.5	0.9	0.7	1.1
Portugal	1.5	0.9	2.7	0.5∗	0.3	0.9	0.9	0.5	1.4
Slovenia	1.1	0.8	1.6	1.6∗	1.1	2.5	1.0	0.6	1.5
Spain	0.9	0.7	1.2	0.9	0.7	1.3	1.3∗	1.0	1.6
Sweden	0.9	0.8	1.1	1.0	0.8	1.1	1.0	0.9	1.1
Switzerland	0.8∗	0.7	1.0	1.0	0.8	1.2	0.8∗	0.7	1.0
UK	1.2	0.9	1.5	0.8	0.7	1.0	1.2	0.9	1.5

∗: $P < 0.1$.

Appendix 3: ARRs (high-middle group)

Table A2 Inequalities (ARRs) (90% CI) in specialist use by occupation, education and social networks (high-middle group)

	Occupation	**CI**	**CI**	**Education**	**CI**	**CI**	**Social networks**	**CI**	**CI**
Austria	1.2*	1.0	1.4	1.0	0.8	1.2	1.2*	1.0	1.3
Belgium	1.1	0.9	1.2	1.1	0.9	1.2	1.0	0.8	1.1
Czech Rep	1.1*	1.0	1.2	1.1*	1.0	1.3	1.3*	1.0	1.5
Denmark	1.0	0.9	1.2	1.0	0.9	1.1	1.1	1.0	1.2
Estonia	1.0	0.9	1.2	1.1*	1.0	1.3	1.1	0.9	1.4
Finland	1.0	0.9	1.2	1.2*	1.0	1.3	1.2*	1.0	1.3
France	1.0	0.9	1.2	1.1	1.0	1.4	1.2*	1.0	1.4
Germany	1.1	0.9	1.3	1.0	0.9	1.2	1.0	0.8	1.1
Hungary	1.0	0.9	1.2	1.1	0.9	1.2	1.0	0.8	1.2
Ireland	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1
Israel	1.1	0.9	1.3	1.1	0.9	1.3	0.9	0.7	1.1
Lithuania	1.0	0.8	1.1	1.0	0.9	1.1	1.0	0.9	1.2
Netherlands	1.0	0.9	1.2	1.0	0.9	1.1	1.0	0.9	1.1
Norway	1.0	0.9	1.1	1.2*	1.1	1.4	1.1	1.0	1.2
Poland	1.0	0.9	1.2	1.4*	1.1	1.6	1.0	0.9	1.2
Portugal	0.9	0.7	1.1	1.6*	1.0	2.4	1.3*	1.0	1.6
Slovenia	1.0	0.8	1.2	1.1	0.9	1.3	1.1	0.9	1.3
Spain	1.1	0.9	1.3	1.4*	1.1	1.7	1.0	0.9	1.1
Sweden	1.1*	1.0	1.3	1.1	1.0	1.2	1.0	1.0	1.1
Switzerland	1.1*	1.0	1.3	1.1	0.9	1.2	1.0	0.9	1.2
UK	1.1	1.0	1.2	1.1*	1.0	1.2	1.1	1.0	1.2

*: $P < 0.1$.

Appendix 4: Relative and absolute inequalities

Table A3 Relative and absolute inequalities in specialist utilization by education, in rising order of relative inequalities

	Specialist	
Education	ARR	ARD
Lithuania	1.0	−0.03
Ireland	1.0	0.03
Slovenia	1.0	0.03
Switzerland	1.1	0.04
Netherlands	1.1	0.04
Israel	1.1	0.03
Hungary	1.1	0.08
UK	1.1	0.08
Denmark	1.1	0.08
Belgium	1.1	0.07
Estonia	1.1	0.07
Sweden	1.1	0.09
Austria	1.2	0.11
Norway	1.2	0.14
Finland	1.3	0.15
Czech Rep	1.3	0.17
France	1.3	0.15
Germany	1.4	0.13
Spain	1.4	0.17
Poland	1.6	0.25
Portugal	2.0	0.35

Appendix 5: Adjusted risk ratios

Table A4 Inequalities (ARRs) (90% CI) in GP use by financial strain, occupation, education and social networks

	Financial strain	CI	CI	Occupation	CI	CI	Education	CI	CI	Social networks	CI	CI
Austria	1.2	0.9	1.6	1.0	0.8	1.4	0.8	0.5	1.2	1.0	0.8	1.4
Belgium	1.4*	1.1	1.8	1.1	0.7	1.5	1.0	0.7	1.6	0.8	0.6	1.1
Czech Rep	1.1	0.9	1.3	1.0	0.8	1.4	0.7	0.4	1.4	0.9	0.6	1.2
Denmark	0.6	0.3	1.2	1.1	0.8	1.6	1.3	0.8	1.9	1.0	0.7	1.5
Estonia	0.8*	0.7	1.0	1.0	0.8	1.2	1.4*	1.0	1.8	1.4*	1.0	2.0
Finland	1.1	0.8	1.4	1.1	0.9	1.4	0.8	0.6	1.1	1.1	0.9	1.4
France	1.6*	1.2	2.3	1.0	0.7	1.6	1.1	0.7	1.9	1.2	0.8	1.9
Germany	1.3	0.9	1.7	0.7*	0.5	0.9	1.2	0.8	1.9	1.0	0.8	1.3
Hungary	1.1	0.9	1.3	1.1	0.8	1.4	1.0	0.7	1.4	1.0	0.7	1.6
Ireland	0.8*	0.7	1.0	1.2	0.9	1.4	0.7*	0.6	1.0	1.1	0.8	1.4
Israel	0.8	0.6	1.1	1.2	0.8	1.6	1.1	0.7	1.9	0.9	0.6	1.3
Lithuania	1.1	0.9	1.3	1.1	0.9	1.4	0.6*	0.4	0.9	0.8	0.6	1.2
Netherlands	1.2	0.9	1.5	0.9	0.7	1.2	1.2	0.9	1.5	0.9	0.7	1.2
Norway	0.9	0.5	1.5	1.1	0.8	1.6	0.6	0.4	1.1	1.0	0.7	1.4
Poland	1.0	0.8	1.3	1.1	0.8	1.4	1.4*	1.0	1.9	0.7*	0.6	0.9
Portugal	1.0	0.6	1.5	1.5	0.8	2.7	0.5*	0.3	0.8	0.8	0.5	1.5
Slovenia	0.9	0.6	1.3	0.8	0.5	1.2	1.9*	1.0	3.4	1.1	0.7	1.8
Spain	0.8	0.6	1.1	0.9	0.7	1.2	1.0	0.7	1.3	1.3	0.9	1.7
Sweden	1.1	0.9	1.4	0.9	0.8	1.1	1.1	0.9	1.4	1.0	0.9	1.3
Switzerland	1.0	0.7	1.3	1.0	0.8	1.2	0.9	0.7	1.3	1.0	0.8	1.2
UK	0.9	0.7	1.2	1.2	0.9	1.5	0.8	0.6	1.1	1.1	0.9	1.4

*: $P < 0.1$.

Appendix 6: Adjusted risk ratios

Table A5 Inequalities (ARRs) (90% CI) in specialist use by financial strain, occupation, education and social networks

	Financial strain	CI	CI	Occupation	CI	CI	Education	CI	CI	Social networks	CI	CI
Austria	0.9	0.9	1.2	1.4*	1.2	1.6	1.2*	1.0	1.5	1.3*	1.1	1.5
Belgium	1.0	0.9	1.2	1.1	1.0	1.3	1.1	1.0	1.3	0.9	0.8	1.1
Czech Rep	1.0	1.0	1.1	1.1*	1.0	1.3	1.3*	1.1	1.5	1.3*	1.0	1.5
Denmark	1.1	1.0	1.4	1.2*	1.0	1.4	1.1	1.0	1.3	1.0	0.9	1.2
Estonia	1.0	0.9	1.2	1.2*	1.0	1.3	1.1	0.9	1.4	1.2*	1.0	1.5
Finland	0.9	0.8	1.1	1.1*	1.0	1.3	1.3*	1.1	1.5	1.1*	1.0	1.3
France	1.1	1.0	1.4	1.2*	1.0	1.5	1.3*	1.1	1.7	1.2*	1.0	1.4
Germany	1.0	0.9	1.3	1.1	1.0	1.3	1.4*	1.1	1.7	1.0	0.9	1.2
Hungary	0.9	0.9	1.1	1.1*	1.0	1.3	1.1	0.9	1.3	1.1	0.9	1.3
Ireland	1.0	1.0	1.1	1.1*	1.0	1.1	1.0	1.0	1.1	1.0	0.9	1.1
Israel	0.8*	0.7	1.0	1.2	1.0	1.4	1.1	0.8	1.4	1.1	0.9	1.4
Lithuania	1.0	0.9	1.1	1.0	0.9	1.1	1.0	0.8	1.1	1.0	0.8	1.1
Netherlands	1.0	0.9	1.2	1.0	0.8	1.1	1.1	0.9	1.2	1.1	0.9	1.2
Norway	1.0	0.9	1.2	0.9	0.8	1.0	1.2*	1.1	1.4	1.1*	1.0	1.2
Poland	1.1*	1.1	1.3	1.0	0.9	1.2	1.6*	1.3	1.9	1.0	0.9	1.2
Portugal	1.1	1.0	1.3	1.0	0.8	1.2	2.0*	1.4	3.0	1.2	0.9	1.5
Slovenia	0.9	0.8	1.1	1.1	0.9	1.3	1.0	0.8	1.4	1.2	0.9	1.4
Spain	1.0	1.0	1.2	1.1	1.0	1.3	1.4*	1.2	1.7	1.1	0.9	1.3
Sweden	1.0	0.9	1.2	1.1*	1.0	1.2	1.1*	1.0	1.3	1.0	0.8	1.1
Switzerland	1.0	0.9	1.3	1.3*	1.1	1.4	1.1	0.9	1.3	1.1	0.9	1.2
UK	0.9	0.9	1.1	1.1	1.0	1.2	1.1*	1.0	1.3	1.1	1.0	1.2

*: $P < 0.1$.

Paper III

INFORMAL CARE IN EUROPE: FINDINGS FROM THE EUROPEAN SOCIAL SURVEY (2014) SPECIAL MODULE ON THE SOCIAL DETERMINANTS OF HEALTH

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Informal care in Europe: findings from the European Social Survey (2014) special module on the social determinants of health

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Background: Against the background of a rising demand for informal care in European societies, this study sets out to provide descriptive information by gender on (i) prevalence rates of (intensive) informal caregiving, (ii) characteristics of (intensive) informal caregivers and (iii) consequences of (intensive) informal caregiving in terms of mental well-being. **Methods:** Data from the European Social Survey, Round 7 were analysed with multilevel (logistic) regression techniques ($n = 28\,406$ respondents in $n = 20$ countries). **Results:** On average, 34.3% of the population in 20 European countries were informal caregivers and 7.6% were intensive caregivers (providing care for minimum 11 h a week). Countries with high numbers of caregivers had low numbers of intensive caregivers. Caregiving was most prevalent among women, 50–59 year olds, non-employed—especially those doing housework—and religious persons. Determinants of providing care hardly differed by gender. Caregivers, especially female and intensive caregivers, reported lower mental well-being than non-caregivers. **Conclusions:** Our results suggest support for both crowding-in and crowding-out effects of the welfare state. Middle-aged women may become increasingly time squeezed as they are likely to be the first to respond to higher demands for informal care, while they are also the major target groups in employment policies aiming for increased labour market participation. Caregivers, and especially female and intensive caregivers, report lower levels of mental well-being. Supportive policies such as respite care or training and counselling may therefore be needed in order to sustain informal care as an important resource of our health care systems.

Introduction

Good quality health care is an essential determinant of health and health inequality both in terms of prevention and treatment of ill health. Equal access to health care for equal need therefore is an important and formalized element of many European welfare states.[10] While health care is most commonly understood as medical services provided by health care professionals, not all forms of health care are provided formally. In fact, more care is provided informally (by family and friends) than formally.[7] However, despite its essential role in the healthcare system, informal care can be characterized as a 'hidden health care system'.[12] This is unfortunate because informal care responsibilities disproportionally fall on certain social groups, such as middle-aged women,[7] and are associated with reduced well-being.[16,21]

More information on informal care becomes increasingly relevant against the background of current policy developments in several European countries. In response to ageing populations and growing needs for long-term care, governments increasingly rely on informal care.[22] The purpose of this article is therefore to provide descriptive information on this "hidden form of care". In particular, it will describe (i) prevalence rates of informal care in 20 European countries, (ii) characteristics of informal caregivers and (iii) consequences of informal caregiving in terms of caregivers' mental well-being. For all three topics, we will consider caregivers in general and intensive caregivers (i.e. those who provide care for 11 h a week or more). In order to provide a thorough description, we will also present gender differences in the determinants and mental health outcomes of (intensive) informal care.

Current country-comparative knowledge on informal care[2,4,9,22] is largely based on samples of older persons that report on received or provided care, most prominently collected in the Survey of Health, Ageing and Retirement (SHARE) initiative that conducted interviews in several European countries in 2004/2005, 2006/2007 and 2010/2011. Data from the seventh round of the European Social Survey (ESS)[8] collected in 2014 provide an excellent source to update and extend our current knowledge. First, it offers very recent information on a wide number of European countries. Second, the ESS is based on random samples of the population aged 15 years and over. This implies that, compared with the SHARE studies, our study may offer a more complete picture of informal care, covering more types of relationships between care receiver and caregiver than the parent–child relationship and, consequently, also a more diverse set of reasons for providing informal care.

Methods

ESS7 offers information on 37 623 respondents from 22 national random samples collected through face-to-face interviews. Complete information on the survey, including questionnaires, is available from http://www.europeansocialsurvey.org. Data from Latvia were unavailable at the time this article was written and we removed Israel to restrict our study to European countries. As a robustness check, we also excluded Hungary since prevalence rates were extremely low and not in line with previous studies.[21] Because conclusions did not alter, we here show the results with Hungary included. We selected respondents aged between 25 and 75 (but conclusions were not different when a sample of 18 year and older was selected); and removed those respondents (5.9%) with a missing value on at least one of the variables of interest. Our analysis sample included 28 406 respondents in 20 countries (see figure 1 for the list of countries and their sample sizes).

Informal caregiving was defined as a positive answer to the question whether one spends any time looking after or giving

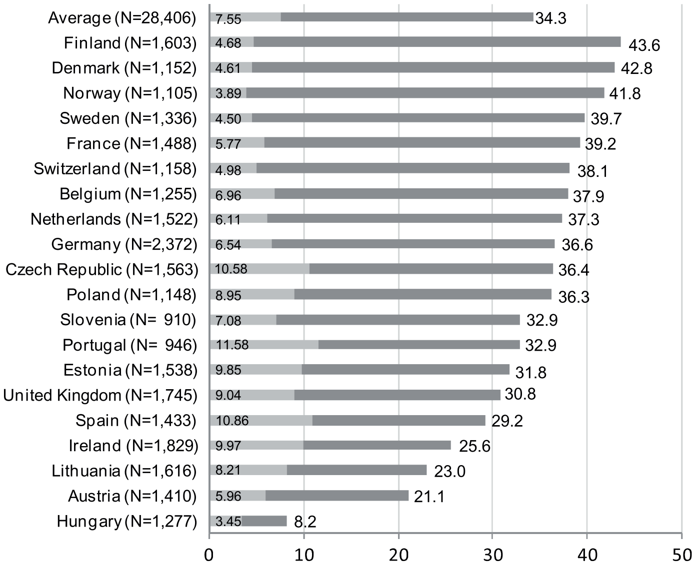

Figure 1 Prevalence rate of informal caregivers by country (%); intensive caregivers are marked in light grey; *source: European Social Survey, Round 7*

help to family members, friends, neighbours or others because of long-term physical ill health or disability, long-term mental ill health or disability, or problems related to old age. In addition, we identified *intensive caregivers* as those who reported to spend 11 h a week or more on this. We found the same patterns, though stronger effects when intensive caregiving was defined as 21 h a week or more (which applied to only 3.7% of our sample).

The selection of determinants of providing informal care was foremost driven by the Informal Care Model.[5] We included indicators for people's attitudes (do I want to) and perceived barriers (can I) towards providing informal care. In addition, we included demographic determinants that are often associated with caregiving.[7] *Sex* was recoded with females having score 1. *Age* was categorized in five-year groups to capture the non-linear relationship between age and informal caregiving. *Relationship status* reflected the current partnership arrangement (instead of legal marital status), distinguishing married, cohabiting, divorced or separated, widowed and single never married persons. *Employment status* was measured in seven categories: full-time job (35 h a week or more), part-time job (less than 35 h a week), housework (including looking after children or other persons), unemployed, retired, disabled (including permanently sick) and in education. We excluded those in military or community service (0.1%). Presence of *children in the household* was recorded in a binary variable. *Self-rated health* was measured on a five-point scale with higher values reflecting better health. *Educational level* was based on International Standard Classification of Education (ISCED) scores and divided into three categories: lower secondary education or less, upper secondary education, and tertiary education or more. We used a categorical variable for two main reasons. First, Schneider[18,19] argued that using years of education is not optimal for comparative research in European countries. Second, comparing educational groups is more relevant than assessing a linear association, given this study's focus on differences between groups in providing informal care. Finally, *religiosity* was another binary variable, indicating whether or not the respondent considered him/herself belonging to any particular religion or denomination.

Mental well-being was measured as a sum score of eight items (a subset of the CES-D scale)[17] about respondents' feelings or behaviours during the past week (e.g. felt depressed, sleep was restless, enjoyed life). Answer categories ran from none or almost none of the time (0) to all or almost all of the time.[3] Previous research has indicated that CES-D 8 is a valid and reliable indicator for depression which is comparable within a European context.[11,13,20]

Table 1 presents descriptive statistics of all variables used in the analyses, also separated by caregiving status.

Our analyses consisted of three parts that followed the aims of this study. Firstly, we calculated the prevalence rate of informal care as well as intensive informal care in each country in our study. Secondly, we estimated the effects of the eight determinants on the odds of being an (intensive) informal caregiver using logistic multilevel analysis techniques with respondents nested in countries. We also conducted separate analyses for men and women and tested gender differences in a full interaction model. Thirdly, we regressed mental well-being on (intensive) informal caregiving, controlled for demographic and socio-economic variables, applying linear multilevel analysis. Again, we stratified our analyses by gender as well and tested differences in a full interaction model.

Results

Figure 1 shows the prevalence rates of informal care in 20 European countries. On average, over a third of the countries' populations provided informal care, but variation between countries was large: from 43.6% in Finland to 8.2% in Hungary. Informal care was more common in Nordic countries and less common in Central, Eastern and Southern Europe. However, nuance is needed. Intensive caregiving—defined as at least 11 h a week and done by only 7.6% of Europe's population—was negatively related to the proportion of informal caregivers. Countries in Central, Eastern and Southern Europe had higher proportions of intensive caregivers than the Nordic countries: for instance, 11.6% in Portugal versus 3.9% in Norway.

Table 2 reveals that demographic and socio-economic groups are most likely to provide (intensive) informal care. Determinants for providing (intensive) care hardly differed by gender and some were

Table 1 Descriptive statistics[a]

	All respondents (n = 28 406)		Non-caregivers (n = 18 984)		Informal caregivers (n = 9422)		Intensive caregivers (n = 2001)	
	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)
Informal caregiver	34.3							
Intensive caregiver (11+ h a week)	7.6							
Female	51.4		49.5		55.0		63.6	
Age								
25–29 years	10.0		11.1		7.9		6.4	
30–34 years	11.5		12.3		10.0		9.5	
35–39 years	10.4		11.4		8.4		8.1	
40–44 years	11.0		11.3		10.3		9.3	
45–49 years	12.1		11.9		12.4		11.0	
50–54 years	12.5		10.8		15.8		15.5	
55–59 years	8.6		7.6		10.5		13.6	
60–64 years	8.6		8.0		9.6		9.8	
65–69 years	7.9		7.7		8.2		9.3	
70–75 years	7.5		7.8		6.9		7.5	
Relationship status								
Married	61.0		59.3		64.3		63.6	
Cohabiting	10.0		11.0		8.1		7.3	
Divorced/separated	10.1		9.9		10.7		12.0	
Widowed	4.2		4.4		3.8		5.1	
Single, never married	14.6		15.4		13.2		12.0	
Educational level								
Lower secondary or less	33.0		33.1		32.9		39.7	
Upper secondary	47.7		46.6		49.9		47.8	
Tertiary or more	19.2		20.3		17.2		12.6	
Employment status								
Full-time job	47.8		49.1		45.3		34.3	
Part-time job	12.7		12.6		12.8		9.4	
Housework	9.6		8.7		11.1		20.9	
Unemployed	7.1		6.9		7.5		9.6	
Retired	18.1		17.9		18.5		20.7	
Disabled	3.1		3.0		3.2		4.4	
In education	1.7		1.8		1.6		0.7	
Children in household	49.1		48.9		49.6		50.9	
Self-rated health (0–4)		2.77 (0.89)		2.80 (0.89)		2.73 (0.88)		2.61 (0.91)
Religious	56.5		55.0		59.2		61.7	
Mental health: depressive symptoms (0–24)		5.32 (4.08)		5.18 (4.05)		5.59 (4.14)		6.49 (4.48)

Source: European Social Survey, Round 7, weighted data using post-stratification (based on age-group, gender, education and region) and population size weights.

[a] Differences between the three groups were tested with χ^2 test (nominal variables) or t-test (continuous variables). All tests were significant at $P<0.05$ except for children in household, self-rated health and religiosity between non-caregivers and informal caregivers.

more, whereas others were less pronounced when intensive caregiving was concerned.

Females had a 33% higher odds of providing care than males (OR = 1.33, 95% CI = 1.26−1.40) and 60% higher odds of providing intensive care (OR = 1.60, 95% CI = 1.44−1.78). Providing care was most likely among respondents in the age of 50–59 and this pattern was similar for intensive caregiving. Widowed and (when informal caregiving in general was concerned) cohabiting respondents provided care less often than married persons, whereas divorced and single respondents did not differ from married persons.

Our analyses showed that middle and higher educated respondents had 18% higher odds of providing care than lower educated respondents (OR = 1.18, 95% CI = 1.10−1.27 for upper secondary education and OR = 1.18, 95% CI = 1.09−1.28 for tertiary education), but this educational effect was purely driven by women. Note that the differences in informal caregiving emerged once we took account of the fact that lower educated persons had different age distributions and employment statuses. Even though higher educational groups may be more aware of ways to mobilize formal care,[9] this apparently does not imply that they do not take up the caring task themselves. When intensive caregiving is concerned, no education differences emerged.

Restrictions, most notably in terms of time and health, are often suggested as reasons for people not to provide care.[5,9] We found mixed support for this idea. In line with time arguments, we found that, compared with full-time workers, several non-employed categories provided informal care more often, most notably persons whose main daily activity is doing housework (OR = 1.52, 95% CI = 1.37−1.69), but also unemployed (OR = 1.16, 95% CI = 1.03−1.30) and retired persons (OR = 1.13, 95% CI = 1.02−1.26). In addition, these effects appeared much stronger when intensive caregiving was concerned, i.e. when the caring task required much time. People doing housework were over three times more likely to belong to the intensive caregiver group than to the non-caregiver group, compared with full-timers (OR = 3.11, 95% CI = 2.66–3.63); this association was significantly stronger for men than for women. In contrast to the idea of time availability predicting care provision, part-time workers appeared to be just as likely to provide (intensive) informal care as full-timers. Also, the presence of children in the household—another potential time restriction—did not appear to be related to the odds of informal caregiving. Respondents with children in the household even appeared to be more likely to be an intensive caregiver than a non-caregiver. Our results did not support the idea that bad health would be a restriction for providing care. Health did not

Table 2 Determinants of being an (intensive) informal caregiver[a]

	Informal caregiver							**Intensive caregiver (11+ h a week)**						
	All respondents		**Females**		**Males**		Δ	**All respondents**		**Females**		**Males**		Δ
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**		**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	
Female	1.33 **	1.26–1.40						1.60 **	1.44–1.78					
Age (ref: 55–59 years)														
25–29 years	0.51 **	0.45–0.58	0.44 **	0.37–0.53	0.61 **	0.50–0.75	*	0.59 **	0.46–0.76	0.55 **	0.40–0.75	0.71	0.47–1.07	
30–34 years	0.56 **	0.50–0.64	0.45 **	0.38–0.53	0.73 **	0.61–0.87	**	0.55 **	0.43–0.69	0.46 **	0.34–0.62	0.77	0.53–1.11	
35–39 years	0.52 **	0.46–0.58	0.48 **	0.41–0.57	0.55 **	0.46–0.66		0.59 **	0.48–0.74	0.61 **	0.47–0.80	0.54 **	0.37–0.80	
40–44 years	0.64 **	0.57–0.72	0.62 **	0.53–0.73	0.66 **	0.55–0.78		0.71 **	0.57–0.87	0.78 *	0.60–1.00	0.55 **	0.38–0.81	
45–49 years	0.79 **	0.70–0.88	0.75 **	0.65–0.87	0.82 *	0.70–0.97		0.77 *	0.63–0.94	0.70 **	0.55–0.90	0.89	0.65–1.22	
50–54 years	1.06	0.96–1.18	1.04	0.90–1.20	1.08	0.93–1.26		0.94	0.78–1.13	0.95	0.75–1.19	0.92	0.67–1.25	
60–64 years	0.83 **	0.74–0.93	0.85 *	0.73–0.99	0.81 *	0.69–0.96		0.72 **	0.59–0.87	0.75 *	0.59–0.96	0.66 *	0.47–0.92	
65–69 years	0.67 **	0.59–0.77	0.66 **	0.56–0.79	0.69 **	0.57–0.85		0.62 **	0.49–0.77	0.66 **	0.51–0.87	0.51 **	0.34–0.75	
70–75 years	0.61 **	0.53–0.71	0.58 **	0.48–0.70	0.66 **	0.53–0.82		0.55 **	0.44–0.70	0.58 **	0.43–0.78	0.49 **	0.33–0.74	
Relationship status (ref: married)														
Cohabiting	0.90 *	0.82–1.00	0.90	0.78–1.03	0.89	0.77–1.03		0.88	0.72–1.08	0.86	0.67–1.11	0.91	0.66–1.26	
Divorced/separated	0.98	0.90–1.06	1.02	0.92–1.14	0.90	0.79–1.02		1.01	0.87–1.16	0.97	0.82–1.16	1.04	0.81–1.34	
Widowed	0.85 **	0.75–0.96	0.85 *	0.74–0.98	0.79	0.62–1.00		0.72 **	0.59–0.88	0.71 **	0.56–0.89	0.66	0.40–1.10	
Single, never married	0.99	0.91–1.08	1.06	0.94–1.19	0.88	0.77–1.01		0.95	0.80–1.12	0.87	0.70–1.08	1.02	0.78–1.34	
Educational level (ref: ≤ lower secondary)														
Upper secondary	1.18 **	1.10–1.27	1.27 **	1.15–1.40	1.09	0.98–1.21	*	1.04	0.92–1.17	1.06	0.91–1.24	0.93	0.75–1.14	
Tertiary	1.18 **	1.09–1.28	1.31 **	1.17–1.46	1.06	0.93–1.19	*	0.90	0.78–1.05	0.97	0.81–1.17	0.73 *	0.57–0.95	
Employment status (ref: full-time job)														
Part-time job	1.06	0.97–1.15	1.12 *	1.01–1.24	0.95	0.80–1.13		1.07	0.90–1.27	1.02	0.83–1.25	1.38	0.96–1.97	
Housework	1.52 **	1.37–1.69	1.56 **	1.39–1.76	1.76 **	1.31–2.36		3.11 **	2.66–3.63	2.93 **	2.45–3.50	4.96 **	3.32–7.42	*
Unemployed	1.16 *	1.03–1.30	1.13	0.96–1.33	1.22 *	1.04–1.44		1.72 **	1.42–2.09	1.63 **	1.26–2.11	1.89 **	1.41–2.53	
Retired	1.13 *	1.02–1.26	1.24 **	1.07–1.44	1.02	0.87–1.20		1.85 **	1.54–2.22	1.76 **	1.40–2.21	2.16 **	1.58–2.95	
Disabled	0.97	0.83–1.14	0.98	0.79–1.22	0.98	0.77–1.24		1.39 *	1.06–1.82	1.34	0.95–1.89	1.49	0.98–2.28	
In education	1.13	0.92–1.39	1.28	0.97–1.68	1.01	0.73–1.38		1.30	0.85–2.00	1.29	0.75–2.22	1.28	0.63–2.60	
Children in household	1.03	0.96–1.10	1.08	0.99–1.18	0.97	0.88–1.07		1.13 *	1.00–1.27	1.13	0.98–1.31	1.20	0.98–1.47	
Self-rated health (0–4)	0.98	0.95–1.01	0.99	0.94–1.03	0.97	0.92–1.02		0.88 **	0.83–0.94	0.89 **	0.83–0.95	0.87 **	0.79–0.96	
Religious	1.13 **	1.07–1.19	1.11 **	1.03–1.20	1.15 **	1.06–1.24		1.14 *	1.03–1.27	1.17 *	1.02–1.33	1.11	0.94–1.32	
Intercept	0.47 **	0.36–0.60	0.57 **	0.43–0.75	0.53 **	0.39–0.71	**	0.07 **	0.05–0.09	0.11 **	0.08–0.15	0.08 **	0.05–0.12	**
Variance country level (intercept)	0.23	0.12–0.43	0.20	0.10–0.38	0.27	0.14–0.52		0.09	0.05–0.19	0.11	0.05–0.24	0.05	0.02–0.16	
No. respondents	28 406		15 013		13 393			28 406		15 013		13 393		
No. countries	20		20		20			20		20		20		

Source: European Social Survey, Round 7, non-weighted data.

[a] Random intercept multilevel logistic regression analysis, odds ratios and 95% confidence intervals.

*$P < 0.05$; **$P < 0.01$.

affect the probability of providing informal care, and the likelihood of providing intensive care was even higher with lower levels of self-reported health.

Besides restrictions, the previous literature mentions care attitudes as a reason to provide informal care.[3,5] Strong care attitudes are partly driven by religious beliefs as religions explicitly emphasize the importance of loving one's neighbour and to helping those in need. Our results supported this argument with religious respondents having a 13% (OR = 1.13, 95% CI = 1.07−1.19) higher odds of being an informal caregiver and 14% (OR = 1.14, 95% CI = 1.03−1.27) higher odds of being an intensive caregiver than non-religious respondents.

Our third set of analyses (table 3) showed that (i) informal caregivers reported significantly lower levels of mental well-being (i.e. more depressive symptoms) than non-caregivers; (ii) that informal caregiving was significantly more detrimental for the mental health of females then for males and (iii) that the negative relationship between caregiving and mental health was much stronger when caregiving was intensive. Controlled for several demographic and socio-economic characteristics, caregivers scored 0.26 points (Model 1) and intensive caregivers even 0.61 points (Model 4) higher on the depression scale, which ran from 0 through 24. Gender differences were marked: for females the effect of caregiving on depressive symptoms was over two times as strong as for male caregivers (0.35 versus 0.15). For intensive caregiving the gender differences were in the same direction, but not statistically significant. Note that the effect sizes [expressed by (b/SD(Y)] of informal caregiving as well as intensive caregiving were limited (0.26/4.08 = 0.06 and 0.61/4.08 = 0.15, respectively); other determinants such as self-rated health and relationship status had more impact on mental well-being.

Discussion

This study used random population samples from 20 European countries to provide up-to-date descriptive information, by gender, on the prevalence of informal caregivers and intensive caregivers, their characteristics, and the mental health consequences of (intensive) informal care provision. We summarize and discuss our results for each of these topics.

First, in the countries under study, on average more than a third of the population spent time looking after or giving help to family members, friends, neighbours or others because of health reasons (including problems relating to health problems to old age). Countries that had high numbers of informal caregivers had low numbers of intensive caregivers (Nordic countries) and vice versa (Central and Eastern Europe). In the debate on the crowding out or crowding in effects of welfare states,[4] this suggests that generous welfare states stimulate taking up a caring role (crowding in), while at the same time they take away the necessity of intensive caring (crowding out).

Second, this study demonstrated that females, 50–59-year olds, non-employed persons and especially those whose main daily activity is housework and religious persons were overrepresented among informal caregivers, and so were persons with children in the household and with lower self-reported health when intensive caregiving was concerned. These differences may relate to differences in time availability and stronger caregiving norms. To the extent that

Table 3 Mental health (depressive symptoms) regressed on (intensive) informal caregiving[a]

	Model 1 All respondents			Model 2 Females			Model 3 Males			Δ	Model 4 All respondents			Model 5 Females			Model 6 Males			Δ
	b		SE	*b*		SE	*b*		SE		*b*		SE	*b*		SE	*B*		SE	
Informal caregiver	0.26	**	0.04	0.35	**	0.06	0.15	*	0.06	*										
Intensive caregiver (11+ h a week)											0.61	**	0.08	0.68	**	0.10	0.42	**	0.13	
Female	0.55	**	0.04								0.55	**	0.04							
Age (ref: 55–59 years)																				
25–29 years	0.44	**	0.10	0.22		0.15	0.63	**	0.14	*	0.42	**	0.10	0.19		0.15	0.62	**	0.14	*
30–34 years	0.37	**	0.10	0.15		0.14	0.58	**	0.13	*	0.36	**	0.10	0.13		0.14	0.57	**	0.13	*
35–39 years	0.30	**	0.09	0.06		0.13	0.52	**	0.13	*	0.28	**	0.09	0.04		0.13	0.52	**	0.13	*
40–44 years	0.26	**	0.09	0.06		0.13	0.42	**	0.13	*	0.25	**	0.09	0.03		0.13	0.42	**	0.13	*
45–49 years	0.30	**	0.09	0.09		0.13	0.48	**	0.12	*	0.30	**	0.09	0.09		0.13	0.48	**	0.12	*
50–54 years	0.17		0.09	0.06		0.13	0.27	*	0.12		0.17	*	0.09	0.07		0.13	0.27	*	0.12	
60–64 years	−0.24	**	0.09	−0.38	**	0.13	−0.13		0.12		−0.24	**	0.09	−0.37	**	0.13	−0.12		0.12	
65–69 years	−0.31	**	0.11	−0.25		0.15	−0.44	**	0.15		−0.31	**	0.11	−0.26		0.15	−0.43	**	0.15	
70–75 years	−0.42	**	0.11	−0.57	**	0.16	−0.31	*	0.16		−0.42	**	0.11	−0.58	**	0.16	−0.31		0.16	
Relationship status (ref: married)																				
Cohabiting	0.27	**	0.08	0.40	**	0.11	0.12		0.10		0.27	**	0.08	0.40	**	0.11	0.12		0.10	*
Divorced/separated	1.14	**	0.06	1.11	**	0.09	1.12	**	0.09		1.14	**	0.06	1.11	**	0.09	1.11	**	0.09	
Widowed	1.68	**	0.09	1.51	**	0.11	1.86	**	0.17		1.68	**	0.09	1.52	**	0.11	1.87	**	0.17	
Single, never married	1.06	**	0.07	1.02	**	0.10	1.00	**	0.09		1.06	**	0.07	1.03	**	0.10	1.00	**	0.09	
Educational level (ref: $\leq$ lower secondary)																				
Upper secondary	−0.47	**	0.06	−0.61	**	0.08	−0.35	**	0.08	**	−0.47	**	0.06	−0.59	**	0.08	−0.35	**	0.08	**
Tertiary	−0.57	**	0.06	−0.74	**	0.09	−0.39	**	0.09	**	−0.56	**	0.06	−0.72	**	0.09	−0.38	**	0.09	**
Employment status (ref: full-time job)																				
Part-time job	0.22	**	0.07	0.11		0.09	0.42	**	0.12		0.22	**	0.07	0.12		0.09	0.42	**	0.12	
Housework	0.55	**	0.09	0.35	**	0.10	1.03	**	0.23	*	0.51	**	0.09	0.31	**	0.10	1.00	**	0.23	*
Unemployed	1.17	**	0.09	1.05	**	0.14	1.27	**	0.12		1.16	**	0.09	1.03	**	0.14	1.26	**	0.12	
Retired	0.14		0.09	0.23		0.12	0.11		0.12		0.12		0.09	0.21		0.12	0.10		0.12	
Disabled	2.20	**	0.13	1.78	**	0.18	2.69	**	0.17	**	2.18	**	0.13	1.76	**	0.18	2.68	**	0.17	**
In education	0.73	**	0.16	0.69	**	0.23	0.73	**	0.22		0.72	**	0.16	0.70	**	0.23	0.72	**	0.22	
Children in household	0.15	**	0.05	0.39	**	0.07	−0.08		0.07	**	0.14	**	0.05	0.39	**	0.07	−0.08		0.07	**
Self-rated health	−1.84	**	0.03	−1.98	**	0.04	−1.66	**	0.04	**	−1.83	**	0.03	−1.97	**	0.04	−1.66	**	0.04	**
Religious	−0.06		0.04	−0.07		0.06	−0.05		0.06		−0.05		0.04	−0.07		0.06	−0.05		0.06	
Intercept	9.67	**	0.19	10.79	**	0.23	9.04	**	0.22	**	9.71	**	0.19	10.85	**	0.22	9.06	**	0.22	**
Variance individual level	3.38		0.01	3.54		0.02	3.16		0.02		3.38		0.01	3.54		0.02	3.16		0.02	
Variance country level (intercept)	0.69		0.11	0.71		0.12	0.71		0.12		0.67		0.11	0.68		0.11	0.70		0.11	
No. respondents	28 406			15 013			13 393				28 406			15 013			13 393			
No. countries	20			20			20				20			20			20			

Source: European Social Survey, Round 7, non-weighted data.

[a] Random intercept multilevel linear regression analysis, unstandardized regression coefficients and standard errors.

*$P<0.05$; **$P<0.01$.

informal caregiving has negative health and well-being consequences, these groups can be considered most at risk and potential target groups for supportive policies such as respite care or training and counselling.[10] A current debate is about the conflicting aims of higher expectations of informal caregivers on the one hand and higher labor market participation (to offset the rising costs of our ageing population) on the other hand.[1] Middle-aged women are likely to be the first to experience the increased demand for informal care, whereas they are the major target groups in those employment policies as well. This suggests that particularly these groups may become vulnerable for experiencing severe time squeezes. Although our study cannot make any causal claims regarding the relationship between employment and informal care provision, we found support for a negative relationship. Non-employed people and especially those whose main daily activity is housework were more likely to provide informal care than full-timers. However, prevalence rates did not differ between part-timers and full-timers. Interestingly, although women were found to be informal caregivers more often than men, determinants of providing informal care hardly differed between men and women.

Third, our results confirmed previous (meta) studies[16,21] that informal caregivers suffer from reduced mental well-being compared with non-caregivers. Negative mental health consequences are especially severe for intensive caregivers, and stronger for female caregivers than male caregivers. The strength of the caregiving effect was not extremely strong, but note that our analyses revealed the net consequences of informal caregiving on mental well-being. On the one hand, informal caregiving can be burdensome and produces stress;[15] on the other hand, providing care to loved-ones is also found to bring benefits, such as a positive feelings of reward or a closer relationship to the care receiver.[6] Our result implied that on average the negative consequences outweigh the positive ones. Future studies should examine under which conditions informal caregiving has more or less severe consequences. The fact that (especially intensive) caregivers experience mental well-being reductions warrants supportive policies to sustain informal caregiving as an important element of European health care systems.

The large comparative reach of this study comes with important limitations as well. First, little detail is provided in the ESS survey about the caregiving situation, such as the relationship to the care recipient (parent, partner, child, other), the care recipient's health status, the types of tasks that are performed, and whether care provisions are shared with other informal caregivers or professionals. Hence, the results in this study only provide crude descriptions. Different caring situations between male and female caregivers may explain why well-being consequences were found to be more strongly negative for women. Second, the concept of informal care could have different interpretations across cultures in Europe. In familialist cultures, looking after family members may not always be labelled as informal care due to the obvious character of it. Third, the cross-sectional design of ESS implies that associations we found cannot be inferred as causal. Finally, as those who cannot speak the main language of a country (or one spoken by at least 5% of the population) are excluded from the survey, ethnic minorities were likely underrepresented. This may affect our prevalence rates of informal caregiving as informal caregiving is suggested to be more common among minority groups.[14]

To conclude, this study provided some basic descriptive information on the largest, but also "hidden" form of health care: unpaid care provided by family members, friends or neighbours. We found substantial variation between countries in the number of informal caregivers as well as in the intensity of informal care provision. Moreover, we found that intensive caregivers are a special group among the total group of informal caregivers, both in terms of characteristics and in their mental health consequences. Given the increased attention to informal health care as a potential health resource, further knowledge on the subject is needed. Future studies could assess whether country differences in health care policies and caregiver support policies are responsible for the different tendencies of taking up (intensive) caregiving and the consequences this have for caregivers' mental health.[21]

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Paper IV

THE USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) IN EUROPE

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The use of complementary and alternative medicine (CAM) in Europe

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Abstract

Background: While the use of complementary and alternative medicine (CAM) has become increasingly popular in western societies, we do not understand why CAM use is more frequent in some countries than in others. The aim of this article is to examine the determinants of CAM use at the individual and country-level.

Methods: Logistic multilevel regressions were applied analyzing data from 33,371 respondents in 21 European countries (including Israel) from the seventh round of the European Social Survey. We examined CAM in terms of overall use and also dichotomized treatments into physical and consumable subgroups.

Results: At the individual level, we found CAM use to be associated with a range of socioeconomic, demographic and health indicators. At the country level, we found that countries' health expenditures were positively related to the prevalence of overall and physical CAM treatments.

Conclusions: A common predictor for CAM use, both at the individual (in terms of education and financial strain) and country-level (in terms of health expenditures per capita), is greater resources.

Keywords: CAM use, Socio-economic position, health care systems, Europe

Background

In contrast to mainstream or conventional medicine, which typically has its roots in modern science (i.e. biomedicine), complementary and alternative medicine (CAM) encompasses a variety of alternative treatments that have historic origins outside of, and are used in combination with, conventional medicine [1, 2].

The use of CAM treatments, such as acupuncture, homeopathy, and chiropractics, has become increasingly popular in western societies [3–5]. For example, in the US, the use of CAM increased rapidly during the 1990s. The estimated number of visits to CAM practitioners in 1997 exceeded the projected number of visits to all primary care physicians in the US by an estimated 243 million [6]. In Europe, France and Germany were found to have the highest prevalences of CAM use of 8 European countries in 1992, with 49 and 46% respectively of the populations having used some form of CAM [7].

Previous single-country studies have shown that there are differences in the demographic characteristics and health status of users of CAM and non-users [5]. For example, females, those in higher socioeconomic groups and those of middle age, have all been found to be more frequent users of CAM [8, 9]. More recent work has examined the health-related and sociodemographic determinants of CAM treatments specifically in Europe, finding that use of CAM is greater among those with health problems, and more common among women and those with a higher education [10].

Studies thus far, however, have not comprehensively examined why CAM use is more prevalent in some countries when compared to others. This article is therefore the first to do so, using a pan-European data set from the seventh round (2014) of the European Social Survey [11].

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In this study, we examine CAM use across 21 European countries (including Israel) in reference to a diverse set of individual and country-level determinants. Specifically, we examine the determinants of CAM use among individuals according to socioeconomic and demographic characteristics, health, health care use and perception of the healthcare system. There is, to our knowledge, no research on what macro-factors might explain the differences in CAM use between countries [3, 4]. We draw on health care systems literature [12] to provide a basis for considering why some indicators should be examined more closely.

Two such macro-factors are GDP per capita and health expenditure. The idea is that richer countries and countries with higher health expenditure are more likely to have integrated CAM treatments into their health care system. Poland, Hungary, Lithuania, Estonia and the Czech Republic for example, all rank at the lower end of GDP per capita [13]. These countries have relatively few CAM treatments reimbursed through health insurance [14]. In Poland, acupuncture is reimbursed, but only for treating chronic pain. In Hungary, some procedures are reimbursed, but the bulk of payments must be made out-of-pocket. In wealthier countries with higher health expenditures, like Switzerland, Norway, Sweden, Denmark and the Netherlands, a greater number of CAM treatments are reimbursed, and integrated into the established health care system [14]. For example, a survey in 2008 found that around 50% of Norwegian hospitals provided some form of CAM, mostly acupuncture [15]. A survey from 2007 found that a third of the people who reported to have used CAM, had the treatment done by a traditional health care practitioner [16]. In short, wealthier countries with higher health care expenditures seem to have integrated CAM treatments into their health care systems to a greater degree than the countries with lower GDP per capita. Whether this integration makes CAM treatments more accessed by the public, remains to be tested.

Other factors that might influence the prevalence of CAM use at the country-level is the density of doctors, gatekeeping functions of the health care system and the price of out-of-pocket payments in primary health care. These factors have been found to be important in work evaluating the accessibility of health care in Europe [12, 17–19]. The idea is that since these conditions have previously been linked to healthcare accessibility issues, they may also provide an incentive for individuals to seek CAM treatments.

There is currently no established way of categorizing or analyzing CAM treatments in social research. Some studies combine a variety of CAM treatments into one overall variable [5], while others choose to categorize treatments into analytical subgroups [10, 20–22]. Davis and colleagues [21] for example, categorize CAM use into *practitioner-based* and *self-administered* treatments. Examples of practitioner based treatments are chiropractics and acupuncture whereas self-administered treatments include products such as natural supplements (vitamins, herbals and minerals), in addition to self-practice activities like yoga and meditation. Other studies [20, 22], by contrast, characterize treatments on the basis of domains described by the National Center for Complementary and Alternative Medicine (NCCAM). These include (1) *whole medical systems* (e.g. acupuncture), (2) *mind-body medicine* (i.e. various spiritual, meditative, and relaxation techniques), (3) *biologically-based systems* (e.g. vitamins and nat ural products), (4) *manipulative and body-based practices* (e.g. massage, chiropractics, and osteopathy), and (5) *energy medicine* (e.g. Reiki therapy) [22]. In this study, we utilize a comprehensive indicator of CAM which combines a variety of types of CAM use into one variable. However, we also make a distinction between physical and consumable treatments, where the former involves the physical manipulation of the body (and includes treatments such as chiropractics) and the latter involves the consumption of a treatment (and includes treatments such as homeopathy). This categorization provides a useful way of comparing whether there are differences in the importance of determinants according to type of CAM use. This distinction also aligns somewhat with Davis and colleagues' paradigm of practitioner-based versus self-administered treatments. This is because all our physical treatments are also practitioner-based, although our consumable treatments are, according to Davis et al. [21], self-administered.

Methods

This study was based on data from the seventh round of the European Social Survey (ESS) (European Social Survey, 2014), which includes data from 40,185 respondents in 21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom. The data was collected in face-to-face interviews with individuals aged 15 and above living in private households. In this study we included respondents aged 25 and above who were not in education, with non-missing values on included variables. By doing so, we only included respondents that are likely to have completed their education, as those below 25 have often not yet completed their education [23]. Capping at age 25 and removing respondents in education would also remove systematic biases due to differences in the countries' educational systems and practices. That left 33,371 respondents. The response rates were similar to previous rounds of the ESS, and ranged from 31% in Germany to 68% in the Czech Republic [11].

Dependent variables

Respondents were asked if they had used any of 12 different treatments for their own health in the past 12 months. These were acupuncture, acupressure, chiropractics, osteopathy, homeopathy, herbal treatment, reflexology, Chinese medicine, hypnotherapy, massage therapy, physiotherapy, and spiritual healing. Of these, we included the seven first listed treatments in our analysis. The responses were grouped into two categories of CAM use, and one overall measure, combining the two. We use the analytical group of physical to refer to treatments that involve physically manipulating the client's outer body. It includes the practices acupuncture, acupressure, chiropractics, osteopathy, and reflexology. The consumable group on the other hand, involves the partaker to ingest something that has the purpose of promoting health or well-being. This group contains the practices homeopathy and herbal treatment. We did not include massage therapy and physiotherapy from the physical group due to high prevalence rates and physiotherapy as it historically has been recognized as a part of biomedicine [24, 25], making it a conventional treatment, and not CAM. As the respondents could mark having used more than one treatment, there were only slight overlap. Around 11% of the sample had used at least one physical treatment, about 9.5% had used any consumable treatment, and 2.54% had used both. This is illustrated in the Venn diagram in Fig. 1. However, we still found significant differences in the results between the two subgroups, and therefore we kept them unchanged.

Socioeconomic and –demographic explanatory variables

- *Gender* was dummy coded, with females assigned the value one, and men as reference.
- *Age* was coded as three 20 year age groups (25–44, 45–64, and 65+).
- *Education* was classified in three categories according to the International Standard Classification of Education (ISCED). The lower educated category included respondents with less than upper secondary education and were used as reference. The middle group with upper secondary education were grouped and distinguished from the higher educated with tertiary education.
- Income groups were identified by the concept *financial strain*; how they felt about their household income. We grouped respondents in three categories; those finding it difficult or very difficult to manage on present income, those coping on present income, and those living comfortably on present income who were used as reference.
- The respondents' *main activity* was measured by grouping the unemployed or houseworking, and using them as reference, compared to people in paid work, the retired, and the permanently sick or disabled. We dropped the respondents who were in education, in community or military service, without 'or' reported 'other'.

Health, and use of health care explanatory variables

- *GP/ medical specialist use* measures which of the health professionals the respondents had discussed their health with. Respondents who had not seen a doctor were grouped, and used as reference (0).

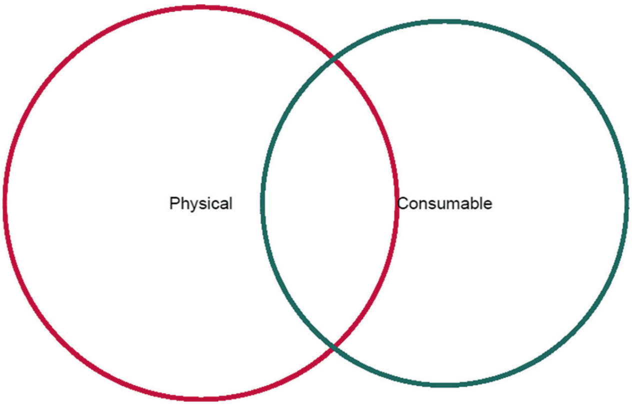

Fig. 1 Venn diagram of the three categories of CAM

Respondents who had seen a General practitioner, but not a specialist were grouped as 1. Finally, respondents who had seen a specialist (excluding dentists) were grouped as 2.

- *Unmet need* measures whether respondents were unable to get a medical consultation or the treatment they needed in the past year, while those who did not report unmet need were used as reference.
- Respondents who ranked their satisfaction 4 or lower on a scale from 0 to 10, were treated as being *dissatisfied with overall state of health services* in their country (1). Those responding with the values 5 or higher were used as reference (0).
- *Self-reported health (SRH)* was dichotomized, where the responses 'very good', and 'good' were coded as good health and used as reference, while 'fair', 'bad', or 'very bad' health were coded as poor health.
- Respondents who reported being hampered in any way by any longstanding illness or disability, infirmity or a mental health problem were treated as having a *longstanding health problem*, while those who did not were used as reference.

Multilevel analysis

In this study, we employed four country-level variables. Health expenditures per capita, out-of-pocket payments, and physician density were collected from The World Bank [13, 26, 27]. The data was primarily from 2014, but supplied with prior years where missing values were found. A variable measuring gatekeeping in primary health care was constructed based on data from the the Organisation for Economic Co-operation and Development (OECD) [28] supplemented by a policy brief for the European Commission [29], for the missing values of OECD's report. Countries that were in a gray zone were regarded as having a gatekeeping function in primary health care with the value 1, those without gatekeeping were used as a reference with the value 0. Examples of countries in a gray zone are countries with incentives for gatekeeping, like France, Germany, Switzerland, and Poland. All values of country-level variables for each country is presented in the Additional file 1.

For the analysis, we applied logistic multilevel modeling, and used country as the grouping variable. A multilevel model was necessary to control for the nested structure of the data [30]. Furthermore, it allows the possibility of using country-level indicators to examine the relation between macro-level phenomenon and individual-level outcomes. We use intraclass correlation (ICC) to determine the explained variance of group-level variables, presented as a percentage of explained between-country variance in the models where country-level variables were included. The formula is $(1-(ICC_m/ICC_b))*100$, where ICC_m indicates the ICC of the model where a country-level variable has been included, and ICC_b, the ICC of the baseline comparison model without the group-level variable.

With only 21 s-level units, the standard errors may be downwardly biased [31]. We therefore included only 1 s-level variable at a time to reduce the impact of biased results in the analysis. The analyses were post-stratification weighed.

Results

Table 1 shows post stratification-weighted prevalences by the independent variables and the sizes of each subpopulation. Females, more than men, were found to report greater use of CAM. Prevalences were also found to be the highest among the age group 45–64, among those with higher education, and among those living comfortably on their income. However, for consumable CAM use we found the opposite relation with income. People in paid work were found to report greater CAM use than the unemployed and retired, while the permanently sick or disabled were found to report CAM use more than all other main activity groups. We found a clear pattern with regards to health care use, where having discussed own health with health care personnel, is related to all CAM categories. Similarly, people who reported having an unmet medical need, reported greater CAM use than those who did not. Those who reported being unsatisfied with health services in their country reported only marginally more CAM use than those of an average or higher opinion of health services, except for physical CAM use, where the relation was opposite. People who reported being in poor health also reported greater overall and consumable CAM use than people who reported being in good health, but we found no relation between health and physical CAM use. People who had reported having a longstanding health problem reported CAM use to a greater degree than people who did not.

Table 2 presents four multilevel logistic models with individual-level variables. We found largely the same pattern as in the prevalence table. Females had used CAM to a greater degree than men after controlling for the other independent variables (OR = 1.62, 95% CI = 1.49–1.75). Age was not significantly related to CAM use. Higher education was related to greater use of all CAM categories (OR = 2.00, 95% CI = 1.70–2.34). Less financial strain was only statistically significant for physical and overall CAM use (physical OR = 1.46, 95% CI = 1.25–1.70). The same pattern was found with regards to employment, where the employed had used significantly more physical and overall CAM than the unemployed, but not consumable CAM (physical OR = 1.32, 95% CI = 1.10–1.58). Doctor visits were the strongest predictor for all types of CAM use. People who had visited a specialist

Table 1 Distribution of sample, and prevalence by independent variables and the sizes of each subpopulation. Post-stratification weighted

Measure	Study population	Overall CAM use	Physical CAM use	Consumable CAM use
Total	33, 371	17.9%	10.9%	9.3%
Gender				
Male	47.3%	13.9%	9.0%	6.4%
Female	52.7%	21.5%	12.6%	11.9%
Age group				
25–44 years	37.6%	18.5%	11.6%	9.6%
45–64 years	38.4%	18.9%	11.9%	9.5%
65+ years	24.0%	15.3%	8.3%	8.4%
Educational level				
Primary education	32.6%	12.2%	6.8%	6.6%
Secondary education	49.3%	19.6%	12.1%	10.1%
Tertiary education	18.2%	23.2%	15.1%	11.8%
Financial strain				
Living comfortably	29.8%	20.7%	15.2%	8.2%
Coping	47.2%	17.2%	10.0%	9.6%
Difficult & very difficult	23.0%	15.5%	7.5%	9.9%
Main activity				
Paid work	57.2%	19.1%	12.3%	9.4%
Unemployed/housework	14.3%	16.7%	9.3%	10.1%
Retired	25.1%	15.1%	8.3%	8.3%
Permanently sick/disabled	3.4%	21.4%	14.9%	10.6%
Health care utilization				
No doctor visits	17.9%	8.8%	4.9%	4.6%
Only GP	39.9%	15.7%	9.2%	8.0%
MS/MS & GP	42.1%	23.7%	15.2%	12.5%
Unmet medical need				
No unmet need	87.5%	16.5%	10.2%	8.5%
Unmet need	12.5%	27.3%	16.3%	14.7%
Opinion of health services				
Average or higher opinion	68.8%	17.6%	11.1%	8.8%
Low opinion	31.2%	18.4%	10.6%	10.3%
Self-reported health				
Good health	64.6%	17.1%	11.0%	8.3%
Poor health	35.4%	19.3%	10.9%	11.0%
Longstanding health problem				
No longstanding health problem	71.7%	16.2%	9.8%	8.4%
Longstanding health problem	28.3%	22.1%	13.7%	11.5%

were more likely to have used any CAM treatment than people who had not seen a doctor in the past year (OR = 2.87, 95% CI = 2.37–3.47). Unmet need was positively related to all types of CAM use (OR = 1.57, 95% CI = 1.40–1.76). Dissatisfaction with health services was positively related to all categories of CAM use (OR = 1.26, 95% CI = 1.17–1.36). SRH did not show a significant relation to any CAM use. Having a longstanding health problem was related to a higher use of all types of CAM use (OR = 1.44, 95% CI = 1.26–1.54). Lastly, the ICC indicates that the between-country variance were greater for the subgroups than for the overall measure (Overall

Table 2 Logistic multilevel models of CAM use with individual-level variables. Post stratification weighted

	Overall			Physical			Consumable		
	CAM use			CAM use			CAM use		
	O.R.	95% CI		O.R.	95% CI		O.R.	95% CI	
Female	1.62	1.49	1.75	1.44	1.28	1.62	1.80	1.61	2.01
Age group (ref. 25–44 years)									
45–64 years	1.01 (–)	.94	1.08	.97 (–)	.87	1.08	1.01 (–)	.93	1.11
65+ years	.94 (–)	.74	1.20	.81 (–)	.62	1.07	1.04 (–)	.79	1.36
Educational level (ref. Primary Education)									
Secondary education	1.58	1.39	1.79	1.68	1.46	1.93	1.48	1.24	1.77
Tertiary education	2.00	1.70	2.34	2.03	1.66	2.49	2.07	1.66	2.58
Financial strain (ref. Difficult/very difficult on present income)									
Coping	1.13 (–)	.98	1.31	1.24	1.07	1.45	1.06 (–)	.90	1.24
Living comfortably	1.31	1.15	1.49	1.46	1.25	1.70	1.10 (–)	.95	1.29
Main activity (ref. Unemployed/Housework)									
Paid work	1.15	1.03	1.29	1.32	1.10	1.58	.92 (–)	.81	1.06
Retired	.83 (–)	.69	1.00	.93 (–)	.75	1.15	.71	.58	.87
Permanently sick or disabled	1.03 (–)	.86	1.24	1.21 (–)	.97	1.50	.97 (–)	.75	1.26
Health care use (ref. No doctor visits)									
Only GP	1.84	1.62	2.10	1.76	1.53	2.02	1.87	1.59	2.20
MS or MS and GP	2.87	2.37	3.47	2.95	2.40	3.63	2.75	2.14	3.53
Unmet need	1.57	1.40	1.76	1.45	1.27	1.65	1.51	1.27	1.78
Dissatisfied with health services	1.26	1.17	1.36	1.33	1.22	1.45	1.21	1.08	1.35
Poor health	.97 (–)	.88	1.07	.97 (–)	.89	1.06	.98 (–)	.81	1.17
Longstanding health problem	1.44	1.26	1.65	1.54	1.32	1.79	1.29	1.11	1.51
Constant term	.03	.02	.04	.01	.01	.02	.02	.01	.03
ICC	.076			.160			.158		

(–) = Not significant on the .05 level

ICC = 0.076, Physical ICC = 0.160, Consumable ICC = 0.158).

We performed two sensitivity analyses not presented in the tables, because the results were not in agreement with prior research. These results are available upon author request. First, we ran the models without controlling for health care utilization, unmet need, and longstanding health problems. Here, SRH was significantly positively related to physical treatments while controlling for health care utilization and unmet need, but not longstanding health problems. SRH was significantly positively related to consumable treatments while controlling for unmet need, but not health care utilization or longstanding illness. The second sensitivity analysis was to add an interaction between age groups and gender. The analysis showed that females aged 45–64 used the most physical CAM, while the men used less with higher reported age.

Table 3 shows the association between country-level variables and overall, physical, and consumable CAM use. Each row represents a new model with the indicated country-level variable included. Health expenditures per capita was positively related to overall and physical CAM use. Moreover, it was the best predictor for physical CAM use on the country level, with an explained between-country variance of 69%. Out-of-pocket payments were only significantly related to physical CAM use with a negative effect. Physician density was positively related to overall CAM use, but not significantly related to any of the sub-groups. Gatekeeping was negatively related to consumable CAM use, but not any of the other types of CAM use, making it the only significant predictor of between-country variance in consumable CAM use.

Discussion

This study aimed to examine the determinants of CAM use at the individual and country-level.

At the individual level, results indicate that females reported more overall CAM use than men, and that socioeconomic position (education, employment, and financial strain), in addition to longstanding illness, health care

Table 3 Logistic multilevel models of CAM use with country-level variables. Post stratification weighted

	Overall		Physical		Consumable	
	CAM use		CAM use		CAM use	
Model with variable	Relation	Expl. Var.	Relation	Expl. Var.	Relation	Expl. Var.
Health exp. tot/capita	+	22%	+	69%		7%
OOP total		3%	–	23%		2%
Physicians density	+	18%		5%		4%
Gatekeeping		0%		0%		2%

Empty cell = Country-level variable not significant on the .05 level

Exp. Var. Explained variance on the country level

utilization, unmet medical needs and a negative opinion of the state of the health services were positively related to CAM use. These results were mostly replicated in the subgroup analysis of CAM treatments, with the exception that financial strain and employment were found to be significant predictors of physical but not consumable CAM use.

Prior studies have found greater CAM use among females [10, 32, 33]. Females have been found to report higher rates of unmet need [18], more health care utilization [34] and poorer health [35]. These were all factors predicting CAM use in our study. However, females still significantly used more CAM while controlling for these factors. This might indicate differences in values and personality traits such as risk seeking behavior, between men and women [36]. And in contrast to some previous work we did not find a relationship between CAM use and older age [8, 9], nor SRH [37]. Our sensitivity analysis revealed that middle-aged women reported the most physical CAM use, while men's use decreased with older age. Therefore, the reason for age not showing a significant relation with CAM use might be that the male and female respondents, and the people who reported physical and those who reported consumable CAM use, pull the result in opposite directions, making the overall estimates not statistically significant. As for SRH, our sensitivity analysis showed that poor health was related to greater CAM use, before controlling for longstanding health problems, unmet need, and visits to health care practitioners, implying that SRH is an underlying factor for predicting CAM use. This result is in line with findings from Kemppainen et al. [10] who also find poor health to be a predictor for greater CAM use.

The results in terms of education and financial strain suggest the importance of individual resources in explaining CAM use. Prior research found education, employment and income to be related to CAM use [6, 8–10], and our results largely support this with one nuance: financial strain was not related to consumable CAM use in our data material. This finding might indicate that while physical CAM treatments generally involves paying and seeing a trained practitioner, the consumable treatments do not necessarily. People with more resources are better equipped to pay for more expensive CAM treatments, thus creating a social gradient in physical CAM use. It has also been suggested that people of a higher socioeconomic position may want to choose and control their approach towards health-related issues [5]. These results also support Astin's [8] notion of educated people reading about possible treatments for their illness, challenging the doctor's authority, and wanting to be in control of their own lives. However, it has been pointed out that even though users of alternative medicine may be better educated on average, it does not necessarily follow that they are better informed about the efficacy of alternative forms of treatment [5]. The physical CAM treatments are in part characterized by paying and seeing a trained practitioner for every treatment. For consumable treatments, this may not always be the case and might explain why they were not found to be related to financial strain and employment.

In terms of the health care explanatory variables, our results align with previous work which found that a quarter of the people who had used some form of CAM in the past year were referred by a conventional health care practitioner [20]. Some studies have shown that even though users of alternative health care almost make twice as many visits to conventional medical providers as non-users make, they are still reporting much higher levels of unmet need for health care [38]. This supports the conclusion of Druss and Rosenheck [39] that use of alternative treatments appears as a complement and not as an alternative to conventional health care.

At the country level, CAM use was best predicted by health expenditures. In the overall model, health expenditures explained around 22% of the between-country variation, while for physical CAM, the model explained around 69%. Results for consumable CAM treatments were non-significant. The high explained variance in physical treatments, and non-significant result for consumable treatments might be understood by looking at what specific treatments are reimbursed through health insurances and integrated into the established health care system. Neither countries in the high nor low end of health expenditure have widely integrated homeopathy, or herbal treatment in the health care system or reimbursement through health insurance [14]. The treatments that have been integrated or reimbursed in the high health expenditure countries are acupuncture and chiropractics, both physical treatments. Higher integration is therefore closely related to health expenditures, and health expenditures explains 69% of the variation in physical CAM use. Health expenditures is best predicted by GDP [40], suggesting the underlying factor is the economy of the countries, making a more diverse selection of treatments, including CAM, available for the public.

To our knowledge this work is the first to examine country-level determinants of CAM use. The finding that healthcare expenditure explains much of the inter-country variance of physical CAM use has in common with the individual-level results that resources seem to be an important predictor of CAM use. The physical treatments cost more on average than the consumable treatments. This might play a role in explaining why the less financially strained used more physical, but not consumable CAM than those who were more financially strained. On the country level, having more resources gives the same outcome as on the individual level. The exact mechanism is still unclear, but one could hypothesize that the process of integrating CAM into the established health care systems requires resources, and that the physical treatments costs more to integrate due to more equipment and education required to make that happen. Furthermore, treatments which require trained practitioners might be easier to incorporate into the health care system, as it makes accountability possible because the training is formalized. Richer countries may therefore be better equipped to make the integration happen.

Limitations

This study should be interpreted in the light of some limitations. Although the ESS maintains a high standard of data collection, the survey is still prone to differences in response rates, and cross-cultural quality of questions [11]. The ESS uses cross-sectional data, and therefore it is difficult to draw conclusions with regards to causal relationships. For example, dissatisfaction with health care may influence people to use CAM, but the causal relationship might also go the other direction. There are also some methodological limitations related to our work; e.g. the data used in the analyses only measure whether respondents have used CAM or not in the past year, and does not provide information on the frequency of care. A person using CAM weekly would preferably be considered differently than a person using such treatments once a year.

Conclusion

At the individual level, we found CAM use to be associated with a range of socioeconomic, demographic and health indicators. At the country level, we found that countries' health expenditures were positively related to the prevalence of overall and physical CAM treatments. Therefore, a common predictor for CAM use, both at the individual and country-level, is greater resources. At the individual level greater resources may influence CAM use through an out-of-pocket payment for the wished treatment, making the less resourceful less equipped to seek it. At the country level, greater resources may be related to how well CAM is integrated into conventional health care systems. Based on these conclusions, a hypothesis for future research would be that countries with less CAM integration in the health care system, would have a steeper social gradient with regards to income than countries with more reimbursements through health insurances and more CAM integration.

Supplementary information

Supplementary information accompanies this paper at https://doi.org/10.1186/s12906-020-02903-w.

Additional file 1: Appendix. Participating countries' average CAM use and second-level variables.

Abbreviations

CAM: Complementary and alternative medicine; CI: Confidence interval; ESS: European Social Survey; ICC: Intraclass correlation; ISCED: International Standard Classification of Education; NCCAM: National Center for Complementary and Alternative Medicine; OR: Odds ratio; OECD: The Organisation for Economic Co-operation and Development; *SRH*: *Self-reported health*

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Authors' contributions

EF Led the work with the paper. Contributed substantially to all parts of the manuscript and collaborated on the work of the analyses. Revised the manuscript according to comments from other authors. Contributed to data design of the ESS Health Module, which is the data source of the article. EL helped drafting the manuscript, performed the statistical analyses, wrote main parts of the discussion, wrote parts of the limitations, revised the manuscript. CLM and TAE Provided conceptions and ideas, reviewed the manuscript, provided comments. All authors have read and approved the manuscript.

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design of the study, collection, analysis, nor in the interpretation of data or in the writing the manuscript.

Availability of data and materials

The ESS7–2014 Edition 2.2 was released on 1 December 2018. The data file can be downloaded here: https://www.europeansocialsurvey.org/data/download.html?r=7. Please note that users are obliged to read the ESS conditions of use: https://www.europeansocialsurvey.org/data/conditions_of_use.html.

Ethics approval and consent to participate

The article is solely based on publicly available survey data (ESS ERIC). All information about informants are treated with strict confidentiality and in accordance with EU's General Data Protection Regulation (GDPR) and national data protection laws. The ESS ERIC has subscribed to the Declaration on Professional Ethics of the International Statistical Institute. A **Privacy notice** for ESS can be found here: https://www.europeansocialsurvey.org/about/privacy.html

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Competing interests

None declared.

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Publisher's Note

Appendix: Participating countries’ average CAM use and second-level variables.

Country	Overall CAM use	Physical CAM use	Consumable CAM use	Health exp. tot. per capita	Out-of-pocket payments	Physician density	Gatekeeping
Poland	.06	.02	.05	910.28	23.46	2.22	1
Portugal	.07	.04	.04	2096.82	26.84	4.10	1
Hungary	.07	.03	.06	1036.62	26.59	3.08	1
Netherlands	.11	.08	.05	5693.86	5.22	2.86	1
Spain	.12	.07	.07	2658.27	24.00	4.95	1
Israel	.12	.11	.04	2910.29	26.98	3.34	0
Ireland	.13	.11	.03	4239.15	17.66	2.67	1
Slovenia	.14	.06	.11	2160.75	12.07	2.52	1
Finland	.14	.12	.04	4612.29	18.23	2.91	1
Czech Republic	.15	.04	.13	1378.52	14.33	3.62	0
Great Britain	.15	.11	.06	3934.82	9.73	2.81	1
Belgium	.19	.14	.09	4884.07	17.81	4.89	0
Sweden	.20	.18	.02	6807.72	14.06	3.93	1
Norway	.21	.20	.02	9522.22	13.61	4.28	1
Austria	.21	.10	.14	5580.49	16.15	4.83	0
Germany	.23	.15	.12	5410.64	13.20	3.89	1
Estonia	.24	.07	.20	1248.28	20.72	3.24	1
Denmark	.25	.23	.03	6463.24	13.36	3.49	1
Switzerland	.29	.20	.14	9673.52	26.80	4.05	1
Lithuania	.30	.02	.29	1063.42	31.27	4.12	1
France	.30	.21	.16	4958.99	6.34	3.19	1

Paper V

EDUCATIONAL INEQUALITIES IN MORTALITY AMENABLE TO HEALTH CARE. A COMPARISON OF EUROPEAN HEALTH CARE SYSTEMS

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RESEARCH ARTICLE

Educational inequalities in mortality amenable to healthcare. A comparison of European healthcare systems

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Abstract

Background

Educational inequalities in health and mortality in European countries have often been studied in the context of welfare regimes or political systems. We argue that the healthcare system is the national level feature most directly linkable to mortality amenable to healthcare. In this article, we ask to what extent the strength of educational differences in mortality amenable to healthcare vary among European countries and between European healthcare system types.

Methods

This study uses data on mortality amenable to healthcare for 21 European populations, covering ages 35–79 and spanning from 1998 to 2006. ISCED education categories are used to calculate relative (RII) and absolute inequalities (SII) between the highest and lowest educated. The healthcare system typology is based on the latest available classification. Meta-analysis and ANOVA tests are used to see if and how they can explain between-country differences in inequalities and whether any healthcare system types have higher inequalities.

Results

All countries and healthcare system types exhibited relative and absolute educational inequalities in mortality amenable to healthcare. The low-supply and low performance

from national statistical offices in the study countries. The original data can only be retrieved from each country directly due to protection of privacy. We have presented the sources of mortality data in a (S1 Table) with contact information for each study country. We confirm that others will be able to access the data in the same way as we did. We also confirm that there were no special access privileges.

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mixed healthcare system type had the highest inequality point estimate for the male (RII = 3.57; SII = 414) and female (RII = 3.18; SII = 209) population, while the regulation-oriented public healthcare systems had the overall lowest (male RII = 1.78; male SII = 123; female RII = 1.86; female SII = 78.5). Due to data limitations, results were not robust enough to make substantial claims about typology differences.

Conclusions

This article aims at discussing possible mechanisms connecting healthcare systems, social position, and health. Results indicate that factors located within the healthcare system are relevant for health inequalities, as inequalities in mortality amenable to medical care are present in all healthcare systems. Future research should aim at examining the role of specific characteristics of healthcare systems in more detail.

Introduction

Over the last few decades, many studies have shown that socioeconomic factors (such as educational attainment, occupational class, and income) are the leading determinants of population health in European countries, and their influence appears to have increased substantially (cf. [1–3]). Healthcare systems have been characterized as one of the key dimensions of modern welfare states, since welfare states constitute “a complex set of institutionalized citizenship rights”, shaping “the causes and consequences of health, illness and healing” [4]. Nevertheless, healthcare has been by and large absent from major welfare state theories [5–9]. In this article, we explore and discuss the associations between healthcare and social inequalities in health, on the empirical basis of mortality data from 21 European countries.

Educational level and health are related through numerous pathways, such as smaller risk of unemployment, higher income, good housing conditions, low financial hardship, lower levels of health damaging behavior, and feelings of mastery, control, and social support [10]. Educational attainment is also closely related to health literacy: the ability to use reading and numerical skills to understand health information provided by for instance physicians, nurses, and pharmacists [11]. Educational inequalities in health and mortality appear to vary across European countries, with the rank order of countries depending on the indicator of health and mortality that is used (cf. [12–15]). Education is a pragmatic measure of social position status which is reasonably comparable across contexts, and often used in cross-national studies where data on income or occupation is unavailable or considered too context-dependent–as is the case with this article [16]. Further, education is less sensitive to reverse causation–for adults, educational attainment does not change if one’s health deteriorates. Educational distribution in the study countries is available in S2 Table.

A common approach to comparative studies of and social inequalities in health has been to focus on the role of welfare regime types (e.g., [17]) or political systems (e.g., [18,19]). Welfare regime typologies have contributed to highlighting and comparing some of the principles underpinning welfare states, the generosity of social transfers, and entitlements and social rights, which all may affect the social distribution of health [20]. The results from this regime approach to health inequalities have been described as “a patchy picture with contradictory findings” [21].

A common criticism against the welfare state regime approach has been related to its crudeness–it has been argued that there is a need to specify which welfare state characteristics are of importance for public health outcomes [22]. Moreover, reviews of the regime approach to health inequalities have concluded that the empirical evidence does not consistently support the association between welfare regime and health outcomes proposed by welfare regime theory [21,23]. Most notably: The Nordic countries belonging to the Social Democratic welfare regime, committed to universality and equality, have exhibited high life expectancies in combination with comparatively large health inequalities–often described as the Nordic public health puzzle or paradox [15,20].

In order to further advance research on macro-level explanations for cross-national differences in socioeconomic health inequality, more detailed accounts of the specific aspects of welfare regimes or political systems most prone to influence health are needed. Further, there is a need to link specific country-level mechanisms to specific health outcomes rather than general indicators of health or mortality.

In this study, we aim to provide a novel contribution by exploring the variation of educational inequalities in mortality amenable to healthcare among European countries and healthcare system types. We argue that the healthcare system is a feature of welfare states that is most directly relevant and linkable to health outcomes, compared to for instance GDP per capita or indicators of healthcare spending. We further argue that mortality amenable to healthcare is a health outcome with a clearer and stronger connection to state or healthcare intervention than other measures of health and mortality [24]. Amenable mortality can be defined as deaths which are preventable through medical intervention and which should not occur in the presence of timely and effective healthcare, including prevention, diagnosis, and treatment [25–27]. From this perspective, we aim to explore variation across 1) European countries and 2) European healthcare system types.

Welfare and healthcare typologies

Several strategies to measure and classify healthcare systems have been proposed since the 1970s, often based on healthcare expenditure, healthcare financing, service provision, and access regulation and resulting in versions of three healthcare system ideal types closely connected to Esping-Andersens welfare state regimes: voluntary insurance, social health insurance, and national health service [7]. Reibling, Ariaans, and Wendt [28] used 13 country-level variables to construct a typology of healthcare systems across 29 high-income countries. Health expenditure per capita and the number of GPs per population indicated healthcare supply, the financial and human resources spent on health. The role of the state and the public/private mix in healthcare was indicated by the public share of health expenditure, the share out-of-pocket payments, and the remuneration of specialists as a measure of cost sharing. Access regulation was measured by indicators of healthcare coverage and choice restrictions. Expenditure on outpatient-care and their GP-to-specialist ratio indicated primary care orientation. Finally, healthcare performance was measured by indicators of tobacco and alcohol consumption and a quality sum index based on avoidable hospital admissions. Here, tobacco and alcohol consumption were used as proxies for the effectiveness of a healthcare system's preventive efforts, as adequate data on regulatory and monitoring activities was not available. Factor analyses of these indicators resulted in a five-fold typology of healthcare systems (countries included in our data in bold):

Type 1 –Supply- and choice-oriented public systems (Australia, **Austria**, **Belgium**, **Czech Republic**, **France**, Germany, Iceland, Ireland, Luxembourg, **Slovenia**): Primarily public funded social insurance systems. Characterized by medium to high levels of financial and human resources, free choice, and access regulation only by cost sharing. Performance scores are mediocre with regards to both prevention and healthcare quality.

Type 2 –Performance- and primary-care-oriented public systems (**Finland**, Japan, New Zealand, **Norway**, Portugal, South Korea, **Sweden**): Public funded high-performing healthcare systems. The state has a strong role in regulating access and in the payment of medical specialists. Primary care has high priority.

Type 3 –Regulation-oriented public systems (Canada, **Denmark**, **Italy**, Netherlands, **Spain**, **United Kingdom**): Primarily public funded healthcare systems. Medium level of resources, low levels of out-of-pocket payments, and high level of access regulation and limitation of choice. Lower priority of primary care and lower performance than Type 2.

Type 4 –Low-supply and low performance mixed systems (**Estonia**, **Hungary**, **Poland**, Slovakia): Mostly public funded healthcare systems with low levels of financial and human resources, high levels of out-of-pocket spending, strong access regulations, and low performance on prevention and quality of care.

Type 5 –Supply- and performance-oriented private systems (**Switzerland**, United States): Healthcare systems with a strong role of private financing and out-of-pocket payments. Public resources are in the majority, with high supply and expenditures. Access is regulated by sharing regulations such as deductibles. This type shows high quality-of-care performance.

Since we wanted to utilize the full range of our data, and to avoid calculating with single-country clusters, we grouped Lithuania (which is not included in the data of Reibling et al. [28]) in Type 4, and Switzerland (which is the only Type 5 country in our data) in Type 1. This is done based on an assessment of key indicators used in the initial factor analysis. Subsequently, only four of the five healthcare systems types were included in our analysis. As results from research using welfare state regimes to compare health inequalities have been largely inconclusive, our contribution with this article is to use a validated and more specific health outcome–amenable mortality rather than self-reported health or limiting longstanding illness–and a typology more directly related to health–Reibling and colleagues' [28] healthcare system types.

Expectations

Our study design is not suited for predicting inequality effects of specific health policies. However, we expect inequality rates to vary across countries and healthcare system types, and results from previous research allow us to formulate some modest expectations with regards to this variation. First, low education can be associated with poor health by being an indicator of material disadvantage. Financial strain due to e.g. unemployment or low income may matter more in a context with scarce healthcare resources and high out-of-pocket payments. Blom, Huijts, and Kraaykamp's [29] analyses of repeated cross-sectional survey data revealed that high total and state provision of healthcare, measured as total and governmental healthcare expenditure, was associated with smaller educational inequalities in self-rated health, while specific inequality-reducing health policies had a less substantial effect. This leads us to expect that low public funding, as found in the low supply and low performance mixed systems (Type 4), is associated with higher levels of inequalities.

Second, the impact of strong access regulation and choice restriction, as found in the performance- and primary-care-oriented public systems (Type 1) and the regulation-oriented public systems (type 3), appears less clear. On the one hand, regulations may enhance health equality, ensuring equal access and preventing overconsumption of services. On the other hand, to maneuver a bureaucracy-governed healthcare system may (unintentionally) reward immaterial resources typically associated with high socioeconomic position, such as health literacy, social networks and the ability to "work the system" [30].

Third, people of low socioeconomic position have tended to be more intensive users of general practitioners, mainly due to a higher disease prevalence [31,32]. High priority of primary care, as found in the performance- and primary-care-oriented public systems (Type 2), could therefore also be associated with lower inequalities.

Data and methods

Data

The EURO-GBD-SE project collected and harmonized mortality data from the 21 European countries for which comparable data was available. This article utilizes all available data, covering time periods between 1998 and 2006, depending on country (see S1 Table). This data is to our knowledge the latest individual-level mortality dataset encompassing a majority of European countries. The datasets included four Nordic countries (Finland, Sweden, Norway, and Denmark), six Western European populations (England & Wales, Scotland, Belgium, France, Switzerland, and Austria), four Southern European populations (Barcelona, Basque Country and Madrid (Spain) and Turin (Italy)), four Central/Eastern European countries (Slovenia, Hungary, Czech Republic, and Poland) and two Baltic countries (Estonia and Lithuania). The data covered the entire national, regional (Madrid, the Basque Country) or urban (Barcelona and Turin) populations. The data from Spain and Italy only covers parts of the population, which prevents us from generalizing to the whole countries. These populations are therefore excluded when we estimated relative and absolute inequalities for the different healthcare system types but are displayed in tables and figures as a reference point.

Mortality data for Hungary, the Czech Republic, Poland and Estonia came from cross-sectional (CS) unlinked mortality studies. Data for Barcelona and Madrid was derived from a cross-sectional census linked studies. Data for other European countries has a longitudinal design. In the cross-sectional unlinked mortality studies, information on socioeconomic position was derived separately from death certificates and census records. In the longitudinal studies, mortality was linked to socioeconomic position determined during a census. An overview of the mortality data sources is displayed in S1 Table.

The Finnish dataset included only 80% of the Finns. The Swiss dataset excluded Non-Swiss nationals, the French dataset excluded those born outside mainland and the Dutch dataset excluded people from institutions. The 100% linkage between the population and death registries was achieved in most of the included populations. In countries where the default in linkage was lower than 5% no corrections were applied. In countries and areas such as Austria, Barcelona, the Basque Country, and Madrid, where a higher percentage of deaths that could not be matched with the mortality registry, we introduced a correction factor. In Austria, the correction factor was broken down by sex and 5-year age group. In Barcelona, the Basque Country and Madrid, there were no variations by age and sex for excluded deaths. The correction factor was therefore equal to 1.06 (1/0.946) for Barcelona and the Basque Country and 1.25 (1/0.8) for Madrid.

The causes of death amenable to healthcare were selected on basis of the publications by Stirbu et al. (2010) and the AMIEHS (2011) report from the European Union's Public Health Programme. In public health research, the terms "avoidable", "amenable", and "preventable" have been associated with some ambiguity, and often been used interchangeably [33]. Piers, Carson, Brown, and Ansari [34] have argued that avoidable mortality includes amenable and preventable conditions, where deaths can be averted from the former, while the latter can be prevented from occurring altogether. Others have attempted to classify mortality according to the relevant level of healthcare intervention: primary, secondary, and tertiary avoidable mortality [35], and health policy and medical care indicators of avoidable mortality [36]. For example, Perez and colleagues' [37] analysis of avoidable mortality in Spain showed that figures on avoidable mortality could be affected by different processes such as healthcare interventions, prevention and promotion strategies, or by intersectoral policies. The authors argued that the concepts (and sub-concepts) of amenable and avoidable mortality have tended to blur the image of the prevalence and trends of specific causes of death. Nolte and McKee [33] have further questioned the underlying assumption of these classifications: that health outcomes can be attributed to specific elements of healthcare. For several conditions, there are discrepancies in the literature regarding the effect of public health and medical interventions, and thus also the nature of their preventability. Additionally, the classification of amenable mortality may to a certain extent suffer from systematic cross-national variation in diagnosis, death certification, and cause of death classification [27]. When assessing amenable mortality in the different healthcare system types, we will also contrast these estimates with inequalities in all-cause mortality.

Our classification leans on the precedence set by previous cross-national comparisons of amenable mortality (cf. [38–40]). One contested measure has been to classify ischemic heart disease and heart failure as non-amenable. It has been argued that the impact of medical treatment on these causes of death is unclear, while the association with lifestyle factors such as smoking, alcohol consumption and obesity is strong. Causes of death classified as amenable to healthcare are reported in Table 1. Other scholars have used different versions of the same data with similar classifications. Stirbu et al. [41] found educational inequalities in mortality amenable to medical care across all European countries, particularly pronounced in Central-/Eastern-, and Baltic European countries; Plug et al. [42] found that these inequalities were not

Table 1. Causes of death amenable to medical care according with ICD10 codes.

Cause of death	ICD10 codes
HIV/ AIDS	B20-B24
Tuberculosis	A15–A19, B90
Other infectious and parasitic diseases	A00-B99
Cancer of colon-rectum	C18–C21
Cancer of cervix uteri	C53
Cancer of testis	C62
Hodgkins lymphoma	C81
Leukemia	C91-C95
Rheumatic heart disease	I00–I09
Hypertension	I10–I15
Other heart disease	I30-I52
Cerebrovascular disease	I60–I69
Pneumonia/ influenza	J10–J18
Asthma	J45–J46
Appendicitis, hernia, cholecystitis and lithiasis	K11.5, K35-K38, K40-K46, K80, K81, N20,
Peptic ulcer	K27
Prostate hyperplasia	N40
Maternal deaths, conditions originating in the perinatal period	O00-O99
Congenital heart disease	Q20-Q28

https://doi.org/10.1371/journal.pone.0234135.t001 associated with inequalities in healthcare use; Mackenbach et al. [15] compared mortality amenable to behavior change, amenable to medical intervention, amenable to injury prevention, and non-preventable mortality, finding the smallest inequalities in the latter category, and the steepest gradient in the former; Mackenbach et al. [43] found that mortality declined faster among the higher than among the lower educated and that educational inequalities in mortality decline were similar between causes of death amenable to behaviour change and medical care.

We used educational attainment as a measure of socioeconomic position. This was categorized according to the International Standard Classification of Education as low (no or primary education and lower secondary education, ISCED 0–2), middle (upper secondary education, ISCED 3–4) and high (tertiary education, ISCED 5–6) education. In order to create comparability across countries, we needed the same educational grouping in all countries. These three groups were what national educational classifications allowed us to create, and this division is also utilized in the studies cited above. Table 2 displays the amenable mortality rates by educational level.

Analyses

All analyses were conducted separately for women and men aged 35–79 years (age interval depending on country) and age-standardized with the European Standard Population as reference [44]. Individuals whose educational attainment was unknown were omitted from the analyses. The magnitude of relative educational inequalities in mortality amenable to healthcare across European countries and across healthcare systems was calculated by relative indices of inequality (RII) by means of Poisson regression. The RII is a regression-based measure that accounts for the distribution of the population by educational groups using rank of educational attainment as a dependent variable [45]. The educational rank was calculated over all three educational groups defined above. The resulted RII represents the risk of death at the lowest educational level as compared to the highest educational level in the population. Values larger than 1 indicate a disadvantage for the low educated, values smaller than 1 a disadvantage for the high educated. The magnitude of absolute educational inequalities was calculated by Slope Index of Inequality (SII), a regression-based measure that takes into consideration the entire distribution of education; its values indicates differences in predicted values between low and high educated. Positive values indicate a disadvantage for the low educated, negative values a disadvantage for the high educated.

To further test the applicability of the different typologies, meta-analyses and analysis of variance (ANOVA) was performed on RII and SII estimates. Meta-analyses are common in systematic reviews and aim to synthesize data from multiple studies [46]. In this article, pooled estimates were calculated for each healthcare system type through meta-analysis techniques; each country estimate was weighed with its inversed variance to calculate effect summary with standard errors and confidence intervals. Since the inequality rates were estimated from different populations, we calculated random effects models when heterogeneity was not too low. When performing ANOVA analyses, we used F-tests to compare the RII and SII means of the healthcare systems, and to determine whether between-group variance was larger than within-group variance. Meta- and ANOVA analyses utilize tests of statistical significance, but with a small country-level sample size, estimates are bound to be surrounded by uncertainty [47]. We therefore avoid using these analyses as tests of whether differences between healthcare system types are significant or non-significant. Fig 1 displays statistical uncertainty as 95% confidence intervals, while S3–S5 Tables includes the p-values from the ANOVA analyses.

Table 2. Mortality rates by educational level standardized to the European Standard Population.

Country	Gender	Mortality rates, ISCED 0–2	Mortality rates, ISCED 3–4	Mortality rates, ISCED 5–6
Austria	Men	274.4	210.1	148.4
	Women	159.8	114.9	90.2
Belgium	Men	238.0	198.2	153.9
	Women	158.5	121.1	94.8
Czech Republic	Men	478.2	265.7	163.8
	Women	261.7	182.9	106.1
Denmark	Men	284.3	232.3	183.7
	Women	190.7	150.1	118.9
England/ Wales	Men	219.0	144.3	122.5
	Women	159.2	106.8	110.8
Estonia	Men	689.0	530.2	317.3
	Women	403.5	279.2	172.8
Finland	Men	242.7	184.1	138.6
	Women	144.9	102.8	74.7
France	Men	310.7	223.4	141.1
	Women	136.8	90.2	55.7
Hungary	Men	644.1	351.5	247.8
	Women	345.8	188.6	182.4
Italy (Turin)	Men	200.8	170.6	136.7
	Women	120.2	111.0	95.4
Lithuania	Men	405.4	270.4	155.2
	Women	235.6	130.3	73.9
Norway	Men	246.5	181.1	136.1
	Women	163.3	120.8	85.3
Poland	Men	248.6	134.6	84.1
	Women	130.5	78.6	48.2
Scotland	Men	223.2	163.3	148.7
	Women	158.2	72.8	99.4
Slovenia	Men	421.2	278.2	178.3
	Women	202.4	133.8	104.3
Spain (Barc.)	Men	239.3	193.2	151.6
	Women	119.5	94.3	78.1
Spain (Basque)	Men	206.5	162.6	158.1
	Women	95.1	77.6	67.8
Spain (Madrid)	Men	231.8	206.9	183.2
	Women	122.4	111.0	78.3
Sweden	Men	184.2	146.6	113.4
	Women	125.8	95.4	69.8
Switzerland	Men	183.6	113.8	83.5
	Women	88.4	61.4	46.5

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Results

Relative and absolute inequality estimates are displayed in Table 3. In all countries, and subsequently in all healthcare system types, RII > 1 and SII > 0, meaning that mortality amenable to healthcare was higher for lower educated groups in all populations, both in relative and absolute measures. Among men, Poland (RII 4.67) and the Czech Republic (RII 4.60) showed higher relative inequalities, while Denmark (RII 1.81) and Sweden (RII 1.95) showed the

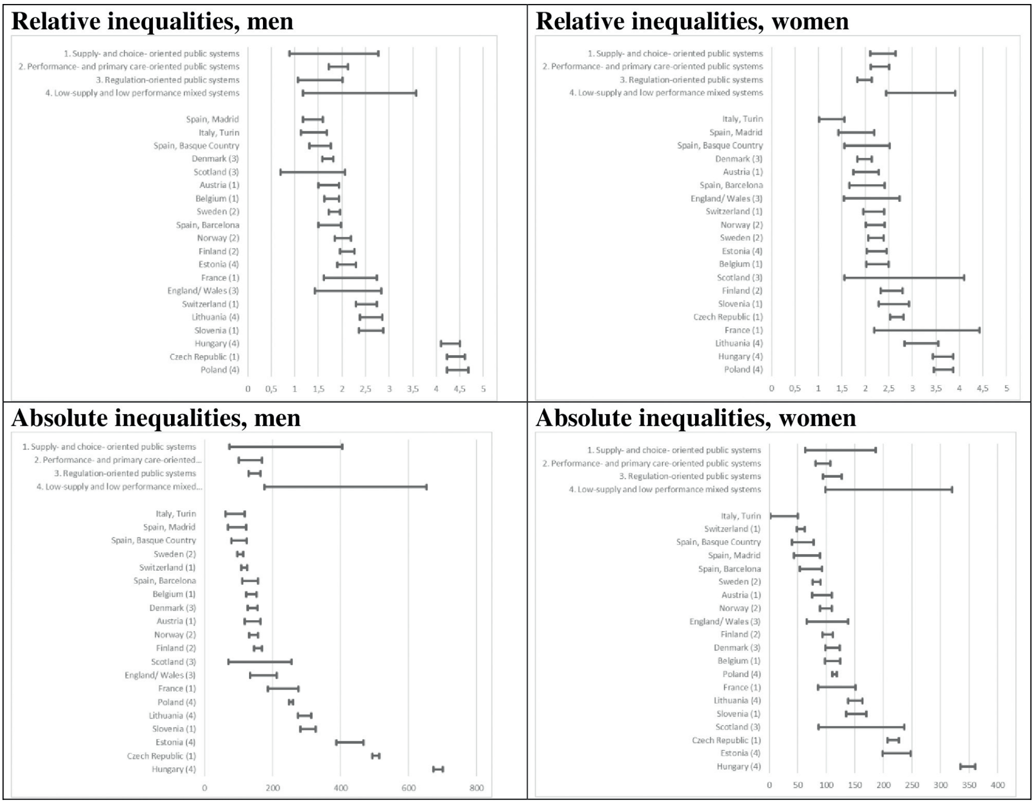

Fig 1. RII and SII estimates (95% CIs). Healthcare system types in parentheses.

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lowest. The highest absolute inequalities were found in Hungary (683.3) and the Czech Republic (503.5), while the lowest inequalities were found in Sweden (SII 105.0) and Switzerland (SII 116.5). In the female population, Poland (3.66) and Hungary (3.65) showed the highest inequalities; Denmark (RII 2.0) and Austria (RII 2.0) has the lowest relative inequalities. Hungary (348.2) and Estonia 223.7) showed high absolute inequalities; Switzerland (55.2) and Sweden (82.9) had the lowest.

The healthcare system typology estimates were associated with much uncertainty and few clear-cut differences could be detected. A general pattern was that type 4, the low-supply and low performance mixed systems, had the highest point estimate in all analyses, while types 2 and 3, the performance- and primary care-oriented and the regulation-oriented public systems, showed the lowest absolute and relative inequality estimates respectively.

Results from ANOVA tests (S3–S5 Tables) were mixed; for most combinations of inequality measure and gender, except from relative inequalities among women, results indicated that variation between healthcare system types was not smaller than variation within types. These results imply that healthcare system similarities were not reflected in health inequality outcomes.

Table 3. RII and SII estimates. Standard errors in parentheses.

	Men		Women	
	RII	SII	RII	SII
Austria	1.91 (0.11)	141.4 (11.7)	2.0 (0.14)	92.2 (8.7)
Belgium	1.93 (0.08)	138.0 (7.8)	2.25 (0.12)	111.2 (6.8)
Czech Republic	4.60 (0.10)	503.5 (5.1)	2.67 (0.07)	217.4 (5.2)
Denmark	1.81 (0.06)	140.6 (7.2)	2.0 (0.08)	109.7 (6.5)
England/ Wales	2.66 (0.36)	171.6 (20.1)	2.06 (0.3)	100.6 (18.6)
Estonia	2.28 (0.10)	423.8 (20.5)	2.23 (0.11)	223.7 (12.7)
Finland	2.26 (0.08)	157.0 (6.0)	2.55 (0.12)	101.9 (4.6)
France	2.62 (0.28)	232.9 (22.9)	3.12 (0.57)	120.1 (16.7)
Hungary	4.5 (0.1)	686.3 (7.2)	3.65 (0.11)	348.2 (6.6)
Italy (Turin)	1.64 (0.14)	90.0 (14.5)	1.25 (0.14)	25.8 (12.4)
Lithuania	2.84 (0.12)	293.6 (10.1)	3.18 (0.18)	150.9 (6.3)
Norway	2.18 (0.09)	143.8 (6.7)	2.2 (0.1)	99.4 (5.4)
Poland	4.67 (0.11)	254.2 (3.0)	3.66 (0.11)	114.7 (2.0)
Scotland	1.81 (0.35)	162.6 (47.2)	2.52 (0.65)	164.6 (38.4)
Slovenia	2.85(0.13)	305.1 (11.7)	2.58 (0.16)	153.1 (9.0)
Spain (Barcelona)	1.95 (0.12)	134.4 (12.0)	2.0 (0.19)	71.7 (10)
Spain (Basque Country)	1.73 (0.12)	101.4 (11.4)	1.98 (0.25)	58.6 (9.6)
Spain (Madrid)	1.57 (0.11)	96.5 (13.8)	1.77 (0.19)	65.9 (11.8)
Sweden	1.95 (0.06)	105.0 (4.4)	2.22 (0.08)	82.9 (3.6)
Switzerland	2.72 (0.11)	116.5 (4.4)	2.17 (0.11)	55.2 (3.6)
Pooled estimate	2.53 (0.22)	220.1 (36.6)	2.39 (0.14)	123.0 (14.4)
1. Supply- and choice-oriented public systems	2.77 (0.48)	239.6 (84.7)	2.37 (0.14)	124.9 (31.6)
2. Performance- and primary care-oriented public systems	2.12 (0.10)	135.0 (17.2)	2.31 (0.10)	94.4 (6.6)
3. Regulation-oriented public systems	2.01 (0.24)	146.8 (8.89)	1.98 (0.08)	110.6 (8.23)
4. Low-supply and low performance mixed systems	3.57 (0.61)	414.5 (121.4)	3.18 (0.37)	209.3 (56.6)

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Discussion

Few distinct conclusions can be drawn from our comparisons of European healthcare system types. As expected, Type 4 characterized by low supply in general showed the highest inequality rates, suggesting that high supply of healthcare services combined with focus on primary and preventive healthcare focus may moderate health inequalities. We outlined different mechanisms through which regulation of access and choice in a healthcare system could affect inequalities. The healthcare systems characterized by public financing and regulation of access had low point estimates of inequality. However, results were associated with uncertainty, demonstrated by the large confidence intervals. Type 4 scores low on both resources and the performance indicators, and it is thus difficult to distinguish any specific healthcare system characteristics affecting inequalities in amenable mortality. This inconclusiveness corresponds with the findings from Bergqvist, Yngwe, and Lundberg's [21] review, leading the authors to suggest that the regime approach "is not a fruitful way forward". In a sensitivity analysis (S6 Table), we calculated RII and SII estimates in total mortality for all countries and healthcare system types, finding similar patterns: The low-supply and -performance systems showed the largest relative and absolute inequalities, with indiscernible differences between the other types., results from ANOVA tests of all-cause mortality were, similar to those of amenable mortality, mixed. Greater variation was demonstrated between than among types only for relative inequalities among women and absolute inequalities among men. Analyses using all-cause mortality accounts for competing causes; when using amenable mortality and excluding some causes of death, we risk removing data points where multiple morbidities have affected death. Results from these sensitivity analyses suggest similar population health patterns in the countries within each typology, but potentially through other mechanisms than similar healthcare systems.

Inequalities were demonstrated also in systems emphasizing high supply and state control of access and choice, i.e. being close to what one could call universal healthcare systems. A common explanation of health inequalities in these systems has been to emphasize social patterns in background risk factors, for example in smoking, since these systems exhibit large social inequalities in such risk factors [12,48,49]. However, we have defined mortality directly related to tobacco and alcohol (cancer of larynx, trachea, bronchus, and lung; chronic obstructive pulmonary disease; alcoholic psychosis, dependence, and abuse; alcoholic cardiomyopathy and cirrhosis of liver; and accidental poisoning by alcohol) as not amenable to healthcare, and thus excluded these causes of death from our analyses. This is not to say that smoking and drinking could not be indirectly related to other causes of death, for instance as cardiovascular-related mortality amenable to healthcare, but we have assumed them to only have a limited influence on the observed mortality inequalities, leaving the greatest explanatory power to factors located within the healthcare services.

Healthcare plays a key role in the social distribution of health, illness and death. Healthcare system arrangements may therefore function as mechanisms connecting social position to health outcomes. At the organizational level, a lack of access to good quality healthcare in lower socioeconomic groups could translate into larger educational inequalities in mortality. However, the evidence on this point is inconclusive, in particular for high-income countries with publicly financed healthcare systems [15,50]. A related, potentially inequality-producing, factor is unequal *use* of healthcare services by socioeconomic groups. Low socioeconomic position has been associated with more use of primary healthcare, while higher socioeconomic groups have reported significantly more specialist contact, even though they overall are in better health. These inequalities have been shown to vary across countries and welfare state regimes [31,32,51–53]. Some examples of suggested explanations are 1) that physicians could be more concerned about high-status patients; 2) that low-status patients are less able to “work the system” and pressure their physicians to prescribe more care; 3) that the interpretation of symptoms and perception of the need for healthcare, are closely associated with socioeconomic position; and 4) that patients with low education are more sensitive to a paternalistic doctor-patient relationship [30,54–56]. At the level concerning the specific treatment and the physician-patient relation, patients with low education and patients who in less affluent areas are more likely to receive shorter primary care consultations and to experience their physician as less empathic [57,58]. Similar to previous research, our results indicated that amenable mortality inequalities existed in all study countries and healthcare system types. The type characterized by low resources and access regulation showed signs of the overall largest inequalities, but some decoupling of the typologies is still needed. Further, our data did not allow us to determine whether these inequalities estimates stem from inequalities in access, in use, or in quality of healthcare services.

Limitations

The approach of classifying countries into typologies or regimes has been subject to debate. As Wendt [6] has demonstrated, several typologies with different healthcare system types and varying country classifications have been proposed during the last few decades (e.g. [7,59–61]). Although typologies inherently capture a broad range of interrelated dimensions, they also always depend on the extent to which dimensions are emphasized or de-emphasized in the operationalization. Apparently similar programs and policies may be differently organized, and indicators upon which a typology is based, for instance choice restrictions and funding, may be confounded. However, the healthcare system typologies first developed by Wendt [6] and later followed up by Reibling et al. [28] is to our knowledge the most comprehensive typology to our knowledge, aiming to intercept all important aspects of a healthcare system.

To adapt the Reibling et al. [28] typology to our available data material, we classified Lithuania and Switzerland as respectively *Low-supply and low performance mixed systems* and *Supply- and choice-oriented public systems*. Classification was done by key indicators from the initial factor analyses of Reibling et al. [28]. Additional meta-analyses and ANOVA tests showed that including these countries in their respective clusters affected meta-analysis estimates, but the overall differences between the estimates remained similar, while results from ANOVA tests excluding Switzerland and Lithuania indicated that the within-type variation was not lower than the between-type variation, similar to the analyses of amenable mortality.

Some compatibility issues occurred between the country-level healthcare system typology and the individual-level cause-specific mortality data. The Reibling et al. [28] typology is based on data from 2011 to 2014, while the mortality data covers the period 1998 to 2006 (depending on country, see S1 Table). Though the 2019 healthcare system types have similarities with earlier typologies (cf. [6,62]), this partial incompatibility weakens the link between our two data levels. Most all analyses combining data from the individual and country level face similar constraints; the influence of country-level variables on mortality is hard to narrow down in general, as numerous policies affect one's health over the life course. In our discussion, we have met this limitation by using the typologies to describe variations rather than assigning direct effects to specific policies.

The 20% of Finns excluded from the data was a random sample and results should not be affected. Related is the exclusion of non-Swiss nationals from the Swiss data. The impact of this potential bias is unclear; our analyses may over- or underestimate the magnitude of inequalities in mortality in Switzerland as a whole, depending on inequalities in mortality in the excluded population compared to Swiss nationals. As aforementioned, meta-analyses and ANOVA with and without Switzerland returned similar results, but this exclusion nevertheless limits our conclusions. Non-linkage represents another limitation; applying the correction factor provides a more accurate result but will not remove a systematic non-linkage bias–we do not know the composition of the non-linked populations. Lastly, the "No education" and "Missing education data" categories may be heterogenous; Flanagan and McCartney [63] have demonstrated how differentiation across categories and missing data on educational attainment has varied between censuses in England and Wales from 1971 to 2001. The ISCED categories provides comparability across countries, but national differences in questioning, coding, and organization of the education system are still unaccounted for.

The applied definition of amenable mortality and the indicators used to construct a typology may also be conflicting. An apparent example is that consumption data on alcohol and tobacco are used to measure for healthcare prevention performance, while mortality directly related to lifestyle traits was excluded from the analyses. Variation in countries' performance in preventing smoking and alcohol use may thus not be reflected in the mortality numbers. On the other hand, Reibling et al. [28] included these indicators as proxies; they are meant to indicate general preventive care performance. Further, only mortality *directly* attributed to smoking and alcohol use was excluded; we included causes of death *indirectly* associated with lifestyle, which again could be related to the performance of a country's preventive services.

The concepts of amenable mortality and healthcare system types offers both the advantages and disadvantages associated with combining several dimensions in one encompassing classification. Originally, amenable mortality was intended to be useful in terms of policy intervention, with an aim to distinguish those forms of mortality that a more effective organization of the healthcare system could deal with. However, such classifications may also hide variation between the different causes of death–within and across countries. Though amenable mortality was originally proposed as an indicator of healthcare quality, Nolte and McKee [33] have suggested–on the basis of the ambiguous operationalisations and evidence–that it rather should be treated as a starting point for further research and an indicator of concern. Although our analysis may suffer from crude divisions of mortality, we argue that these were necessary steps for the cause of overview and comparison, and as a point of departure for discussing how healthcare systems may produce health inequalities. We urge future research to derive more specific policy recommendations based on empirical analyses focusing on specific aspects of healthcare systems and detailed forms of amenable mortality. This will require the availability of rich data at the individual level as well as the national level for a large number of countries to improve statistical power.

Conclusions

Many of the pathways connecting social position to health can potentially be found within the healthcare system. This article has combined a novel healthcare system typology with comprehensive individual-level mortality data. Our results demonstrated educational inequalities in mortality amenable to healthcare across 21 European populations. Meta-analyses suggested that higher inequalities were found in healthcare systems characterized by low healthcare supply, strong access regulation, and low scores on selected performance indicators.

All four healthcare system types exhibited inequalities in mortality amenable to medical care, and healthcare systems characterized by universality and high levels of provision did not show smaller inequalities. This paradox has previously been explained by pointing to inequalities in lifestyle traits, but our analyses indicated that inequalities are apparent in these systems also when mortality directly attributable to alcohol and tobacco is excluded, suggesting that organizational features of these healthcare systems also could be determinants of health inequalities, but the typology utilized may be a too crude measure. One purpose of our analyses was to provide an overview and discuss how healthcare systems may affect health. We further recommend future research on amenable mortality and morbidity to examine specific health policies and their impact on specific amenable health outcomes.

Supporting information

S1 Table. Data sources.
(DOCX)

S2 Table. Educational distribution.
(DOCX)

S3 Table. Analysis of variance, RII and SII estimates of healthcare system types (amenable mortality).
(DOCX)

S4 Table. Analysis of variance, RII and SII estimates of healthcare system types–excluding Switzerland and Lithuania (amenable mortality).
(DOCX)

S5 Table. Analysis of variance, RII and SII estimates of healthcare system types (all-cause mortality).
(DOCX)

S6 Table. RII and SII estimates in total (all-cause) mortality.
(DOCX)

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Table S1: Data sources

Country	Age group	Data	Period	Contact information
Austria	35-79	Longitudinal	2001-2002	Data were obtained from Statistics Austria (info@statistik.gv.at). Our contact person in the project was Johannes Klotz (johannes.klotz@statistik.gv.at)
Belgium	35-79	Longitudinal	2004-2005	Data were obtained from Statistics Belgium (statbel@economie.fgov.be). Our contact person in the project was Patrick Deboosere (patrick.deboosere@vub.ac.be)
Czech Republic	35-79	CS, unlinked	1998-2003	Data were obtained from the Czech Statistical Office (infoservis@czso.cz). Our contact person in the project was Jitka Rychtarikova (rychta@natur.cuni.cz)
Denmark	35-79	Longitudinal	2001-2005	Data were obtained through Statistics Denmark (www.dst.dk). Our contact person in the project was Anita Lange (anl@dst.dk)
England/ Wales	35-79	Longitudinal	2001-2006	Data were obtained from the Office for National Statistics (www.ons.gov.uk). Our contact person in the project was Chris White (chris.white@ons.gov.uk).
Estonia	35-79	CS, unlinked	1998-2002	Death data were obtained from Causes of Death Registry, National Institute for Health Development (NIHD), Tallinn, Estonia (gleb.denissov@tai.ee); population data by educational level were obtained from Statistics Estonia open database (https://stat.ee). Data were combined into multidimensional frequency tables for project needs by Mall Leinsalu, Department of Epidemiology and Biostatistics, NIHD (mall.leinsalu@tai.ee). She is the contact person for further requests.
Finland	35-79	Longitudinal	2000-2005	Data were obtained from Statistics Finland (web: http://www.stat.fi/tup/mikroaineistot/index_en.html; tutkijapalvelut@stat.fi). Our contact person in the project was Pekka Martikainen (pekka.martikainen@helsinki.fi)
France	35-79	Longitudinal	1999-2004	Death data were obtained from the French Causes of Death Registry, CepiDc, French National Institute for Health and Medical Research (Inserm; https://www.inserm.fr); population data by educational level were obtained from the French National Institute for Statistics (INSEE; https://www.insee.fr/en/information/3974508). Data were combined into multidimensional frequency tables for project needs by Gwenn Menvielle, Pierre Louis Institute for Epidemiology and Public Health (gwenn.menvielle@inserm.fr). She is the contact person for further requests.
Hungary	35-79	CS, unlinked	1999-2002	Data were obtained from the Hungarian Central Statistical Office (https://kapcsolat.ksh.hu/ContactCenter/index.xhtml?lang=en). Our contact person in the project was Katalin Kovacs (kovacs@demografia.hu)
Italy (Turin)	35-79	Longitudinal	2001-2006	Data were obtained from the Turin Longitudinal Mortality Study. Our contact person in the project was Giuseppe Costa (giuseppe.costa@epi.piemonte.it)
Lithuania	35-69	Longitudin	2001-	Data were obtained from the Lithuanian Department of

		al	2005	Statistics (aleksandra.golubovic@stat.gov.lt). Our contact persons in the project was Domantas Jasilionis (Jasilionis@demogr.mpg.de) and Ramunė Kalėdienė (Ramune.Kalediene@lsmuni.lt)
Norway	40-79	Longitudinal	2001-2006	Norwegian Institute of Public Health, Kåre Bævre (kare.baevre@fhi.no). Our contact person in the project was Bjørn Heine Strand (bjorn.heine.strand@fhi.no)
Poland	35-64	CS, unlinked	2001-2003	Data can be obtained from Statistics Poland (https://stat.gov.pl/en/contacts/. Our contact person in the project was Bogdan Wojtyniak (bogdan@medstat.waw.pl)
Scotland	35-74	Longitudinal	2001-2005	Professor Chris Dibben (chris.dibben@ed.ac.uk), Longitudinal Study Centre Scotland, National Records of Scotland, Ladywell House, Ladywell Road Edinburgh Scotland EH12 7TF.
Slovenia	35-79	Longitudinal	2002-2006	Data can be obtained from the Statistical Office of the Republic of Slovenia (gp.surs@gov.si). Our contact person in the project was Barbara Artnik (barbara.artnik@mf.uni-lj.si)
Spain (Barc.)	35-79	CS, repeated	2002-2006	Spanish data for Barcelona city was obtained through Carme Borrell (cborrell@aspb.cat)
Spain (Basque)	35-79	Longitudinal	2001-2006	Regional Spanish data for the Basque country was obtained through Santiago Esnaola (sesnaola@ej-gv.es)
Spain (Madrid)	35-79	Longitudinal	2001-2003	Regional Spanish data for Madrid was obtained through Enrique Regidor (eregidor@msc.es)
Sweden	35-79	Longitudinal	2000-2004	Data can be obtained from Statistics Sweden (https://www.scb.se/en/About-us/contact-us/. Our contact in the project was Olle Lundberg (olle.lundberg@chess.su.se)
Switzerland	35-79	Longitudinal	2000-2005	Swiss Federal Statistical Office, Espace de l'Europe 10, CH-2000 Neuchâtel. Demetriq project contact person: Matthias Bopp (matthias.bopp@uzh.ch). Current contact person: Dominik Ullmann (dominik.ullmann@bfs.admin.ch)

Table S2: Educational distribution

Country	ISCED 0-2	ISCED 3-4	ISCED 5-6
Austria	30.8	56.05	13.2
Belgium	48.6	25.2	26.2
Czech Republic	59.5	29.1	11.4
Denmark	38.6	37.7	23.7
England/ Wales	38.9	25.8	24.0
Estonia	26.2	55.7	18.1
Finland	33.9	36.8	29.3
France	42.4	40.4	17.2
Hungary	43.6	43.2	13.2
Italy (Turin)	59.2	27.4	13.4
Lithuania	22.5	59.5	18
Norway	19.7	55.0	25.3
Poland	53.2	34.5	12.3
Scotland	44.7	31.0	24.3
Slovenia	45.0	31.5	23.5
Spain (Barc.)	55.7	21.5	22.8
Spain (Basque)	60.9	20.5	18.6
Spain (Madrid)	56.6	21.9	21.5
Sweden	27.1	50.3	22.6
Switzerland	19.8	57.8	22.4

Table S3: Analysis of variance, RII and SII estimates of healthcare system types (amenable mortality)

RII men

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	16.6	2.77	0.97
HCS Type 2	3	6.38	2.13	0.03
HCS Type 3	3	6.27	2.09	0.24
HCS Type 4	4	14.3	3.57	1.42

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.15	3	1.72	2.14	0.15	3.49
Within Groups	9.64	12	0.80			
Total	14.78	15				

SII men

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	1437.5	239.6	21813.6
HCS Type 2	3	474.9	158.3	253.6
HCS Type 3	3	405.8	135.3	728.3
HCS Type 4	4	1657.9	414.5	38088.4

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	173555.2	3	57851.7	3.1	0.1	3.5
Within Groups	225297.2	12	18774.8			
Total	398852.4	15				

RII women

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	14.8	2.46	0.17
HCS Type 2	3	6.56	2.19	0.09
HCS Type 3	3	6.97	2.32	0.04
HCS Type 4	4	12.7	3.18	0.45

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.17	3	0.72	3.56	0.05	3.49
Within Groups	2.44	12	0.20			
Total	4.61	15				

SII women

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	749.3	124.9	3097.2
HCS Type 2	3	374.9	125.0	1201.2
HCS Type 3	3	284.2	94.7	106.1
HCS Type 4	4	837.4	209.4	10616.7

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	27441.5	3	9147.2	2.2	0.1	3.5
Within Groups	49950.5	12	4162.5			
Total	77392.0	15				

Table S4: Analysis of variance, RII and SII estimates of healthcare system types – excluding Switzerland and Lithuania (amenable mortality)

RII men

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	5	13.9	2.78	1.21
HCS Type 2	3	6.38	2.13	0.03
HCS Type 3	3	6.27	2.09	0.24
HCS Type 4	3	11.4	3.82	1.78

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.85	3	1.95	2.19	0.15	3.71
Within Groups	8.91	10	0.89			
Total	14.77	13				

SII men

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	5	1320.9	264.2	22725.0
HCS Type 2	3	474.9	158.3	253.6
HCS Type 3	3	405.8	135.3	728.3
HCS Type 4	3	1364.3	454.8	47393.9

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	191210.8	3	63736.9	3.4	0.1	3.71
Within Groups	187651.8	10	18765.2			
Total	378862.7	13				

RII women

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	5	12.61	2.52	0.18
HCS Type 2	3	6.56	2.19	0.09
HCS Type 3	3	6.97	2.32	0.04
HCS Type 4	3	9.54	3.18	0.68

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.74	3	0.58	2.48	0.12	3.71
Within Groups	2.34	10	0.23			
Total	4.08	13				

SII women

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	5	694.0	138.8	2415.8
HCS Type 2	3	374.9	125.0	1201.2
HCS Type 3	3	284.2	94.7	106.1
HCS Type 4	3	686.6	228.9	13643.6

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	30069.4	3	10023.1	2.5	0.1	3.71
Within Groups	39565.1	10	3956.5			
Total	69634.5	13				

Table S5: Analysis of variance, RII and SII estimates of healthcare system types (all-cause mortality)

RII men

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	16.5	2.75	0.95
HCS Type 2	3	7.10	2.37	0.06
HCS Type 3	3	7.07	2.36	0.08
HCS Type 4	4	15.2	3.79	1.85

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.04	3	1.68	1.90	0.18	3.49
Within Groups	10.6	12	0.88			
Total	15.6	15				

SII men

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	6344.2	1057.4	302874.7
HCS Type 2	3	2922.9	974.3	71229.6
HCS Type 3	3	2447.8	815.9	37061.2
HCS Type 4	4	7947.6	1986.9	319683.0

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3180950.0	3	1060316.7	4.73	0.02	3.49
Within Groups	2690004.3	12	224167.0			
Total	5870954.4	15				

RII women

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	11.6	1.93	0.06
HCS Type 2	3	6.87	2.29	0.01
HCS Type 3	3	6.78	2.26	0.04
HCS Type 4	4	10.4	2.60	0.13

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.09	3	0.36	5.38	0.01	3.49
Within Groups	0.81	12	0.07			
Total	1.90	15				

SII women

Groups	*Count*	*Sum*	*Average*	*Variance*
HCS Type 1	6	2209.1	368.2	24910.0
HCS Type 2	3	1820.1	606.7	14492.0
HCS Type 3	3	1288.6	429.5	6226.4
HCS Type 4	4	2553.5	638.4	59741.0

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	228870.4	3	76290.1	2.65	0.10	3.49
Within Groups	345209.9	12	28767.5			
Total	574080.3	15				

Table S6: RII and SII estimates in total (all-cause) mortality

	Men		Women	
	RII	SII	RII	SII
Austria	1.91 (0.05)	608.7 (25.5)	1.54 (0.06)	236.3 (17.0)
Belgium	2.28 (0.04)	845.0 (17.4)	1.84 (0.05)	357.6 (13.7)
Czech Republic	4.66 (0.05)	2110.0 (10.7)	2.27 (0.03)	639.9 (10.3)
Denmark	2.10 (0.03)	788.4 (14.9)	2.08 (0.04)	525.4 (12.4)
England/ Wales	2.41 (0.14)	734.9 (47.1)	2.09 (0.17)	447.9 (39.0)
Estonia	2.43 (0.05)	1952.3 (44.1)	1.96 (0.06)	635.4 (23.5)
Finland	2.43 (0.04)	914.0 (14.4)	2.11 (0.05)	376.6 (10.4)
France	2.47 (0.13)	755.0 (45.1)	1.63 (0.17)	205.2 (32.8)
Hungary	4.33 (0.05)	2711.1 (16.0)	2.65 (0.04)	925.5 (12.9)
Italy (Turin)	1.97 (0.08)	464.9 (32.1)	1.08 (0.07)	36.3 (24.6)
Lithuania	2.96 (0.05)	1715.2 (24.9)	2.59 (0.08)	524.7 (13.5)
Norway	2.60 (0.05)	883.1 (14.9)	2.36 (0.06)	497.3 (11.5)
Poland	5.44 (0.06)	1394.7 (6.3)	2.78 (0.04)	361.6 (4.3)
Scotland	2.59 (0.22)	1081.8 (102.5)	1.87 (0.25)	179.3 (18.8)
Slovenia	2.71 (0.06)	1074.5 (25.1)	1.93 (0.07)	360.3 (17.2)
Spain (Barcelona)	2.13 (0.06)	660.5 (24.6)	1.55 (0.08)	92.2 (21.1)
Spain (Basque Country)	1.77 (0.05)	450.1 (26.3)	1.30 (0.08)	84.4 (24.3)
Spain (Madrid)	1.76 (0.05)	542.7 (32.2)	1.19 (0.07)	588.2 (82.3)
Sweden	2.05 (0.03)	574.1 (9.9)	2.03 (0.04)	358.0 (7.3)
Switzerland	2.44 (0.04)	679.6 (11.2)	1.62 (0.04)	213.3 (8.8)
1. Supply- and choice-oriented public systems	2.75 (0.43)	1057.5 (315.9)	1.93 (0.14)	368.6 (82.2)
2. Performance- and primary care-oriented public systems	2.36 (0.17)	815.7 (123.0)	2.26 (0.10)	429.2 (42.9)
3. Regulation-oriented public systems	2.32 (0.15)	937.0 (85.5)	2.17 (0.04)	571.2 (38.2)
4. Low-supply and low performance mixed systems	3.79 (0.65)	1986.9 (387.1)	2.60 (0.18)	638.2 (147.7)

Appendix: European Social Survey (2015) Round 7 Module on Social Inequalities in Health and Their Determinants – Question Design Final Module in Template

ESS Round 7
Question Module Design Template[1]

Module Title: Social inequalities in health and their determinants

Module Authors: Terje Eikemo, Johan Mackenbach, Clare Bambra, Olle Lundberg and Tim Huijts

Contents

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SECTION A: Theoretical background

Describe the theoretical background of the module, its aims and objectives

The overall objective is to establish a module that can examine the variation of a range of health outcomes in European welfare states and their political, social, material, life course-related, behavioural, and psychosocial influences. It will also add to recent efforts in mapping the health effects of the economic transition in Eastern and Central Europe.

The European Social Survey (www.europeansocialsurvey.org) is ideal for this perspective because political, social, and material variables already exist in the survey. However, by including behavioural, life-course related and psychosocial health determinants together with an extensive set of health outcomes, the ESS will strengthen its position tremendously as the main data source for European cross-national analyses of health inequalities. The members of the Questionnaire Design Team (QDT) derive from the fields of political science, sociology, medicine, and health policy and have already published dozens of articles in high-ranked journals using the two available health variables currently available in the ESS. However, a broader set of health determinants and more nuanced health outcomes in particular are urgently needed to further develop a cross-national macrosociology of population health.

Social inequalities in health continue to be a key public health problem in European countries (Siegrist & Marmot, 2006, p. 27). Not only are social inequalities in morbidity and mortality reported in many European countries (Mackenbach, 2006); they are in fact found to be substantial in all countries with available data (Kunst, 2007). Comparative approaches to inequalities in health are important for at least two reasons. First, they are central to establishing the nature of health inequalities – are such inequalities a universal phenomenon or something specific for certain stages of development or historical periods? Second, and more importantly, systematic international comparisons form the basis for one of the key questions in health inequality research, namely whether or not it is possible to organize society, or welfare states, in a way that reduces or even eradicates health inequalities. The concept of welfare state regimes has therefore been increasingly used by political scientists and health sociologists to analyse cross-national differences in population health. These studies have invariably all concluded that population health is enhanced by the relatively generous and universal welfare provision of the Social Democratic Scandinavian countries (Bambra, 2006; Chung & Muntaner, 2007; Coburn, 2004; Navarro et al., 2003; Navarro et al., 2006). Although it is widely acknowledged that welfare states are important determinants of health as they mediate the extent, and impact, of socio-economic position on health, there is an urgent need to expand our knowledge with comparable data on health determinants and more refined health outcomes for a large number of European countries. Earlier comparative studies have suffered from important weaknesses such as a small number of countries included and serious comparability problems.

Four major practical applications of the results of this module are foreseen:
(1) The ESS data will provide information on the major social determinants of health (some of which are already included in the main ESS modules) on which interventions and policies should focus in order to reduce health inequalities in Europe. Such information is at the moment fragmentary and only available for a few countries. By expanding this knowledge-base, data from the ESS will support the development of packages of essential policies and interventions for tackling inequalities in health. For example, this data will potentially become the main source for prevalence data in European contributions to future Global Burden of Disease studies.
(2) We will be able to quantify the magnitude of social inequalities in health between European welfare states for an extensive number of health outcomes, which will add importantly to the available studies on self-reported general health and limiting longstanding illness.
(3) We will be able to assess the contribution of a unique selection of major health determinants (social, political, material, behavioral, life-course-related, and psychosocial determinants) to inequalities in health between European welfare states for an extensive number of health outcomes.
(4) We will be able to make comparisons of the magnitude of social inequalities between European welfare state regimes, with a view to assessing the scope for reducing these inequalities between and within European countries. If we were able to find systematic variations of the magnitude of (social) inequalities in health for a (large and complementing) range of health outcomes between countries sharing similar welfare

policies, we could therefore provide policy makers with important tools for reducing the extent of health inequalities both within and between countries.

Health, health inequality and social determinants

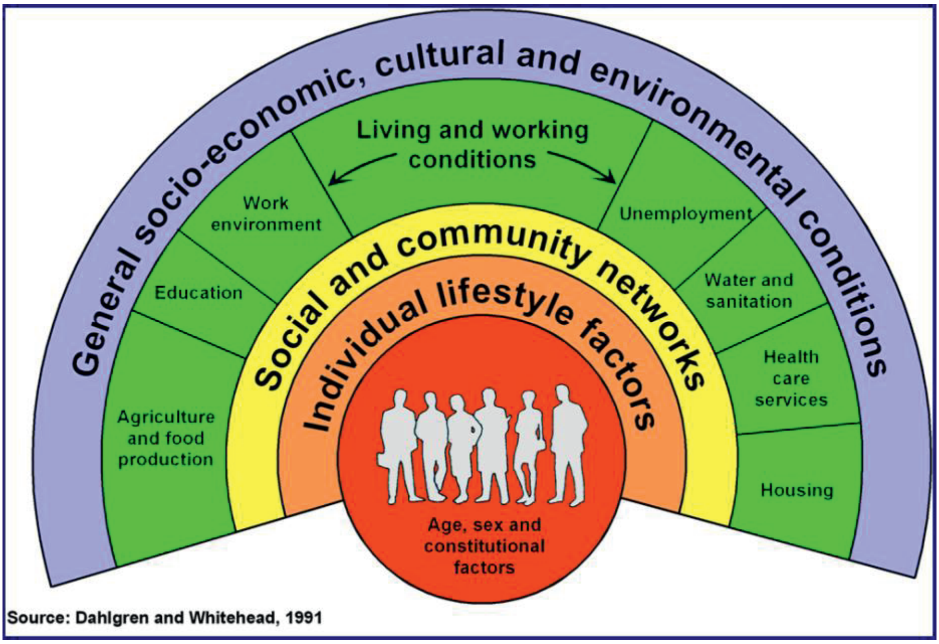
Definitions of health have changed over time: its etymological roots lie in the Old English for ‘whole’ implying that a person who is healthy is ‘whole’. The World Health Organisation attempts to encompass this in its 1948 definition of health as “*a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity”*. In contemporary Western societies, several competing theories of health co-exist (Seedhouse, 1986): Health as an ideal state; health as a personal strength or ability; health as physical and mental fitness to do socialised tasks; health as a commodity; and health as the foundation for achievement of potentials. Nadioo and Wills (2000) suggest that in the West a gradual shift in the meaning of health occurred during the 18th century as the increasing dominance of medicine encouraged a mechanistic view of the body. In this mechanical/medical conceptualisation, health is simply the absence of disease, and ill health is the presence of disease. The causation of disease presence or non-presence, and hence of a state of ill health or health, is thus atomised and examined at the level of the individual. However, population health arises from the complex interactions of individual, environmental, material and social relations (Dahlgren and Whitehead, 1991). In short, the level of health experienced or attainable by an individual, community or population is a direct result of the interaction and quality of the relationship between the various biological and social determinants of health (Marmot and Wilkinson, 2006).

Health inequality

The term “health inequality” is usually used to refer to the systematic differences in health which exist between socio-economic classes or groups (although there are other inequalities for example by gender or race). Health inequality can be defined in a purely descriptive way. For example, Kawachi and colleagues refer to health inequality as “*a term used to designate differences, variations, and disparities in the health achievements of individuals and groups*” (Kawachi et al., 2002). More commonly though, the moral and ethical dimensions of the term are emphasised: inequalities in health are thereby “*systematic differences in health between different socio-economic groups within a society. As they are socially produced, they are potentially avoidable and widely considered unacceptable in a civilised society*” (Whitehead, 2007). Inequalities in health between socio-economic groups are not restricted to differences between the most privileged groups and the most disadvantaged; health inequalities exist across the entire social gradient (Marmot, 2006). The social gradient in health is not confined to the poorest in society; it runs from the top to the bottom of society and *“even comfortably off people somewhere in the middle tend to have poorer health than those above them”* (Marmot, 2006). Socio-economic inequalities in health are universal within European countries and they extend along the whole social ladder: *“the higher the social position, the better the health”* (Lundberg and Lahelma, 2001). Health inequalities are thus not *“natural”* or *“inevitable”*; they are socially distributed and socially determined. John H. Goldthorpe represents the neo-weberian class theory and draws the line between manual and non-manual workers (Goldthorpe, 1997). The *Erikson-Goldthorpe class schema* is arguably one of the most influential conceptualisation of occupational class in European sociology, which is designed to distinguish positions within the labour market (Erikson & Goldthorpe, 1992) and has also been extensively used by the co-applicants in previous ESS health publications (see for example Eikemo & Bambra, 2008f). With the new *European Socioeconomic Classification* (ESeC) problems of comparability have now been addressed to a much larger extent than in any previous occupational class scheme. The ESeC classification classifies people according to their positions within labour markets and production units, with special attention to their employment relations. The ESeC is designed to facilitate international overviews and cross-national comparisons across the EU.

Social determinants of health

The social determinants of health are the wider cultural, psychosocial, and material conditions in which people work and live (Marmot and Wilkinson, 2006). These are what social epidemiologists refer to as the ‘causes of the causes’ (Marmot, 2006). The main social determinants of health are widely considered to be: access to essential goods and services (specifically water and sanitation, and food); housing and the living environment; ‘lifestyle’ factors; access to health care; unemployment and social security; working conditions; and transport (Dahlgren and Whitehead, 1991). This is demonstrated in figure 1.



Source: Dahlgren and Whitehead, 1991

Figure 1: Dahlgren and Whitehead (1991) model of the determinants of health

Access to essential goods and services

Access to clean water and hygienic sanitation systems are the most basic prerequisites for good public health. In the advanced capitalist democracies, access to water and sanitation were amongst the first major public health reforms of 19th Century Europe, although it was often only with the slum clearances and the advent of the post-war welfare state that access became universal. Agricultural policies affect the quality, quantity, price, and availability of food, all of which are important for public health (Dahlgren et al., 1996). While overall increases in life expectancy may be partly attributed to better nutrition, increases in the prevalence of obesity in many countries points to the contribution food policies also make to over-nutrition. Obesity is associated with an increased risk of disease (e.g. diabetes, heart disease) and premature mortality (Robertson et al., 2006). Rates of obesity are higher amongst lower socio-economic groups. Access to healthy food is often restricted by what have been termed ‘obesogenic environments’: geographic areas (usually low income areas) with little access to fresh fruit and vegetables, high access to high fat fast foods combined with low access to green space or sports facilities in terms of exercise (Lake and Townshend, 2006).

Housing and the living environment

Housing has long been recognised as an important material determinant of health and health concerns underpinned the slum clearances that accompanied the advent of the post-war welfare state. Housing which is damp can lead to breathing diseases such as asthma; infested housing leads to the rapid spread of infectious diseases; overcrowding can also result in higher infection rates, and it is also associated with an increased prevalence of household accidents. Expensive housing (e.g. as a result of high rents) can also indirectly have a negative effect on health as expenditure in other areas (such as diet) is reduced (Stafford and McCarthy, 2006). The wider living environment is also an important determinant of population health. In the past, environmental issues tended to focus on pollution from factories. However, more recently psychosocial concerns such as crime levels leading to stress and fear (as well as preventing people from exercising or walking) or the negative reputation of deprived areas resulting in the poor self-esteem of the inhabitants, have also become recognised as potentially important influences on health.

Lifestyle factors

In addition to diet, smoking, alcohol and physical activity are considered to be the other lifestyle factors which are important determinants of health. They are referred as lifestyle factors because there is to some extent an element of choice around participation in these health damaging activities, however constrained the choice may be by the other social determinants. Smoking remains the most important preventable cause of mortality in the advanced capitalist world (Jarvis and Wardle, 2006). Alcohol related deaths and diseases are on the increase, and drugs are an increasingly important determinant of death amongst the young. Physical inactivity is recognized as a major independent risk factor for chronic non-communicable diseases. Also, regular physical activity can help prevent and reduce obesity and maintain a healthy weight (Hill and Wyatt, 2005). Risky health behaviours such as these are more prevalent amongst lower socio-economic groups and the causes of this are hotly debated and politically charged: are they ‘free’ choices or constrained and limited?

Access to health care

Access to health care is a fundamental determinant of health, particularly in terms of the treatment of pre-existing conditions. In most advanced capitalist countries, access to health care is universal. However, there are variations in terms of how health care is funded (e.g. social insurance, private insurance or general taxation), the role and level of co-payments for treatment, and the extent of provision – what has been collectively termed ‘health care decommodification’ (Bambra, 2005). Provision can vary within countries. For example, in the nationalised UK health system, it has long been the case that an ‘inverse care law’ operates whereby there are fewer doctors in areas of higher need (Hart, 1971). People in lower socio-economic groups are also less likely to access health care services than those in higher socio-economic groups with the same health need.

Unemployment and Social Security

Unemployment is associated with an increased likelihood of morbidity and mortality. There are clear relationships between unemployment and increased risk of poor mental health and para-suicide, higher rates of all cause and specific causes of mortality, self-reported health and limiting long term illness, and, in some studies, a higher prevalence of risky health behaviours (particularly amongst young men), including problematic alcohol use and smoking (Bartley et al., 2006). The negative health experiences of unemployment are not limited to the unemployed but also extend to their families and the wider community (Novo et al., 2001). Links between unemployment and poorer health have conventionally been explained through two inter-related concepts: the material consequences of unemployment (e.g. wage loss and resulting changes in access to essential goods and services), and the psychosocial effects of unemployment (e.g. stigma, isolation and loss of self-worth). Lower socio-economic groups are disproportionately at risk of unemployment and it is a key determinant of the social gradient in health (Popham and Bambra, 2010). The relationship between unemployment and health varies across Europe as demonstrated by a study utilising ESS data (Bambra and Eikemo, 2009).

Working conditions

The physical work environment can impact negatively on physical health via exposure to dangerous substances (e.g. lead, asbestos, mining, mercury etc) or via physical load and ergonomic problems. Epidemiological research has also found a relationship between the psychosocial work environment, work related stress and inequalities in health status (Marmot et al., 2006). The Demand-Control-Support model suggests that high work demands and low job control increase work-related stress, and that social support from colleagues and supervisors might mediate this relationship. The Effort-Reward Imbalance model focuses on the stress resulting from differences between the effort put into to a job and the rewards gained. Work related stress is associated with increased rates of heart disease, depression and sickness absence (Marmot et al., 2006). It is considered to be a major determinant of health inequalities (Marmot et al., 1991). How work is organised through, for example shift work, hours of work or job insecurity, is also important for population health.

Explanations of health and health inequalities

Traditionally, three main theories which attempt to explain how social determinants interact with health and inequalities in health have been stressed: cultural-behavioural, material and psychosocial. More recently, however, a theory of fundamental causes has received some support.

Cultural-Behavioural

The cultural-behavioural approach asserts that the link between socio-economic status and health is a result of differences between socio-economic groups in terms of their health related behaviour: smoking rates, alcohol and drug consumption, dietary intake, physical activity levels, risky sexual behaviour, and health service usage. Such differences in health behaviour, it is argued, are themselves a consequence of disadvantage and unhealthy behaviours may be more culturally acceptable amongst lower socio-economic groups. The 'hard' version of the cultural-behavioural approach asserts that the differences in health between socio-economic groups are wholly accounted for by differences in these unhealthy behaviours. The 'softer' version posits that behaviour is a contributory factor to the social gradient but not the entire explanation (Macintyre, 1997). Risky health behaviours are more concentrated amongst poorer socio-economic groups due to the concentration of individuals with less self-control, lower responsibility, poorer coping abilities, lower health knowledge, and a more short term outlook on life: an agency focused explanation which can be summed up as the 'feckless poor' argument. A more recent version of the behavioural model (the cultural-behavioural approach) takes into consideration the more structural role of culture and how different cultural norms can pattern the distribution of unhealthy behaviours. Unhealthy behaviours are more common in lower socio-economic groups where these behaviours represent the cultural norm and are more acceptable. The cultural-behavioural explanation does not take into account possible wider reasons for why unhealthy behaviours are more prevalent and/or more acceptable in lower socio-economic groups, namely the social determinants of health and other more structural factors such as the experience of deprivation and feelings of powerlessness. Simplistic behavioural explanations therefore merely lend authority to policies which stigmatise already disadvantaged individuals and communities (Joyce and Bambra, 2010). Cultural health capital is also relevant in this perspective, which Cockerham (1997) explains with the following logic: the further up a social hierarchy a person is located the less exposure to health-effecting stressors. They will also have access to, more social and psychological resources in the event of experiencing such stressors.

Materialist

The materialist explanation focuses on income, and the neo-materialist approach on what income enables, in the relationship between socio-economic status and health. Important dimensions of what income enables include access to goods and services and the limitation of exposures to physical, and psychosocial, risk factors. By way of illustration, a decent income enables access to health care, transport, an adequate diet, quality housing and opportunities for social participation; all of which are health promoting. Material wealth also enables people to limit their exposures to known risk factors for disease such as physical hazards at work or adverse environmental exposures. Materialist approaches give primacy to structure in their explanation of health and health inequalities, looking beyond individual level factors (agency), in favour of the role of public policy and services such as schools, transport and welfare in the social patterning of inequality (Bartley, 2004; Skalická et al., 2009). Cross national comparisons demonstrate the importance of material factors on health and health inequalities (Bartley, 2004). In general, countries with narrower income differences between rich and poor have better health and wellbeing e.g. obesity, drug misuse, teenage conceptions, stress, mental ill health (Wilkinson and Pickett, 2009). These countries also have better welfare services and so access to education, social housing, transport, health care provision and green spaces tend to be better and more fairly distributed across the population. This may partly account for how lower income inequality translates into better health outcomes (Bartley, 2004). This evidence augments the theory that everyone does better in conditions where income equality exists. However, data from recent ESS studies do not suggest that relative health inequalities are smaller in more equal countries and this has been a particular challenge for the materialist approach (Eikemo et al., 2008a, 2008b).

Psychosocial

Psychosocial explanations focus on how social inequality makes people feel and the effects of the biological consequences of these feelings on health. Bartley describes how feelings of subordination or inferiority stimulate stress responses which can have long term consequences for physical and mental health especially when they are prolonged (chronic) (Bartley, 2004). The socio-economic gradient is therefore explained by the unequal social distribution of psychosocial risk factors. Psychosocial risk factors associated with the workplace include low levels of control over how work is undertaken, limited autonomy over work tasks, monotonous work and time pressures, low levels of support from co-workers and supervisors, an imbalance between efforts exerted and rewards received and organisational injustice (Marmot et al., 2006). Bartley underscores how it is the way stress makes people feel that is important in relation to health outcomes rather than straightforward exposures to stressors. In this way the model combines both structure and agency. For example, it may not simply be income level or an adequate working environment alone that leads to good health but rather how good income and good quality work can make people feel, especially in relation to others (Bartley, 2004). Here perceptions of social status and in particular perceptions of status in comparison to other people in society are significant constructs: what matters is how individuals value themselves. If these value judgements are negative, feelings of inferiority or subordination can invoke harmful stress responses.

Fundamental causes

The discussion of the influence of the social determinants above reflects the dominant model within cross-national health research, which stems from social-epidemiological research. This model is particularly useful because it does not consider health to be primarily a product of individual action, but rather stresses the complex social determinants behind the inequalities. However, it is not fully satisfactory as a sociological model because it does not consider that the social distribution of health is also a result of how individuals actively form their own life chances and not only the result of the social context in which individuals live. This is the core of the fundamental cause theory. Link and Phelan (1995) developed the theory of fundamental causes to explain the association between social status and mortality. They proposed that the enduring association results because social status embodies an array of resources, such as money, knowledge, prestige, power, and beneficial social connections that protect health no matter what mechanisms are relevant at any given time (Link & Phelan 1995). According to the authors, a fundamental social cause of health inequalities has four essential features. First, it influences multiple disease outcomes, meaning that it is not limited to only one or a few diseases or health problems. Second, it affects these disease outcomes through multiple risk factors. Third, it involves access to resources that can be used to avoid risks or to minimize the consequences of disease once it occurs. Finally, the association between a fundamental cause and health is reproduced over time via the replacement of intervening mechanisms. It is the persistent association of socioeconomic status (SES) with overall health in the face of dramatic changes in mechanisms linking SES and health that led Link and Phelan to call SES a “fundamental” cause of health inequalities.

Tackling inequalities in health

Health inequalities emerge in the intersection between social structures, individual actions and biological processes. While disease and premature mortality are ultimately biological phenomena taking place in individual bodies, social inequalities in ill health, disease and mortality are caused by socially determined conditions and processes of social inequality and stratification.

Recently, there has been a strong increase in the interest for health inequalities and how to tackle these, both among policymakers and in academia. A key element in this wave of interest is social determinants, in particular represented in the final report by the WHO Commission on Social Determinants in Health led by Michael Marmot (WHO 2008). Here, the roots of health inequalities are placed in *“…the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness”*. In other words, our health will depend on a range of circumstances and conditions throughout our lives, including childhood conditions, education, working conditions, economic resources and housing conditions. Thereby the key social determinants of health also constitute the welfare resources necessary to lead a good life, following Johansson’s (1970) definition of *welfare* as *“the resources … by which the individual can control and* *consciously direct her conditions of life.”*

Many of these welfare resources are generated within the family or in the employment market. In addition to such individual resources there are also collective resources generated through welfare state institutions. These resources are intended to assist citizens with *“…the collective matters that arise from the demands and possibilities that all individuals in all societies are facing during the life cycle”* (Johansson 1979:56). In other words, in all societies people will be faced with the challenge to get an education and means to support themselves, to find a job and somewhere to live, to raise and support a family, to care for their children and older relatives, and so on.

The collective resources can thus be divided in two major groups, ‘cash’ and ‘care’, where the former include social insurances covering income loss due to, for example, illness, unemployment and old age. More recent programmes also include family policies. The latter category comprises welfare services provided free of charge or heavily subsidised, for example child care, health care and care for the old and the disabled.

From a public health point of view it is reasonable to believe that the supply and quality of collective resources provided through welfare policies are important for people’s possibilities to sustain their health and wellbeing. The importance of these resources is likely to be greater among people with smaller incomes and less favourable living conditions. The less you have in terms of individual resources, the more important it will be that you are able to draw on collective resources, which means that welfare policies that provide more generous transfers and better quality services are likely to improve public health and reduce health inequalities. In order to address questions concerning social determinants of health and how they might be modified by welfare state institutions and other social conditions, comparative data is needed.

Module Objectives

Objective 1: Establish a comprehensive and comparative pan-European data set on the social determinants of health and health inequalities

In 2005 the World Health Organisation set up a ‘Commission on the Social Determinants of Health’ which systematically examined the contribution of the social determinants to health inequalities within and between countries. Since publication of its final report in 2008, various national governments have commissioned similar reports (such as the Marmot Review of Health Inequalities in England, Marmot 2010), as has the European Union. The social determinants of health and health inequalities have therefore become increasingly recognised as of significance to population health. However, there is little by way of comprehensive pan-European data on the social determinants of health, or on a range of health outcomes. Currently, the ESS contains data on a limited number of social determinant variables (e.g. unemployment, income etc), and only two inter-related health outcomes (self-rated health and limiting long term illness). Beyond the ESS, a large EU funded study on health inequalities (the Eurothine programme, see Mackenbach et al., 2007) combined various national health surveys and mortality data sets from across a number of European countries. However, although extensive, this study was limited by issues of data comparability (particularly in terms of large variations in the range of health outcomes provided by each national survey), as well as by limited country coverage (e.g. occupational data was available for only 8 countries and regional data had to be used for Italy and Spain, Mackenbach et al., 2008). The proposed module will provide a more comprehensive and comparable data set, for a wider range of European countries. The ESS may become the main source of health and health determinant data in such large European projects and within comparative health research in general. For example, the successor of the Eurothine, the EURO-GBD-SE project (www.EURO-GBD-SE.eu) utilizes data on income and social participation from the ESS.

Objective 2: Use the data set to compare the influence of different European policy regimes

It has been increasingly recognised by European governments that those interventions which positively change the social determinants can improve health and reduce health inequalities. However, all the official reports have highlighted the lack of evidence to support how to intervene to improve health inequalities (e.g. WHO, 2008; Marmot, 2010). Of course, one way to do this is to commission more experimental evaluations of interventions. Another is to conduct more “natural experiments” of existing policies and interventions, by comparing different countries. The proposed ESS module of the social determinants of health and health inequalities will help in achieving this objective by creating and making publicly available a comprehensive and comparable pan-European data set on the social determinants of health, which includes a wide range of health outcomes. The influence of different European policy arrangements (policy regimes) on health and health inequalities can then be compared (*objective 2*). Additionally, as the proposed module includes a range of validated mental and physical health outcomes then such comparisons will be more extensive and specific than previous ones using ESS data (Eikemo et al., 2008a-e; Huijts, 2011).

Objective 3: Test theories of health and health inequalities for a range of health outcomes

In addition, the module should help researchers to examine and compare the influence of the social determinants of health, with the intention of testing the relative empirical contribution of the different models of health and health inequalities (cultural-behavioural, material and psychosocial), and how this might vary by country and policy context (*objective 3*). It has not been possible to do this on a pan-European scale before, although some work has been done using the Norwegian HUNT study (Skalicka et al., 2009). Establishing which of the models is most influential on various health outcomes across different European countries is important in terms of thinking about priorities for policy actions to improve population health and/or reduce health inequalities.

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SECTION B. Brief description of <u>all</u> the concepts to be measured in the module and their expected relationships, either verbally or diagrammatically.

Top level concept: Self-reported conditions (C)
Top level concept: Body mass index (C)
Top level concept: Childhood conditions (C)
Top level concept: Working conditions (C)
Top level concept: Alcohol consumption (C)
Top level concept: Fruit and vegetable consumption (C)
Top level concept: Health care utilization (C)
Top level concept: Dimensions of mental wellbeing (C)
Top level concept: Smoking (S)
Top level concept: Activity and Participation Limitations (S)
Top level concept: Quality of Housing (S)
Top level concept: Provision of unpaid care (S)
Top level concept: Physical activity (S)

-Self-reported conditions are a more precise way of capturing people's physical health than e.g. self-rated health
-Additionally, high BMI is an indicator of a broad range of health problems
-Self-reported conditions and BMI are both influenced by the other concepts, all of which are also expected to mutually influence each other: childhood conditions, physical working conditions, alcohol consumption, smoking, physical activity, fruit and vegetable consumption, and health care utilization.

COMPLEX CONCEPT NAME: Self-reported conditions

Describe the concept in detail, outlining the various sub concepts it comprises

The proposed conditions to measure here are:
Back pain, heart problems, allergies, breathing problems, stomach problems, skin conditions, diabetes, cancer and severe headaches.

Studies have found socioeconomic inequalities in morbidity. Higher prevalences are reported among people from low socioeconomic status (SES) for a large range of diseases. High blood pressure, musculoskeletal disorders or diabetes among others are more prevalent among people from low SES (Melchior 2006, Roper 2001). High blood pressure has been recently shown to largely contribute to differences in mortality between eight social groups in the US (Danaei 2010). Moreover, the severity (as well as the prevalence) of the disease differs by SES. Among people with diabetes, low SES appears to increase the risk of morbidity and mortality (Roper, et al. 2001, Bachmann, et al. 2003).

We ask for a selected number of diseases whether people had experienced this disease in the last 12 months and whether people are limited in their usual activities because of this disease. These conditions are not always very prevalent, but they would be suitable for pooled European analyses. In the EURO-GBD-SE project (http://www.euro-gbd-se.eu/), comparable mortality rates have been collected for 36 causes of death in all parts of Europe (which can be stratified into social position, sex, and age), which will enable a precise estimation of expected prevalence for the below suggested conditions.

Expected relationship with other complex and simple concepts

All simple concepts are expected to be correlated with socioeconomic position: less prevalent outcomes among lower socioeconomic groups. These items are intended to discover what is captured by self-rated health, to capture prevalence, and to be a more precise measure (outcome) than self-rated general health. Therefore, we expect the specific diagnoses to be correlated with the two core ESS variables (self-rated general health – C7 and limiting long standing illness – C8), which will also be very important for the module.
Some specific health outcomes are also used as determinants (of health and mortality). These items are intended to discover what is captured by self-rated health, to capture prevalence, and to be a more precise measure (outcome) than self-rated general health. The two core ESS variables (self-rated general health and limiting long standing illness) will also be very important for the module.

In a literature review, the largest socioeconomic differences were observed for stroke (heart problems), diabetes, and arthritis (back pain); while no differences or even inverse differences were observed for cancer, kidney diseases (stomach pain), skin diseases and allergy.

Question wording:

E28 CARD 54 Which of the health problems on this card have you had or experienced in the last 12 months, that is since [MONTH, YEAR]? Just tell me which letters apply to you.[2]
INTERVIEWER: Refer to the same month as the interview but of the previous year. For example, if the interview takes place in September 2014, use [September 2013].
PROBE: Which others?
CODE ALL THAT APPLY

Z	01	**ASK E29**
F	02	
T	03	

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[2] The actual health problems should not appear in the questionnaire given to interviewers. Interviewers should only see the letters and corresponding numeric code.

	K	04	
	H	05	
	Y	06	
	Q	07	
	E	08	
	L	09	
	B	10	
	M	11	
(None of these)	-	55	**GO TO E30**
(Don't know)	-	88	

ASK IF CODE 01- 11 AT E28

E29 STILL CARD 54 And which of the health problems that you had or experienced in the last 12 months hampered[3] you in your daily activities in any way? Again, just tell me which letters apply to you. **PROBE:** Which others?

CODE ALL THAT APPLY

Z	01
F	02
T	03
K	04
H	05
Y	06
Q	07
E	08
L	09
B	10
M	11
(None of these)	55
(Don't know)	88

CARD 54:

Heart or circulation problem	Z
High blood pressure	F
Breathing problems such as asthma attacks, wheezing or whistling breathing[4]	T
Allergies	K
Back or neck pain	H
Muscular or joint pain in hand or arm	Y
Muscular or joint pain in foot or leg	Q
Problems related to your stomach or digestion	E
Problems related to a skin condition	L
Severe headaches[5]	B
Diabetes	M

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[3] Hampered – limiting or restricting you in your daily activities.

[4] Wheezing is a high-pitched whistling sound made while breathing. Countries can use one or two terms to convey wheezing or whistling breathing, making sure to include the term that is understood by the majority of the population.

[5] Headaches – severe headaches are meant but not just migraines. Do not translate 'headaches' literally as 'migraines'.

References for self-reported conditions

Bachmann, M. O., Eachus, J., Hopper, C. D., Davey Smith, G., Propper, C., Pearson, N. J., et al. (2003). Socio-economic inequalities in diabetes complications, control, attitudes and health service use: a cross-sectional study. *Diabetic Medicine*, *20*(11), 921-929.

Danaei, G., Rimm, E. B., Oza, S., Kulkarni, S. C., Murray, C. J., & Ezzati, M. (2010). The promise of prevention: the effects of four preventable risk factors on national life expectancy and life expectancy disparities by race and county in the United States. *PLoS Medicine*, *7*(3), e1000248.

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SUB CONCEPT NAME: Muscular pain

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Problems with arms or hands, legs or feet, back or neck (include arthritis or rheumatism) It is hard to estimate the prevalence mainly because we have chosen to incorporate three originally different variables into one. Still, it is possible to obtain an estimated prevalence based on these separate outcomes. In a Cypriot survey (Statistical Service of the Republic of Cyprus, 2012) with more than 40 000 respondents 4,2 percent of all males and 4,0 percent of females reported problems with back or neck with 4,2% . These estimates were somewhat smaller for problems with legs or feet with (1,1 percent among males and 1,2%, among females) and problems with arms or hands with (0,9 percent among males and 1,2 percent among females. These conditions seem to be far more present in Central-Eastern European countries. In Slovenia (SORS Labour Force Survey), each of these 3 conditions has a much higher prevalence (Lah & Svetin, 2012). The question was “ever been diagnosed with”. Problems with back or neck has a prevalence of 21 percent among men and 22 percent among women. Problems with legs or feet has a prevalence of 9,1 percent among men and 7,4 percent among women. Problems with arms and hands has a prevalence of 5,0 percent among men and 6,6 percent among women. Cyprus and Slovenia are likely to represent outcomes that are close to the minimum and maximum of what we can expect because we already know from previous ESS studies that Cyprus scores very good on general health, while Slovenia is often observed in the other end. We would therefore estimate roughly that the prevalence of this variable would vary between 5 and 30 percent depending on the observed country. We should note that back/neck pain is by far the most prevalent outcome. It could therefore be a better idea to incorporate only back or neck from the suggested variable to get a more accurate outcome and because we know that most of the cases would stem from back or neck pain anyway. If we ask for “currently experiencing or ever been told”, the prevalence will probably be higher.

Expected relationship with other sub concepts

We expect muscular pain to be associated with poor working conditions, and it may be associated with poor life style behaviours, and having a lower socioeconomic status. It may also be related to poor mental health, other chronic conditions and the health variables from the core module. However, these expectations could not be based on previous studies.

Question wording:
Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for Muscular pain

Lah, L., & Svetin, I. (2012). *Persons with Health Problems in the Labour Market, Slovenia, 2nd quarter 2011 - final data*. Statistical Office of the Republic of Slovenia (SORS). Available at: https://www.stat.si/eng/novica_prikazi.aspx?id=4596.

Statistical Service of the Republic of Cyprus (2012). *New Publication: Labour Force Survey, 2011*. Available at: http://www.mof.gov.cy/mof/cystat/statistics.nsf/All/A49F44C5C8100070C2257A6E003CF266?OpenDocument&sub=1&sel=1&e=&print.

SUB CONCEPT NAME: Back pain

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

We want to examine to what extent back pain is socially distributed (by class and education) in European populations. We are aiming to capture back pain which is serious enough to have had a substantial influence on people's everyday life and/or work. We want to focus on back pain, as opposed to hand/arm, foot/leg, because it is by far the most prevalent condition among these and has also been demonstrated to be distributed unequally between social groups in total populations. This concept can be measured directly and does not need further sub concepts.

In a Cypriot survey with more than 40 000 respondents, 4.2 percent of all males and 4.0 percent of females reported problems with back or neck. These estimates were somewhat smaller for problems with legs or feet with (1.1 percent among males and 1.2%, among females) and problems with arms or hands with (0.9 percent among males and 1.2 percent among females (Statistical Service of the Republic of Cyprus, 2012). These conditions seem to be far more present in Central-Eastern European countries. In Slovenia (SORS Labour Force Survey), each of these 3 conditions has a much higher prevalence (Lah & Svetin, 2012). The question was "ever been diagnosed with". 'Problems with back or neck' has a prevalence of 21 percent among men and 22 percent among women. 'Problems with legs or feet' has a prevalence of 9.1 percent among men and 7.4 percent among women. 'Problems with arms and hands' has a prevalence of 5.0 percent among men and 6.6 percent among women.

Cyprus and Slovenia are likely to represent outcomes that are close to the minimum and maximum of what we can expect because we already know from previous ESS studies that Cyprus scores very good on general health, while Slovenia is often observed in the other end. We would therefore estimate roughly that the prevalence of this variable would vary between 5 and 30 percent depending on the observed country.

Expected relationship with other sub concepts

Back pain is the most common cause of long-term sickness absence among manual workers, after acute medical conditions (see Bambra, 2011) (see Clare Bambra – Work, Worklessness and the Political Economy of Health, 2011). Back pain is also among the most prevalent morbidities in the total population. Several studies have reported a strong social gradient of back pain. For example, a German study found that adults with a low educational level had almost a 4-fold risk of reporting disabling back pain compared to subjects with a high educational level (Schmidt, Moock, Fahland, Feng & Kohlmann, 2011). The study concludes that while back pain cannot generally be regarded as a symptom of a low social status, social inequality is of major importance regarding the prediction of severe back problems. It should be noted that this is not a consistent finding in the literature. For example, a study from the UK did not reveal any social gradient of back pain among people aged 75 or above (Docking et al., 2011), but this study did not cover the total population.

The concept can be measured directly and is expected to be correlated with socioeconomic position (back pain being more prevalent among lower socioeconomic groups). We also expect back pain to be associated with physical working conditions and low work control (see Bambra, 2011) (see Clare Bambra – Work, Worklessness and the Political Economy of Health, 2011). It has also been demonstrated an association with high BMI (Heuch, Hagen, Heuch, Nygaard & Swart, 2010; Karppinen, 2010).

We also expect the variable to be correlated with self-reported health variables from the core module.

Question wording:

Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for Back pain

Bambra, C. (2011). *Work, worklessness, and the political economy of health*. Oxford: Oxford University Press.

Docking, R. E., Fleming, J., Brayne, C., Zhao, J., Macfarlane, G. J., & Jones, G. T. (2011). Epidemiology of back pain in older adults: prevalence and risk factors for back pain onset. *Rheumatology*, *50*(9), 1645-1653.

Heuch, I., Hagen, K., Heuch, I., Nygaard, Ø., & Zwart, J. A. (2010). The impact of body mass index on the prevalence of low back pain: the HUNT study. *Spine*,*35*(7), 764-768.

Karppinen, J. (2010). High BMI may be linked to low back pain. Available at: http://www.healio.com/orthopedics/spine/news/online/%7Bb86bd159-f6cb-4148-82d0-8556d8b233d4%7D/high-bmi-may-be-linked-to-low-back-pain.

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Schmidt, C. O., Moock, J., Fahland, R. A., Feng, Y. Y., & Kohlmann, T. (2011). Back pain and social status among the working population: what is the association? Results from a German general population survey. *Schmerz*, *25*(3), 306-314.

Statistical Service of the Republic of Cyprus (2012). *New Publication: Labour Force Survey, 2011*. Available at: http://www.mof.gov.cy/mof/cystat/statistics.nsf/All/A49F44C5C8100070C2257A6E003CF266?OpenDocument&sub=1&sel=1&e=&print.

SUB CONCEPT NAME: Heart problems

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

By heart problems we aim at capturing serious heart conditions in the form of high blood pressure, circulation problems or stroke with longstanding consequences. This concept can be measured directly and does not need further sub concepts.

Expected relationship with other sub concepts

With support from the literature we may expect heart problems to be associated with low socioeconomic status (Marmot, Bosma, Hemingway, Brunner & Stansfeld, 1997), lack of physical activity (Eaton et al., 1995), low job control (Marmot et al, 1997), smoking, diabetes, fruit and vegetable consumption and BMI (www.EURO-GBD-SE.eu). We also expect the variable to be correlated with self-reported health variables from the core module.

Self-reported heart, or circulation problems, such as high blood pressure (including stroke with longstanding consequences) has a prevalence of 20.4 percent among men and 17.7 percent among women in the same Slovenian survey (SORS Labour Force Survey). The question was “ever been diagnosed with". In the US, high blood pressure prevalence is about 10 percent in the age group 18-39, 30 percent in the age group 40-59, and above 60 percent in the age group 60+ (Yoon, Ostchega & Louis, 2010). According to the WHO, deaths attributable to high blood pressure is as high as 35 percent in Europe and Central Asia (Lawes, Hoorn & Rodgers, 2008). Further, the WHO has estimated that high income countries have a prevalence of high blood pressure of about 30 percent among women and 40 percent among men (WHO, 2014). We know that self-reports slightly underestimate the real estimates. Still, it seems reasonable to expect a prevalence of 20 percent (slightly less among women) or more on average in European countries.

Question wording:

Please refer to wording under the complex concept 'Self-Reported Conditions'.

References for Heart problems

Eaton, C. B., Medalie, J. H., Flocke, S. A., Zyzanski, S. J., Yaari, S., & Goldbourt, U. (1995). Self-reported physical activity predicts long-term coronary heart disease and all-cause mortalities: twenty-one-year follow-up of the Israeli Ischemic Heart Disease Study. *Archives of Family Medicine*, *4*(4), 323.

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Lawes, C. M., Hoorn, S. V., & Rodgers, A. (2008). Global burden of blood-pressure-related disease, 2001. *Lancet*, *371*(9623), 1513-1518.

Marmot, M. G., Bosma, H., Hemingway, H., Brunner, E., & Stansfeld, S. (1997). Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *Lancet*, *350*(9073), 235-239.

World Health Organization (WHO) (2014). Global Health Observatory (GHO): *Raised blood pressure: Situation and trends*. Available at: http://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence_text/en/.

Yoon, S. S., Ostchega, Y., & Louis, T. (2010). Recent trends in the prevalence of high blood pressure and its treatment and control, 1999-2008. *NCHS Data Brief*, (48), 1-8.

SUB CONCEPT NAME: Allergy

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

This sub concept aims to capture whether the respondent has had any kind of allergies. These include rhinitis, eye inflammation, allergic asthma, and food allergies. This variable can be measured directly and no further sub concept is needed. This concept was chosen because it is among the most frequent self-reported conditions, which is strongly related to many known risk factors for health that are also included in the module. It may also be related to socioeconomic position, however, with more frequent cases among the higher groups. This reversed social gradient further is worth examining. Also it will be interesting to see whether the reversed social gradient is a universal phenomenon. The allergy sub-concept can be measured directly and no further sub concept is necessary.

According to a Belgian study, allergic rhinitis has a high prevalence in Western Europe and is frequently undiagnosed (Bauchau & Durham, 2004). There are few large-scale, standardised studies of the prevalence of allergic rhinitis in Europe. For the adult population, the European Community Respiratory Health Survey (ECRHS) found that the overall prevalence of allergic rhinitis was 21 percent (Janson et al., 2001).

The diagnosis rate for allergic rhinitis has only been measured in studies that have been limited in terms of the studied populations and/or had restricted geographical coverage. The proportion of undiagnosed subjects was relatively high, ranging from 25–60, suggesting that it might be better to ask “currently experiencing or ever been told” than “ever been diagnosed with”. This is further supported by the Belgian study mentioned above, where 19 percent of the subjects were aware of having allergic rhinitis (which is close to the 21 percent estimated in the ECRHS), while only 13 percent had a physician-based diagnosis. Making a conservative estimate, we could probably expect a prevalence of about 10 percent using a “diagnosis approach” and close to 20 percent using a “ever experiences/been told” strategy.

Expected relationship with other sub concepts

Allergy is one of the very few conditions that appears to be more prevalent in the higher socio-economic groups (Mackenbach, 2006), so we do not expect, in contrary to most other self-reported conditions, that there is a correlation between allergy and lower socioeconomic position. However, we know that tobacco smoking is common in patients with allergic rhinitis, so an association with smoking is likely (Bousquet et al., 2009).

We may also expect a correlation with diabetes. A Canadian study showed that, adjusted for household size, number of bedrooms, immigrant status, income adequacy, educational level, smoking status, alcohol drinking status, regular exercise, and age, that there was a positive association between allergy and diabetes with an odds ratio of 1.25 (Dales, Chen, Lin & Karsh, 2005). We also know that obesity is associated with a greater prevalence of asthma in children (Yao et al., 2011). Thus, an association with high BMI may be likely as well. It is hard to speculate whether intake of fruit and vegetables is associated with allergies, but we have evidence showing that a Mediterranean diet is associated with reduced asthma in Mexican school children (De Batlle, Garcia-Aymerich, Barraza-Villarreal, Antó & Romieu, 2008). It may also be associated with physical working conditions / toxic working environments (see Bambra, 2011) (see Clare Bambra – Work, Worklessness and the Political Economy of Health, 2011).

Given the extensiveness of correlations between other known risk factors for ill health, it may seem surprising that allergy itself is not correlated with lower socioeconomic status. We also expect the variable to be correlated with the self-reported health measures in the core module.

Question wording:

Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for allergy

Bambra, C. (2011). *Work, worklessness, and the political economy of health*. Oxford: Oxford University Press.

Bauchau, V., & Durham, S. R. (2004). Prevalence and rate of diagnosis of allergic rhinitis in Europe. *European Respiratory Journal*, *24*(5), 758-764.

Bousquet, P. J., Cropet, C., Klossek, J. M., Allaf, B., Neukirch, F., & Bousquet, J. (2009). Effect of smoking on symptoms of allergic rhinitis. *Annals of Allergy, Asthma & Immunology*, *103*(3), 195-200.

Dales, R., Chen, Y., Lin, M., & Karsh, J. (2005). The association between allergy and diabetes in the Canadian population: implications for the Th1-Th2 hypothesis. *European Journal of Epidemiology*, *20*(8), 713-717.

De Batlle, J., Garcia-Aymerich, J., Barraza-Villarreal, A., Antó, J. M., & Romieu, I. (2008). Mediterranean diet is associated with reduced asthma and rhinitis in Mexican children. *Allergy*, *63*(10), 1310-1316.

Janson, Anto, J., Burney, P. O., Chinn, S., De Marco, R., Heinrich, J., et al., (2001). The European Community Respiratory Health Survey: what are the main results so far? *European Respiratory Journal*, *18*(3), 598-611.

Mackenbach, J. P. (2006). *Health inequalities: Europe in profile.* An independent, expert report commissioned by the UK presidency of the EU. London: Department of Health. Available at: http://www.who.int/social_determinants/resources/european_inequalities.pdf.

Yao, T. C., Ou, L. S., Yeh, K. W., Lee, W. I., Chen, L. C., & Huang, J. L. (2011). Associations of age, gender, and BMI with prevalence of allergic diseases in children: PATCH study. *Journal of Asthma*, *48*(5), 503-510.

SUB CONCEPT NAME: Breathing problems

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

By asking respondents about breathing problems we aim to capture chronic diseases, such as asthma and chronic obstructive pulmonary disease (COPD), which have a substantial effect on people's everyday life. According to the OECD, asthma is a disease of the bronchial tubes characterised by "wheezing" during breathing, shortness of breath or coughing" (OECD, 2012: 46). Asthma is the single most common chronic disease among children, and also affects many adults. It is a significant public health problem. Approximately 200 000 to 300 000 people die each year in Europe because of COPD, and among respiratory diseases, it is the leading cause of lost work days (European Lung Foundation, 2012). We want to include asthma or chronic bronchitis, but not allergic reactions such as allergic asthma. This can be measured directly and no further sub concept is necessary.

Most estimates of the prevalence of asthma and chronic obstructive pulmonary disease (COPD) are derived from European Health Interview Survey questions, conducted in many EU member states between 2006 and 2010. Typically, respondents were asked: "Do you have or have you ever had any of the following diseases or conditions? 1) Asthma (allergic asthma included) (yes/no). 2) Chronic bronchitis, chronic obstructive pulmonary disease, emphysema (yes/no). If yes: Was this disease/condition diagnosed by a medical doctor? (yes/no). Have you had this disease/ condition in the past 12 months? (yes/no)." The WHS asks During the last 12 months, have you experienced any of the following: Attacks of wheezing or whistling breathing? Attack of wheezing that came on after you stopped exercising or some other physical activity? A feeling of tightness in your chest? Have you woken up with a feeling of tightness in your chest in the morning or any other time? Have you had an attack of shortness of breath that came on without obvious cause when you were not exercising or doing some physical activity?

The Slovenian labour survey has estimated a prevalence of 8.7 percent among men and 7.4 percent among women concerning chest or breathing problems. The question was "ever been diagnosed with". Prevalence estimates of chronic obstructive pulmonary disease (COPD) by diagnostic approach show that the prevalence typically varies between 4 and 10 percent (WHO, 2007). It is as high as 11 percent in Italy (12.5 percent among women and 11.8 percent in Italy), but much lower in Denmark (3.7 percent overall) and Norway (4.1 percent in average). As calculated using appropriate epidemiological methods, the prevalence of COPD is generally higher than is recognized by health authorities or administrative databases. It is estimated to range from 4 percent to up to 20 percent in adults over 40 years of age. We expect, as a conservative estimate, an average prevalence of 7 percent among men and 5 percent among women.

Expected relationship with other sub concepts

We expect breathing problems to be associated with socioeconomic status and smoking. Persons with low levels of education are more than twice as likely to report COPD as those with high levels (OECD, 'education at glance', 2012). Persons from low socio-economic groups also report higher rates of smoking, which is the major risk factor for COPD (ibid.). We also expect the variable to be correlated with self-reported health variables from the core module.

Question wording:

Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for Breathing problems

European Lung Foundation (2012). *COPD Burden in Europe*. Available at: http://www.europeanlung.org/en/lung-disease-and-information/lung-diseases/copd.

OECD (2012). *Health at a Glance: Europe 2012*, OECD Publishing. Available at: http://www.oecd.org/health/healthataglanceeurope.htm.

World Health Organization (WHO) (2007). *Global surveillance, prevention and control of chronic respiratory diseases: a comprehensive approach.* J. Bousquet & N. Khaltaev (Eds). Geneva: WHO. Available at: http://www.who.int/respiratory/publications/global_surveillance/en/.

SUB CONCEPT NAME: Stomach

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

The main reason for asking about stomach pain is the combination of a relatively high prevalence in the population (based on evidence from Slovenia only) combined with the fact that self-reported prevalence has not been (according to our knowledge) previously examined in the adult population, overall or by socioeconomic position.

Studies of stomach pain is often performed among school children (as a proxy of stress), or in combination with other health outcomes, such as headache and back pain.

We do not want to capture periodical and light stomach pain (which is commonly experienced), but rather more serious stomach pain which may have had a substantial effect on the every-day life of the respondent. This can be measured directly and no further sub concept is necessary.

It is very difficult to obtain prevalence estimates of stomach problems, which is comparable to our purposes. However, 6.5 percent of the adult population has ‘stomach diseases’ (diagnosed ulcers) (Schiller, Lucas, Ward & Peregoy, 2012). It is hard to translate this number into European estimates, but we do have numbers from the Slovenian labor force survey, which is actually relatively similar to those observed in the US: these are 5.4 percent among men and 4.9 percent among women. Again, these estimates are based on a question which is broadly similar to ours (stomach, liver, kidney or digestive problems), but they have asked for diagnoses and not “ever experienced/ever been told”. Thus, it is likely that we will obtain estimates that are larger than, but not substantially larger than, 5 percent, both for men and for women.

Expected relationship with other sub concepts

Studies of children suggest some age-related links between social status and the experience of stomach pain (for example Kristjansdottir, 1996)). There is no evidence of the association between social determinants of health which specifically examines self-reported stomach pain. Stomach cancer and liver cancer, however, is known to be causally related to smoking, BMI, diabetes, and fruit- and vegetable consumption (Eikemo & Mackenbach, 2012) (EURO-GBD-SE project).

We also expect the variable to be correlated with self-reported health variables from the core module.

Question wording: Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for Stomach

Eikemo, T., & Mackenbach, J.P. (Eds.) (2012). *EURO-GBD-SE. The potential for reducing health inequalities in Europe. Final Report*. Rotterdam: Department of Public Health, Erasmus MC. Available at: http://www.euro-gbd-se.eu/.

Kristjansdottir, G. (1996). Sociodemographic differences in the prevalence of self-reported stomach pain in school children. *European Journal of Pediatrics*, *155*(11), 981-983.

Schiller, J.S., Lucas J.W., Ward, B.W., & Peregoy, J.A. (2012) *Summary health statistics for U.S. adults: National Health Interview Survey, 2010.* National Centre for Health Statistics. *Vital Health Stat* 10(252). Available at: http://www.cdc.gov/nchs/data/series/sr_10/sr10_252.pdf.

SUB CONCEPT NAME: Skin conditions

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

We have included skin conditions because they are among the most common health problems. Among Americans they collectively exceed the prevalence of conditions such as obesity, hypertension and cancer. At any one time, one-third of the U.S. population is experiencing at least one active skin condition. While most skin conditions are not life-threatening, many pose significant clinical burdens to populations and individuals as well as deficits to quality of life.

We want to measure skin conditions, which are not serious as such, but which may still affect the quality of everyday life of the respondent. This can be measured directly and no further sub concept is necessary.

The Slovenian labour force survey also included skin problems in their survey (ever been diagnosed with…), which demonstrated prevalence of 4.6 percent among men and 4.9 percent among women. The prevalence of skin diseases in adults with normal immune systems in the US is about 1 – 3 percent (Society for Investigative Dermatology and The American Academy of Dermatology Association, 2005). These are Slovenian estimates that were based on a question which asked for diagnoses, so it is likely that we will obtain larger prevalence estimates, but not substantially larger than 5 percent, both for men and for women.

Expected relationship with other sub concepts

Skin conditions correlate with physical (toxic) working environment (De Craeker, Roskams & Op de Beeck, 2008) and has been reported to be more frequent in manual classes groups (Bambra, 2011) (Clare Bambra, 2011). However, a large European study did not reveal any socioeconomic differences (Dalstra et al., 2005). We are unsure about the relation to socioeconomic position, but we may find a correlation in countries which have a larger proportion of people working with chemicals and in polluted areas. We also expect the variable to be correlated with self-reported health variables from the core module.

Question wording:

Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for Skin conditions

Bambra, C. (2011). *Work, worklessness, and the political economy of health*. Oxford: Oxford University Press.

Dalstra, J. A., Kunst, A. E., Borrell, C., Breeze, E., Cambois, E., Costa, G., et al. (2005). Socioeconomic differences in the prevalence of common chronic diseases: an overview of eight European countries. *International Journal of Epidemiology*, *34*(2), 316-326.

De Craeker, W., Roskams, N., & Op de Beeck, R. (2008): *Occupational skin diseases and dermal exposure in the European Union (EU-25): policy and practice overview / European Agency for Safety and Health at Work*. Luxenburg: Office for Official Publications of the European Communities. Available at: https://osha.europa.eu/en/publications/reports/TE7007049ENC_skin_diseases.

Society for Investigative Dermatology (SID) and The American Academy of Dermatology Association (AADA) (2005). *The Burden of Skin Diseases 2004.* Available at:
http://www.sidnet.org/content.asp?contentid=32
http://www.sidnet.org/files/Burden%20of%20Skin%20Diseases%202004%20Final%20Sept%2005.pdf.

SUB CONCEPT NAME: Diabetes

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Diabetes is included among the self-reported health outcomes because it has become an important worldwide health problem due to its high prevalence and associated mortality rate. In Europe in 2000, 6.5 percent and 5.1% percent of all deaths among men and women, respectively, were due to diabetes.[1] Moreover, the global burden of diabetes is expected to increase from 171.2 to 366.2 million cases between 2000 and 2030 (2.8–4.4% of total population) (Espelt, Kunst, Palència, Gnavi & Borrell 2011.

This sub concept can be measured directly and does not require further sub concepts. We suggest asking for diabetes and not diabetes mellitus. Diabetes type 1 is also a type of diabetes mellitus. Both the EHIS and the WHS ask for diabetes and not diabetes mellitus. Wild et al. estimate that the worldwide prevalence of diabetes was 2.8% in the year 2000 and will be about 4.4% in the year 2030 (Wild, Roglic, Green, Sicree & King, 2004). These data are in accordance with those of Roskam et al. who estimated the prevalence of diabetes mellitus (by socioeconomic group) for the entire European population. In the majority of countries studied, the prevalence of diabetes among people with an advantaged SEP was around 2–3 percent (range 1.5–5.4 percent in men, 0.6–4.1 percent in women), and was higher, around 5 percent (range 2.5–8.5% in men, 2.7–8.8 percent in women) among people with a disadvantaged SEP. In each country, persons with diabetes were identified by self-report based on responses to questions about diabetes. The survey items about diabetes aimed to determine whether the respondent currently had diabetes. In the original surveys this disease was called ‘diabetes’ (most countries), ‘diabetes mellitus’ or ‘high blood sugar (diabetes)’. For one country the responses were scored by a general practitioner (Espelt et al., 2008). In the Slovenian labor force survey, where it was asked about “ever been diagnosed with” the estimates were 7.6 percent among men and 3.3 percent among women. It is likely that we will obtain prevalence estimates of 5 – 10 percent, larger among men than among women.

Expected relationship with other sub concepts

According to the literature, we may expect diabetes to vary by socioeconomic position (Dalstra et al., 2005). Among social determinants, we expect diabetes to be correlated with BMI, heart problems, and physical inactivity.

We also expect the variable to be correlated with self-reported health variables from the core module.

Question wording:

Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for Diabetes

Dalstra, J. A., Kunst, A. E., Borrell, C., Breeze, E., Cambois, E., Costa, G., et al. (2005). Socioeconomic differences in the prevalence of common chronic diseases: an overview of eight European countries. *International Journal of Epidemiology*, *34*(2), 316-326.

Espelt, A., Borrell, C., Roskam, A. J., Rodriguez-Sanz, M., Stirbu, I., Dalmau-Bueno, A., et al. (2008). Socioeconomic inequalities in diabetes mellitus across Europe at the beginning of the 21st century. *Diabetologia*, *51*(11), 1971-1979.

Espelt, A., Kunst, A. E., Palència, L., Gnavi, R., & Borrell, C. (2011). Twenty years of socio-economic inequalities in type 2 diabetes mellitus prevalence in Spain, 1987–2006. *European Journal of Public Health*, *22*(6), 765-771.

Wild, S., Roglic, G., Green, A., Sicree, R., & King, H. (2004). Global prevalence of diabetes estimates for the year 2000 and projections for 2030. *Diabetes Care*, *27*(5), 1047-1053.

SUB CONCEPT NAME: Headache

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Headaches are included among the self-reported health diagnoses because it is very frequent in the adult population, and because headache disorders are associated with personal and societal burdens of pain, disability, damaged quality of life and financial cost (WHO, 2012).

In this sub concept we aim to capture serious headaches such as migraine, which has had a substantial impact on people’s quality of life. This can be measured directly and no further sub concept is necessary.

According to a European systematic review, more than 50 percent of adults indicate that they suffer from general headaches during the last year, but when asked specifically about tension-type headache, the prevalence was 60 percent (Stovner & Andree, 2010). *Migraine* occurs in 15% of adults, *chronic headache* in about 4% and *headaches due to possible medication overuse* in 1–2%. *Cluster headache* (characterised by immense pain) has a lifetime prevalence of 0.2–0.3%. Most headaches are more prevalent in women. The Slovenian Labour Force Survey only has a prevalence of 2.1 percent among men and 5.2 percent among women. However, this survey asked about diagnoses and not about experiences. This clearly illustrates how the phrasing of the question can result in dramatically different results. If we do not ask ESS respondents specifically about diagnoses, it appears that we can achieve a prevalence between 15 (migraine) and 50 percent (general headache), but closer to 15.

Expected relationship with other sub concepts

We expect headaches to be correlated with smoking and alcohol consumption (Aamodt, Stovner, Hagen, Bråthen & Zwart, 2006). According to the Norwegian HUNT study, there was a tendency of decreasing prevalence of migraine with increasing amounts of alcohol consumption compared with alcohol abstinence. Only with regard to symptoms indicating alcohol overuse, a positive association with frequent headache was found. The association between headache and smoking found in the present study raises questions about a causal relationship, e.g. that smoking causes headache or that it allays stress induced by headache. The observed negative association between migraine and alcohol consumption is probably explained by the headache precipitating properties of alcohol. We also expect an association with lower socioeconomic status (Hagen et al., 2002). We also expect the variable to be correlated with self-reported health variables from the core module.

Question wording:

Please refer to wording under the complex concept ‘Self-Reported Conditions’.

References for Headache

Aamodt, A. H., Stovner, L. J., Hagen, K., Bråthen, G., & Zwart, J. (2006). Headache prevalence related to smoking and alcohol use. The Head-HUNT Study. *European Journal of Neurology*, *13*(11), 1233-1238.

Hagen, K., Vatten, L., Stovner, L. J., Zwart, J. A., Krokstad, S., & Bovim, G. (2002). Low socio-economic status is associated with increased risk of frequent headache: a prospective study of 22 718 adults in Norway. *Cephalalgia*, *22*(8), 672-679.

Stovner, L. J., & Andree, C. (2010). Prevalence of headache in Europe: a review for the Eurolight project. *Journal of Headache and Pain*, *11*(4), 289-299.

World Health Organization (WHO) (2012). *Headache disorders. Fact sheet N°277* (October 2012). Available at: http://www.who.int/mediacentre/factsheets/fs277/en/.

SUB CONCEPT NAME: Cancer

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Cancer is included in the module because it is the leading cause of death worldwide (WHO, 2014). We include all kinds of cancers, including malignant tumour, including leukaemia and lymphoma.

On average, worldwide, there is about a 10 percent chance of getting a cancer before age 65 (Parkin, Bray, Ferlay & Pisani, 2001). However, the risk of getting cancer varies between men and women and between world regions and even between European regions. In Eastern Europe this number is 16.2 percent among men and 12.4 percent among women. In Northern Europe these numbers amount to 10.9 percent among men and 13.0 percent among women. In Southern Europe the chance of getting any cancer before age 65 is 13.3 percent among men and 11.1 percent among women. Finally, in Western Europe this amounts to 14.9 percent among men and 13.2 percent among women. The estimates of partial prevalence in each country were derived by combining the annual number of new cases and the corresponding probability of survival by time. Therefore, this prevalence corresponds to current cases. Thus, by asking about current or previous experience of cancer, and provided that there are no serious underreporting, we should have a prevalence of at least 10 percent for both men and women. This number may seem high, but the estimates obtained from the global cancer burden above were for people aged maximum 64. The ESS covers higher ages as well.

Expected relationship with other sub concepts

According to the WHO, tobacco use, alcohol use, unhealthy diet and physical inactivity are the main cancer risk factors worldwide (WHO, 2014). Furthermore, high BMI and occupational risks are associated with cancer (International Agency for Research on Cancer & Cancer Research UK, 2012). Cancer prevalence and cancer mortality is not consistently higher among lower socioeconomic groups. These patterns for all cancers combined are the net result of strongly diverging patterns for specific forms of cancer (Mackenbach, 2006).

For some cancers, ‘reverse’ patterns (with higher death rates in the upper socio-economic groups) are seen in some countries. Examples include prostate cancer among men, and breast and lung cancer in women. For colorectal cancer, another important cause of death, inequalities in mortality tend to be small everywhere. The ‘reverse’ or absent gradients and large contributions to cancer mortality of breast, lung and colorectal cancer in women explain the lack of excess cancer mortality in lower socio-economic groups. In men, the excess cancer mortality in lower socio-economic groups is due to higher mortality from lung cancer, as well as from a number of other cancers including stomach cancer and oesophagus cancer. Based on lessons from studies of mortality, we do not expect to find socioeconomic inequalities in self-reported cancer in most countries, but we still do not know to what extent inequalities in self-reported cancer corresponds to inequalities in cancer mortality. We also expect the variable to be correlated with self-reported health variables from the core module.

Question wording:

ASK ALL
E30 **CARD 55** Do you have or have you ever had any of the health problems listed on this card?
IF YES, is that currently or previously?

Yes, currently	1
Yes, previously	2
No, never	3
(Don't know)	8

CARD 55:

Cancer affecting any part of the body
Leukaemia
Malignant tumour
Malignant lymphoma
Melanoma, carcinoma, or other skin cancer

References for Cancer

International Agency for Research on Cancer & Cancer Research UK (IARC) (2012). *World Cancer Factsheet*. Cancer Research UK, London. Available at: http://www.iarc.fr/en/media-centre/iarcnews/pdf/Global%20factsheet-2012.pdf.

Mackenbach, J. P. (2006). *Health inequalities: Europe in profile*. An independent expert report commissioned by the UK presidency of the EU. London: Department of Health. Available at: http://www.who.int/social_determinants/resources/european_inequalities.pdf.

Parkin, D. M., Bray, F., Ferlay, J., & Pisani, P. (2001). Estimating the world cancer burden: Globocan 2000. *International Journal of Cancer*, *94*(2), 153-156.

World Health Organization (WHO) (2014). *Cancer Fact sheet N°297* (updated February 2014). Available at: http://www.who.int/mediacentre/factsheets/fs297/en/.

COMPLEX CONCEPT NAME: Body Mass Index (BMI)

Describe the concept in detail, outlining the various sub concepts it comprises

Questions on weight and height will be included to obtain BMI. Obesity is associated with an increased risk of disease (e.g. diabetes, heart disease) and premature mortality (Robertson et al, 2006). A much less investigated but also less prevalent health problem in modern Western countries is underweight, which also has implications for health outcomes. BMI cannot be measured directly. Height and weight must be included as further sub concepts.

The interviewers will not be required to calculate the respondent's BMI at the time of interview. A follow up question could be asked to those respondents who are unsure of their exact weight/height, to record their estimates (and reduce nonresponse). There may be within and between country variation in measurement units (kilos, stone, feet, metres, etc) – the questions allow for this.

Expected relationship with other complex and simple concepts

High BMI is associated with an increased risk of disease (e.g. diabetes, heart disease) and premature mortality (Robertson et al, 2006). BMI may also be correlated with lack of physical inactivity (Lindström, Isacsson & Merlo, 2003) and low levels of fruit- and vegetable consumption (Geliebter & Aversa, 2003). Low BMI is also associated with low socioeconomic position (Lissner et al., 2000).

It is possible to speculate an association with stomach problems due to the causal relationship between mortality from kidney cancer / colo-rectum cancer and BMI (EURO-GBD-SE project). We also expect the variable to be correlated with self-reported health variables from the core module.

Psychosocial and psychological factors, such as self- esteem and sense of purpose, body image and body image distortion, and emotional status, seem to be associated with underweight among young women in the industrialised world. Underweight women are more likely to have poorer psychological health than normal weight women. In contrast, overweight and obese women are more likely to have poor health related behaviours and lack of internal locus of control compared with normal weight women (Ali & Lindström, 2006). We therefore expect underweight and overweight to be associated with poorer self-assessed health outcomes in the core-module (at least among women) as compared to normal weight people. It will be important to treat underweight people (and to be aware of varying cut-off points of underweight/normal weight in the literature) as a separate group, or to at least exclude underweight from analyses of normal weight versus overweight.

It is felt that item nonresponse at these items may be associated with lower socioeconomic status. However, data from Eurothine and the EURO-GBD project suggest that item nonresponse for self-reported BMI is actually not problematic, except in France (over 20% missing) and Spain (around 10% missing). A WHO survey also found self-reported BMI to have adequate response rates. Similarly, research shows that the bias in self-reported BMI is actually less problematic than expected. There are many potential sources of error (rounding, memory effects, real change, editing of the response due to its sensitivity, etc), but the error is not likely to be randomly distributed because it tends to be always “negative” (that is, in all studies, actual weight is higher than reported, suggesting that the error is systematic, not random).

Some studies of self-reported BMI showing similar findings (between 0.5 and 2 kg underestimation of weight, and about 1-1.5cm over estimation of height), e.g. Stommel and Schoenborn (2009) Villanueva (2001); Bes-Rastrollo et al (2011). A study by Alvarez-Torices et al (1993) highlights problems with using self-reported measures with older people. A study by Wang et al (2002) outlines some problems of using self-reported measures with younger populations. However, a meta-analysis (Bowman and DeLucia, 1993) concludes that self-reported weight is ‘sufficiently accurate for epidemiological groups’.

SUB CONCEPT NAME: Height

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Height can be measured directly. No further sub concepts are necessary.

Expected relationship with other sub concepts

We expect height to be positively related to weight.

Question wording:

ASK ALL

E11 What is your height without shoes?
INTERVIEWER: If the respondent answers “don’t know” say: “please give your best estimate”.
INTERVIEWER NOTE: 100 centimetres = ‘1 metre’ ‘00 cm’.

INTERVIEWER WRITE IN **metres** **cm**

☐ . ☐☐

OR

INTERVIEWER WRITE IN **feet** **inches**

☐ ☐☐

(Don’t know) 888

SUB CONCEPT NAME: Weight

Describe the sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Weight can be measured directly. No further sub concepts are necessary.

Expected relationship with other sub concepts

We expect weight to be positively related to height

Question wording:

E12 What is your weight without shoes?
INTERVIEWER: If the respondent answers “don’t know” say: “please give your best estimate”.

INTERVIEWER WRITE IN **kilograms (kg)**

☐☐☐ . ☐

OR

INTERVIEWER WRITE IN **stones** **pounds (lbs)**

☐☐ ☐☐

(Don’t know) 8888

NOTE ON ADMINISTRATION OF E11 AND E12: National teams to choose whether metric or imperial or both options appear at E11 and E12. If both metric and imperial are included, these should be presented in the order most logical in the country. An ‘other’ option should also be included if only metric or only imperial answers are provided for. Any ‘other’ responses should be post-coded by the survey agency into metric.

References for Body Mass Index (BMI)

Ali, S. M., & Lindström, M. (2006). Socioeconomic, psychosocial, behavioural, and psychological determinants of BMI among young women: differing patterns for underweight and overweight/obesity. *European Journal of Public Health*, *16*(3), 324-330.

Alvarez-Torices, J. C., Franch-Nadal, J., Alvarez-Guisasola, F., Hernandez-Mejia, R., & Cueto-Espinar, A. (1993). Self-reported height and weight and prevalence of obesity. Study in a Spanish population. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity*, *17*(11), 663-667.

Bes-Rastrollo, M., Sabaté, J., Jaceldo-Siegl, K., & Fraser, G. E. (2011). Validation of self-reported anthropometrics in the Adventist Health Study 2. *BMC Public Health*, *11*(1), 213.

Bowman, R. L., & DeLucia, J. L. (1992). Accuracy of self-reported weight: A meta-analysis. *Behavior Therapy*, *23*(4), 637-655.

Geliebter, A., & Aversa, A. (2003). Emotional eating in overweight, normal weight, and underweight individuals. *Eating Behaviors*, *3*(4), 341-347.

Lindström, M., Isacsson, S. O., & Merlo, J. (2003). Increasing prevalence of overweight, obesity and physical inactivity: two population-based studies 1986 and 1994. *European Journal of Public Health*, *13*(4), 306-312.

Lissner, L., Johansson, S. E., Qvist, J., Rössner, S., & Wolk, A. (2000). Social mapping of the obesity epidemic in Sweden. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity*, *24*(6), 801-805.

Robertson, A., Brunner, E., & Sheiham, A. (2006). Food is a political issue. In M. Marmot and R. G. Wilkinson (Eds.), *The Social Determinants of Health* (2nd edition, pp. 172-195). Oxford: Oxford University Press.

Stommel, M., & Schoenborn, C. A. (2009). Accuracy and usefulness of BMI measures based on self-reported weight and height: findings from the NHANES & NHIS 2001-2006. *BMC Public Health*, *9*(1), 421.

Villanueva, E. V. (2001). The validity of self-reported weight in US adults: a population based cross-sectional study. *BMC Public Health*, *1*(1), 11.

Wang, Z., Patterson, C. M., & Hills, A. P. (2002). A comparison of self-reported and measured height, weight and BMI in Australian adolescents. *Australian and New Zealand Journal of Public Health*, *26*(5), 473-478.

COMPLEX CONCEPT NAME: Childhood conditions

Describe the concept in detail, outlining the various sub concepts it comprises

Inequalities in health are intertwined with social inequalities in a number of living conditions throughout the course of life. One's position in the social structure at each point in time is linked to health, and the accumulated time in lower social positions constitute a good summary measure of life-time "exposure" to adverse conditions. Over and above that, however, adverse living conditions during different periods of the life course affect health (Braveman & Barclay 2009; Galobardes, Lynch & Davey Smith 2004; Lundberg 1993, 1997; Shaw & Krause 2002; Wadsworth & Kuh, 1997). It is of particular interest that social and material conditions during childhood can have both independent effects on health in adult and later life (Elstad 2005; Lundberg, 1993, 1997; Turell et al 2007), as well as be part of the social stratification process (Lundberg 1991).

The key questions on childhood conditions include economic as well as social circumstances during upbringing, typically up to age 16. They can include direct descriptions of these conditions (experience of economic difficulties during one's upbringing), or descriptions of the circumstances in terms of family structure, housing conditions or parental social class (Lundberg 1991, 1993; Fors et al. 2009).

Expected relationship with other complex and simple concepts

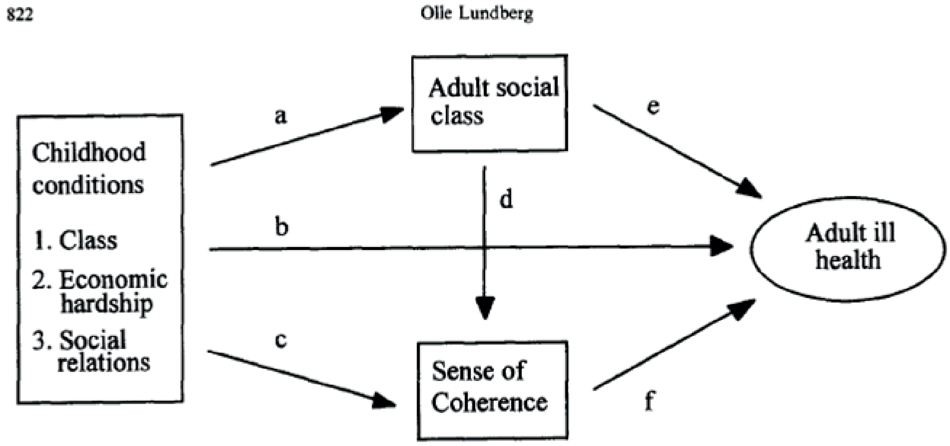

Fig. 1. Conceptual model.

It is well established that conditions during early life and childhood are important for processes and conditions later in life. The educational level and occupation of the parents (covered by the core ESS) will also be useful in establishing the social position of the childhood family.

SUB CONCEPT NAME: Friction in family while growing up

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Conflicts or dissention in the childhood family could have been manifested and experienced in many ways. An item measuring friction in the family while growing up is empirically the most powerful predictor of adult health and living conditions of the childhood factors measured in the Swedish Level of Living Surveys (SLLS).

Expected relationship with other sub concepts

Analyses on the impact of childhood conditions on health in adulthood showed clearly the predictive relationship between this item and adult health and living conditions (Lundberg, 1993). The item also interacts with other factors – the poorest mental health is found among adults who experienced serious dissention but where the parents did not divorce (Gähler, 1998), whereas children of divorcees did not differ from others in their mental health regardless of whether there were conflicts or not.

Question wording:

E31 **CARD 56** Using this card, please tell me how often there was serious conflict[6] between the people living in your household when you were growing up?

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[6] 'conflict' in the sense of 'tension, verbal arguments or physical violence'.

Always	1
Often	2
Sometimes	3
Hardly ever	4
Never	5
(Don’t know)	8

SUB CONCEPT NAME: Economic hardship in family while growing up

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Economic problems and conflicts or dissention in the childhood family could have been manifested and experienced in many ways. The question is to be interpreted in relation to essential consumption. The family should have experienced difficulties in affording the necessities like food, clothes, housing, bills etc.

Expected relationship with other sub concepts

See diagram under ‘expected relationships’ under the heading for ‘childhood conditions’.

Question wording:

E32 **STILL CARD 56** Using the same card, please tell me how often you and your family experienced severe financial difficulties when you were growing up?

Always	1
Often	2
Sometimes	3
Hardly ever	4
Never	5
(Don’t know)	8

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COMPLEX CONCEPT NAME: Working conditions

Describe the concept in detail, outlining the various sub concepts it comprises

Working life remains one of the most important spheres of life for people's health, but in complicated ways. Work provides economic resources and a range of other rewards that are crucial for health, but at the same time adverse working conditions are still an important source of poor health and a major driving force behind health inequalities (Benach, Muntaner, Santan et al. 2007). Even today, large parts of the work force are exposed to harmful physical working conditions in all European countries, although the variation across nations is large (Lundberg, Hemmingsson & Hogstedt 2007). There is a range of working conditions of importance for health, but the most important include heavy lifting, bent or otherwise unsuitable work postures, noise and exposure to dust, smoke or toxic substances. Such conditions are directly linked to musculoskeletal disorder, hearing problems, respiratory problems and specific diseases, but can also affect psychological health through stress (Cox et al. 2000).

In addition, the psychosocial work environment has proven to be important for health. In the classic demand-control model introduced by Robert Karasek (Karasek 1979; Karasek & Theorell 1990) the focus is placed on the job strain that results from the combination of high demands and low control. The model has been consistently related to a range of health outcomes, including mortality (e.g. Belkic et al 2004; Vermeulen & Mustard 2000; de Jonge, Bosma et al 2000), although not necessarily in all occupational groups (de Jonge, Dollard et al 2000). It is also unclear to what extent demand-control variations contribute to inequalities in health (Lundberg 1991b).

Other approaches to the psychosocial dimensions of work include the effort-reward model proposed by Johannes Siegrist (Siegrist et al 1986; Siegrist 1996). This model includes several components, but the basic idea is that an imbalance between (high) efforts put in by an employee and (low) rewards from the employer will result in strain and poor health among employees. While part of the model has received substantial support (van Vegchel et al 2005), there are still several unresolved issues that would need cross-national comparisons to be addressed properly.

In sum, therefore, a cross-European focus on social determinants of health and health inequalities requires information of key work environment factors, including both physical and psycho-social work hazards. Given the limited space we will have to focus on a few indicators only, and while this is quite easy to do for the physical demands of importance it will be more difficult to capture both demand-control and effort-reword with a few questionnaire items. We will therefore most likely focus on the former of these constructs.

Physical working conditions are important determinants of health and will be a very important measure for the module. They have been shown to affect general health (Borg, Kristensen, Burr 2000), sickness absence (Labriola, Lund, Burr 2006; Lund, Labriola, Christensen, Bultmann, Villadsen 2006), disability pension and cardiovascular disease (Holtermann, Mortensen, Burr, Søgaard, Gyntelberg, Suadicani 2009) and mortality (Holtermann, Mortensen, Burr, Søgaard, Gyntelberg, Suadicani 2009).

Physical working conditions cannot be measured directly. Several sub concepts are possible. We could make a distinction between *exposure* (vibrations, noise, high or low temperatures, breathing in smoke/fumes (powder, dust), skin contact with chemical products, tobacco smoke or being in contact with materials that can be infectious) and *work tasks* (tiring positions, lifting or moving people, carrying heavy loads, standing, repetitive hand or arm movements).

We focus on *hazardous* working conditions by means of two sub concepts: ‘ergonomic hazards’, and ‘material hazards’ (including environmental and chemical hazards).

Importantly, by physical working conditions we want to capture working conditions that are clearly hazardous for health. Physical working conditions explain the most work related class variance in health.

With respect to expected prevalence, we can get a good estimate from the European Survey of Working Conditions (ESWC):

	Almost all the time			About ¼ of the time		
EXPOSURE	M	W	Tot	M	W	Tot
Vibrations from hand tools, machinery, etc.?	15%	4%	10%	35%	10%	24%
Noise so loud that you would have to raise your voice to talk to people?	14%	7%	11%	39%	19%	30%
High temperatures which make you perspire even when not working?	8%	5%	7%	31%	17%	25%
Low temperatures whether indoors or outdoors?	5%	2%	4%	29%	13%	22%
Breathing in smoke, fumes, powder or dust etc.?	10%	3%	7%	28%	8%	19%
Breathing in vapours such as solvents and thinners?	4%	2%	3%	15%	7%	11%
Handling or being in skin contact with chemical products or substances?	4%	4%	4%	17%	11%	14%
Radiation such as X rays, radioactive, welding light, laser beams?	2%	1%	1%	6%	3%	5%
Tobacco smoke from other people?	8%	5%	7%	25%	14%	20%
Handling or being in direct contact with materials which can be infectious?	2%	5%	4%	8%	11%	9%
WORK TASKS						
Tiring or painful positions?	16%	15%	16%	48%	42%	45%
Lifting or moving people?	1%	4%	3%	6%	11%	8%
Carrying or moving heavy loads?	12%	6%	10%	43%	25%	35%
Standing or walking?	43%	43%	43%	75%	70%	73%
Repetitive hand or arm movements?	32%	35%	34%	62%	62%	62%
Working in places other than home or company/ organisation premises?	19%	7%	14%	39%	16%	29%
Dealing directly with people who are not employees at your workplace?	34%	49%	41%	59%	66%	62%
Working with computers: PCs, network, mainframe?	22%	30%	25%	43%	48%	45%
Wearing personal protective clothing or equipment?	32%	17%	25%	42%	23%	34%

Exposures to vibrations and noise are most common in men. Exposures to inconvenient temperatures and to smoke - fumes as well as to tobacco smoke - are also rather common. Exposure in general is less often reported by women. With respect to the work tasks, standing or walking, repetitive hand or arm movements, and tiring or painful positions seem to be quite common in Europe, affecting up to 70% of the employees at least a quarter of their working time and up to 40% almost all the time. A considerable percentage of men report their tasks involve carrying or moving heavy loads.

These items were placed in section F of the core ESS questionnaire (next to the other 'job' questions) in order to group all related questions together (asking about current or most recent job) and to avoid unnecessary routing.

Expected relationship with other complex and simple concepts

Recent research into the physical work environment has particularly focused on ergonomic hazards including vibration exposure, lifting heavy loads, work which involves painful positions, and repetitive work. Epidemiological evidence has accumulated demonstrating an association between exposure to vibration (e.g. by the regular and frequent use of vibrating hand-held tools, driving heavy vehicles or operating certain machines) and musculoskeletal disease as well as hand arm vibration syndrome and carpal tunnel syndrome (Chetter et al, 1998). For example, a systematic review found that lower back pain was more frequent in workers exposed to whole body vibration (Lings and Leboeuf-Yde, 2000). Work involving tasks such as lifting and carrying heavy loads or people is also known to be a risk factor for the development of musculoskeletal disorders particularly of the lower back (Parkes et al, 2005). Similarly, work involving repetitive movements has been associated with an increased prevalence of musculoskeletal symptoms involving the neck, shoulders, and upper extremities (Health and Safety Executive, 2010). There is also tentative evidence to suggest that mental health conditions tend to be more frequently reported by workers exposed to repetitive work (Vinet et al, 1989). Working in strenuous, painful and static postures is also associated with musculoskeletal symptoms (Fredriksson et al, 2001; Ohisson et al, 1995).

Recent research by QDT members Eikemo and Bambra and colleagues shows that *physical* working conditions are most strongly associated with health.

SUB CONCEPT NAME: Ergonomic hazards

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Ergonomic hazards at work are essential to understand the dangers of physical working conditions (see working conditions above). It can be measured directly and no further sub concepts are needed. Standing and walking are not included in this sub concept.

Expected relationship with other sub concepts:

Ergonomic hazards (vibrations) are expected to be associated with lower socioeconomic position, back pain, and poor self-reported health (Bambra, 2011).

Question wording:

****F35a[7] CARD 66** In any of the jobs you have ever had, which of the things[8] on this card were you exposed to? **INTERVIEWER PROBE**: Which others?
CODE ALL THAT APPLY

Vibrations from hand tools or machinery	1
Tiring or painful positions	2
Manually lifting[9] or moving people	3

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[7] **NEW QUESTION:** PART OF ROUND 7 ROTATING MODULE ON HEALTH.

[8] 'things' – translators should use a neutral term that does not convey problems.

[9] 'Lifting' in the sense of picking people up.

Manually carrying[10] or moving heavy loads	4
(None of these)	5
(Don’t know)	8

SUB CONCEPT NAME: Material hazards

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Material hazards include environmental and chemical hazards. Environmental hazards at work are essential to understand the dangers of physical working conditions (see working conditions above). Chemical hazards at work are essential to understand the dangers of physical working conditions (see working conditions above).

Expected relationship with other sub concepts:

Environment hazards (noise) are expected to be associated with lower socioeconomic position, heart problems, smoking and poor self-reported health (Bambra, 2011; Gan et al., 2010). For example, chronic exposure to occupational noise is strongly associated with prevalence of cardiovascular heart disease, especially for young male current smokers). Chemical hazards (contact with chemical products) are expected to be associated with lower socioeconomic position, poor self-reported health (Bambra, 2011), skin conditions and heart problems (Price, 2004).

Question wording:

****F35b**[11] **CARD 67** And in any of the jobs you have <u>ever</u> had, which of the things on this card were you exposed to? **INTERVIEWER PROBE**: Which others?
CODE ALL THAT APPLY

Very loud noise	01
Very hot temperatures	02
Very cold temperatures	03
Radiation such as X-rays	04
Handling, breathing in or being in contact with chemical products, vapours or substances[12]	05
Breathing in other types of smoke, fumes[13], powder or dust	06
(None of these)	55
(Don’t know)	88

SUB CONCEPT NAME: Job control

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Job control is a very important psychosocial aspect of working conditions (e.g. in the European Survey of Working Conditions). The ‘psychosocial work environment’ is a collective way of referring to psychological and social influences on health such as time pressure, social reciprocity, job control and autonomy, fairness, and work demands. There is strong evidence of relationships between job strain and adverse

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[10] ‘Carrying’ in the sense of picking something up and moving it.
[11] **NEW QUESTION:** PART OF ROUND 7 ROTATING MODULE ON HEALTH.
[12] Chemical refers to products, vapours and substances
[13] Fumes in the sense of gases

health outcomes including coronary heart disease (Hemmingway and Marmot, 1999) and associated risk factors (Brunner et al, 2007; Chandola et al, 2006), musculoskeletal pain (Bongers et al, 1993) as well as psychological ill health (Stansfeld et al, 1999). Job control cannot be measured directly. It requires further sub concepts, such as organization of working life and working hours, which are both part of the core module of the ESS.

The nature of work in Europe has altered considerably in recent decades, with a rise in flexible – or precarious - employment: increasing numbers of people are working on either temporary contracts or no contracts, characterised by lower levels of security and poorer working conditions (Benach et al, 2002). Precarious employment is usually associated with low income, long and unsociable working hours and high job strain (Quinlan et al, 2001). A core measure of working hours will make it possible to combine a psychosocial measure with the physical working condition enabling analyses of the independent and joint contribution of these two concepts to socioeconomic inequalities in health.

Expected relationship with other sub concepts

A number of adverse physical and mental health indicators are associated with precarious employment including stress, fatigue, backache and muscular pains, self-reported health, minor psychiatric morbidity, blood pressure, health related behaviours as well as mortality (Benavides et al, 2000; Ferrie et al., 2002; Kivimäki et al, 2003).

There is a sizeable body of evidence that demonstrates the negative effects of shift work, and particularly night work, on health and wellbeing (Åkerstadt, 1990; Monk and Folkard, 1992). Reported health problems include sleep disturbances, fatigue, digestive problems, emotional problems, cardiovascular problems, and stress-related illnesses, as well as increases both in general morbidity and in sickness absence (Pilcher et al, 2000; Bøggild, 2000). We therefore expect associations with back pain, poor self-reported health, low socioeconomic position, stomach pain, heart problems, and health related behaviors (for example smoking).

Long working hours have been shown to have negative health impacts (Sparks et al, 1997) and shift work, and working long hours or abnormal hours may result in work-life balance problems which can in turn result in poorer health (Johansson, 2002). We therefore expect the variable to be associated with low socioeconomic position, heart disease (Yang et al., 2006) and poor self-rated health from the core module. Previous research has also demonstrated associations with overweight, smoking and excessive alcohol consumption (Shields, 1999). These are therefore associations that we could expect to find in our module as well.

Question wording (Core ESS items):

ASK ALL WORKING/PREVIOUSLY WORKED

CARD 64 I am going to read out a list of things about your working life. Using this card, please say how much the management at your work allows/allowed you…**READ OUT…**

		I have/ had no influence										**I have/had complete control**	**(Don't know)**
F27	…to decide how your own daily work is/was organised?	00	01	02	03	04	05	06	07	08	09	10	88

F28	…to influence policy decisions about the activities of the organisation?	00	01	02	03	04	05	06	07	08	09	10	88

F29 What are/were your total ‘basic’ or contracted hours each week (in your main job), excluding any paid and unpaid overtime?
INTERVIEWER: 0 hours contract should be coded as 0 hours.
Acceptable range of responses is between 0 and 168 hours[14].

WRITE IN HOURS: ☐☐☐

(Don’t know) 888
(Do not have set ‘basic’ or contracted number of hours) 555[15]

F30 Regardless of your basic or contracted hours, how many hours do/did you normally work a week (in your main job), including any paid or unpaid overtime.
INTERVIEWER: Acceptable range of responses is between 0 and 168 hours[16].

WRITE IN HOURS: ☐☐☐

(Don’t know) 888

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[14] **NEW INTERVIEWER NOTE** FOR ESS7.
[15] **NEW CODE** FOR ESS7.
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COMPLEX CONCEPT NAME: Alcohol consumption

Describe the concept in detail, outlining the various sub concepts it comprises

According to the World Health Organization (WHO), alcohol consumption is a leading risk factor for mortality and morbidity related to both intentional and unintentional injury. In 2000, 16.2% of deaths and 13.2% of disability-adjusted life years (DALYs) from injuries were estimated to be attributed to alcohol in the entire world (Cherpitel C. et.al, 2009). Heavy drinking and alcohol abuse or dependence are common problems in most European countries, and result in substantial suffering, mortality and economic costs. Injuries attributable to alcohol are a growing concern from a public health perspective, as alcohol related injuries such as traffic accidents, burns, poisonings, falls and drowning make up more than a third of the disease burden attributable to alcohol consumption. The WHO estimates that 2.3 million premature deaths occur every year as a result of harmful alcohol use (Cherpitel C. et.al, 2009). The impact of alcohol affects not only those who are intoxicated at the time of injury, but also those who are direct victims of their behaviour. In addition, heavy alcohol drinking has substantial psychological, social and family consequences that extend beyond the individual.

Despite the relevance of alcohol as a risk factor for mortality, there is limited understanding of how alcohol consumption is related to social and economic factors, and how this varies across European countries. Patterns of alcohol consumption vary enormously across Europe. For example, moderate wine drinking is common in the Southern Mediterranean countries, where alcohol has historically been consumed during meals. In contrast, The Nordic European countries have historically been characterized by higher levels of binge drinking. Furthermore, excessive alcohol consumption is not equally distributed within a society. Research indicates that there is a strong social gradient in excessive alcohol consumption, which contributes substantially to social inequalities in health and mortality. For example, it is estimated that up to a third of excess mortality in the lower socioeconomic groups in Finland could be attributable to alcohol consumption.

The measurement of alcohol consumption in this module is not only important given the major burden attributable to alcohol from a public health perspective, but also because alcohol patterns are socially and culturally determined, and the way alcohol relates to social, economic and employment variables is likely to differ substantially across countries. In addition, alcohol policies targeted to altering alcohol consumption patterns differ enormously across Europe. Through cross-nationally comparative data on alcohol, researchers will be able to examine how alcohol policies may have an impact on overall alcohol consumption patterns.

In this module, the QDT aims to measure three dimensions of alcohol consumption: (a) the frequency of alcohol consumption, (b) the quantity of alcohol consumed, and (c) binge drinking. Whereas consuming a high volume of alcohol is mostly associated with health risks, heavy drinking occasions are especially harmful in terms of violence, injuries, and accidents that result from these episodes (WHO, 2004). Hence, because of the broad range of adverse consequences of alcohol use, it is essential to understand the determinants of multiple dimensions of alcohol use, instead of focusing on one aspect. Although this will require the use of three items in the module, we believe that this is necessary to fully and accurately capture alcohol consumption. Additionally, this is necessary to do justice to cross-national variations in alcohol consumption patterns (i.e., some countries are characterized by high binge drinking but low overall frequency of alcohol use, whereas in other countries the opposite pattern can be observed). We do not examine alcohol addiction or severe problem drinking. Although these dimensions of alcohol consumption would be interesting to study as well because of the strong effects on health, the QDT believes that it would not be feasible to study these dimensions as part of the current module, because of the low prevalence of severe problem drinking in most countries.

Recently, the World Health Organization has developed and validated an instrument to measure alcohol consumption, particularly focused on identifying hazardous or harmful alcohol use. The Alcohol Use Disorders Identification Test (AUDIT) is a 10-item screening questionnaire with 3 questions on the amount and frequency of drinking, 3 questions on alcohol dependence, and 4 on problems caused by alcohol. The AUDIT instrument was developed to assess alcohol dependence, adverse alcohol drinking, and adverse consequences of alcohol use. *Hazardous drinking* refers to a pattern of consumption that increases the risk of harmful consequences for the user or others. *Harmful use* refers to alcohol consumption that leads to substantial physical and mental health consequences. *Alcohol dependence* refers to a cluster of behavioural, cognitive and physiological reactions that may develop after repeated alcohol use, and that include strong desire to consume alcohol, impaired control over consumption, persistence in drinking despite harmful consequences, a higher priority given to drinking than other activities, increased alcohol tolerance, and physical withdrawal symptoms is alcohol is discontinued (Babor, T., 2001). The AUDIT instrument comprehensively assesses all these dimensions of alcohol drinking behaviour, and has become a major tool for assessing alcohol consumption in several countries. The AUDIT instrument has been translated to a variety of languages, and a manual is available for its use. The instrument has been validated in many different contexts, and has shown high reliability and good psychometric properties (Allen, 2001; Reinert, 2007). The AUDIT questionnaire is available from the World Health Organization without copyright fee. A shorter version of the instrument, the AUDIT-C (which is a 3-item version) was developed to meet the challenge of brevity and ease of administration in broader settings. The AUDIT-C has been shown to have very good properties, and to perform almost as well as the 10-item AUDIT questionnaire to assess both, heavy/hazardous drinking and alcohol abuse or dependence (Bush et al. 1998).

Using a modified version of this approach requires collaboration with national experts on alcohol consumption, rather than with international experts, since precise knowledge on units and ways of serving drinks in all specific countries is required. Conversion of all specific units / drinks into one standard measure could be achieved after the survey. Potential problems of seasonal effects and time reference periods are less pertinent with the current phrasing used in the UK version of the AUDIT-C. For binge drinking, there is an explicit reference to a time period of within the last 12 months. Because of the salience of binge drinking as opposed to regular moderate consumption, we believe that respondents should be able to recall their general frequency of binge drinking in the last year.

The AUDIT-C is used to calculate a score as follows, with a total of 5+ indicating increased or higher risk drinking:

Questions	**Scoring system**					**Your score**
	0	**1**	**2**	**3**	**4**	
How often do you have a drink containing alcohol?	Never	Monthly or less	2 - 4 times per month	2 - 3 times per week	4+ times per week	
How many units of alcohol do you drink on a typical day when you are drinking?	1 -2	3 - 4	5 - 6	7 - 9	10+	
How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	

Expected relationship with other complex and simple concepts

From earlier research it is known that binge drinking and high quantity of alcohol consumption are negatively related to socioeconomic position (i.e., lower socioeconomic groups exhibit more binge drinking and consume higher quantities of alcohol). However, it has also been shown that this is not necessarily true for the *frequency* of alcohol consumption. The frequency of alcohol consumption is not clearly related to socioeconomic position. This is partly due to moderate and regular alcohol consumption having (modest) beneficial effects on health (mainly by reducing the risk of cardiovascular disease). Therefore, many individuals from higher socioeconomic groups drink moderately.

Binge drinking and a high quantity of alcohol consumed are negatively associated with people’s health (e.g., by increasing the risk of several types of cancer, liver diseases, and accidents). Additionally, people who consume high quantities of alcohol have a higher BMI. However, regular consumption of moderate quantities of alcohol (1-2 units per day) appears to be better for health than abstinence. Hence, the association between alcohol consumption is complex, and needs to be examined by distinguishing several dimensions of alcohol consumption.

In general, alcohol consumption (especially binge drinking and a high quantity of alcohol consumed) is expected to be positively related to other forms of health damaging behaviour that are included in this module, such as low physical activity, smoking, and low fruit and vegetable consumption.

SUB CONCEPT NAME: Frequency of alcohol consumption

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

The frequency of alcohol consumption refers to how often people generally consume alcoholic drinks. The frequency of alcohol consumption does not include any further sub concepts, and it can be measured directly.

Expected relationship with other sub concepts

Frequency of alcohol consumption, quantity of alcohol consumption, and binge drinking are not necessarily positively correlated.

The relationship between these sub-concepts differs across countries. In some countries (e.g., in Northern Europe), binge drinking is relatively high whereas the frequency of alcohol consumption is relatively low. In Southern Europe, we observe the opposite pattern. Typically, people with a pattern of binge drinking usually have a low rather than high frequency of alcohol consumption. Therefore, the three sub-concepts represent truly different dimensions of alcohol consumption, rather than strongly interrelated items within a general internally consistent dimension of alcohol use.

Question wording:

ASK ALL

E6 **CARD 45** In the last 12 months, that is since [**MONTH, YEAR**], how often have you had a drink containing alcohol? This could be wine, beer, cider[17], spirits or other drinks containing alcohol. Please choose an answer from this card.
INTERVIEWER: Refer to the same month as the interview but of the previous year. For example, if the interview takes place in September 2014, use [September 2013].

Every day	01	**ASK E7**
Several times a week	02	
Once a week	03	
2-3 times a month	04	
Once a month	05	
Less than once a month	06	
Never	07	**GO TO E11**
(Don't know)	88	**ASK E7**

---

[17] All countries should include 'wine, beer and spirits' as examples. If cider is not a well-known drink, countries may exclude this or substitute it with a different category of drink.

SUB CONCEPT NAME: Quantity of alcohol consumption

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

The quantity of alcohol consumption refers to the number of drinks or units consumed on a typical day. The quantity of alcohol consumption does not include any further sub concepts, and it can be measured directly.

Expected relationship with other sub concepts

Frequency of alcohol consumption, quantity of alcohol consumption, and binge drinking are not necessarily positively correlated. The relationship between these sub-concepts differs across countries. In some countries (e.g., in Northern Europe), binge drinking is relatively high whereas the frequency of alcohol consumption is relatively low. In Southern Europe, we observe the opposite pattern. Typically, people with a pattern of binge drinking usually have a low rather than high frequency of alcohol consumption.

Therefore, the three sub-concepts represent truly different dimensions of alcohol consumption, rather than strongly interrelated items within a general internally consistent dimension of alcohol use.

Question wording:

ASK IF CODE 01, 02, 03, 04, 05, 06 OR 88 AT E6

E7 **CARD 46** Please think about the last time you were drinking alcohol on a Monday, a Tuesday, a Wednesday or a Thursday.
INTERVIEWER PAUSE TO ALLOW RESPONDENT TO CONSIDER THE SHOWCARD.
How many of each of the following drinks did you have on that day? Use this card to guide your answer.

INTERVIEWER PROBE: any other drinks?
INTERVIEWER: If respondent gives an answer that is not on the card, please refer to the box below:

INTERVIEWER RECORD NUMBER OF EACH TYPE OF DRINK:

(Never drink alcohol Monday to Thursday)	555
(Don't know)	888

NOTE ON ADMINISTRATION OF E7: Country specific question. Translation of the source question wording should be carried out as normal in all countries. Country specific answer categories and showcards will be developed in consultation with ESS ERIC HQ (ess@city.ac.uk). The interviewer guidance box referred to in the interviewer note will also be country specific and agreed during the consultation process. Responses for E7 will be recoded into grams of alcohol before data deposit. See separate adaptation guidelines for further information.

E8 **STILL CARD 46** Now please think about the last time you were drinking alcohol on a Friday, a Saturday or a Sunday.
INTERVIEWER PAUSE TO ALLOW RESPONDENT TO CONSIDER THE SHOWCARD.
How many of each of the following drinks did you have on that day?

INTERVIEWER PROBE: any other drinks?
INTERVIEWER: If respondent gives an answer that is not on the card, please refer to the box below:

INTERVIEWER RECORD NUMBER OF EACH TYPE OF DRINK:

(Never drink alcohol Friday to Sunday)	555
(Don't know)	888

NOTE ON ADMINISTRATION OF E8: Country specific question. Translation of the source question wording should be carried out as normal in all countries. Country specific answer categories and showcards will be developed in consultation with ESS ERIC HQ (ess@city.ac.uk). The interviewer guidance box referred to in the interviewer note will also be country specific and agreed during the consultation process. Responses for E8 will be recoded into grams of alcohol before data deposit. See separate adaptation guidelines for further information.

SUB CONCEPT NAME: Binge drinking

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Binge drinking refers to the frequency of drinking 6 or more (females) or 8 or more (males) units of alcohol on a single occasion. Binge drinking does not include any further sub concepts, and it can be measured directly.

Expected relationship with other sub concepts

Frequency of alcohol consumption, quantity of alcohol consumption, and binge drinking are not necessarily positively correlated. The relationship between these sub-concepts differs across countries. In some countries (e.g., in Northern Europe), binge drinking is relatively high whereas the frequency of alcohol consumption is relatively low. In Southern Europe, we observe the opposite pattern. Typically, people with a pattern of binge drinking usually have a low rather than high frequency of alcohol consumption. Therefore, the three sub-concepts represent truly different dimensions of alcohol consumption, rather than strongly interrelated items within a general internally consistent dimension of alcohol use.

Question wording:

E9 INTERVIEWER CODE:

Respondent is male	1	**ASK E10a**
Respondent is female	2	**GO TO E10b**

ASK IF CODE 1 AT E9

E10a **CARD 47a** This card shows six different examples of how much alcohol a person might drink on a single occasion.
INTERVIEWER PAUSE TO ALLOW RESPONDENT TO CONSIDER THE SHOWCARD.
In the last 12 months, how often have you drunk this amount of alcohol or more on a single occasion? Was it... **READ OUT...**

...daily or almost daily,	1	**GO TO E11**
weekly,	2	
monthly,	3	
less than monthly,	4	
or, never?	5	
(Don't know)	8	

ASK IF CODE 2 AT E9

E10b **CARD 47b** This card shows six different examples of how much alcohol a person might drink on a single occasion.
INTERVIEWER PAUSE TO ALLOW RESPONDENT TO CONSIDER THE SHOWCARD.
In the last 12 months, how often have you drunk this amount of alcohol or more on a single occasion? Was it... **READ OUT...**

...daily or almost daily,	1
weekly,	2
monthly,	3
less than monthly,	4
or, never?	5
(Don't know)	8

NOTE ON ADMINISTRATION OF E10a & E10b: Country specific questions. Translation of the source question wording should be carried out as normal in all countries. Country specific showcards will be developed in consultation with ESS ERIC HQ (ess@city.ac.uk). See separate adaptation guidelines for further information.

References for Alcohol consumption

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COMPLEX CONCEPT NAME: Fruit and vegetable consumption

Describe the concept in detail, outlining the various sub concepts it comprises

It is widely accepted that fruit and vegetables are important components of a healthy diet, and that their consumption help prevent a range of diseases. In particular, ischemic heart disease, ischemic stroke, colorectal cancer, stomach cancer, lung cancer, oesophagus cancer and mouth & pharynx cancer belong to the major causes of death that are related to low fruit and vegetable intake (Ezzati et al., 2003).

Empirical studies have analyzed fruit and vegetable consumption in a very detailed form. For example, they have analysed the effects of particular fruit and vegetable sorts on a specific cause of death, e.g. high intake of cruciferous vegetables such as broccoli, cabbage or cauliflower may substantially reduce bladder cancer risk (Michaud et al., 1999).

Recent work has focused on the promotion of healthy life style in schools among teenagers and adolescents. In a review study, Ammerman et al. (2002) collected 22 studies reporting results for fruit and vegetable intake measured as either servings per day or in other units, such as fruit and vegetable consumption scores. Seventy seven percent of the studies could observe a significant effect in increasing fruit and vegetable intake. The increasing evidence that consumption of fruit and vegetables decreases the risk of several chronic diseases has created a firm basis for policy initiatives. However, knowledge of the actual intake distribution is needed for the strategies to be set up properly.

Currently, no survey containing valid measures of social stratification has measured fruit and vegetable consumption in representative European populations.

Consumption is not limited to *fresh* fruit and vegetables but should exclude juices. Although general measures of fruit and vegetable consumption are almost exclusively analysed in combination, this is an opportunity to examine whether it is the combination of them (or mainly fruit or vegetables) that contributes to better health.

Prevalence is available from the European Health Interview Survey (EHIS):

FV01. How often do you eat fruits (excluding juice)?

Twice or more a day	20.9%
Once a day	39.8%
Less than once a day but at least 4 times a week	11.9%
Less than 4 times a week but at least once a week	17.4%
Less than once a week	7.4%
Never	2.6%
Don’t know	0.0%
Refusal	0.0%

FV02. How often do you eat vegetables or salad (excluding juice and potatoes)?

Twice or more a day	16.8%
Once a day	46.9%
Less than once a day but at least 4 times a week	15.4%
Less than 4 times a week but at least once a week	15.6%
Less than once a week	4.2%
Never	1.1%
Don’t know	0.0%
Refusal	0.0%

Expected relationship with other complex and simple concepts

Increased consumption of fruit and vegetables has been shown to be associated with a reduced risk of stroke in most epidemiological studies (He et al., 2006). In our case, this can be extrapolated into an expected association with heart disease. It may also be associated with physical inactivity, smoking, alcohol consumption, and high BMI (Pérez, 2002).

SUB CONCEPT NAME: Fruit consumption

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Fruit consumption is included because it is one of two items which together constitutes the most frequently applied measure of dietary intake (fruit and vegetable consumption) which has been shown to have beneficial effects on several health outcomes (see above).

Fruit consumption can be measured directly and no further sub concepts are necessary. Frozen fruits should be included but fruit juices should be excluded. After all, frozen fruits largely retain their nutritional value, and therefore have the same expected beneficial effects on the health outcomes as fresh fruits. For fruit juices, however, this is not necessarily true: although certain natural fruit juices may also have beneficial effects on our health outcomes, fruit juices often have high quantities of added sugars, which may make them less beneficial for our health outcomes. It would be difficult to distinguish reliably between healthy and less healthy varieties of fruit juice in the questionnaire.

Expected relationship with other sub concepts

It has not been possible to distinguish the separate effects of fruits and vegetables in our literature review. Although some reviews have looked at specific sorts of fruits and specific sorts of vegetables, we have not identified any studies that have collected all fruits and all vegetables separately. It seems that epidemiological studies consistently apply both fruit and vegetables in their analyses. It will therefore be interesting to examine whether there is a separate effect of both indicators, or if it is the combination of them which makes them so powerful.

We expect low fruit- and vegetable consumption to be associated with low socioeconomic position (more so in the North compared to the South, see Mackenbach et al., 2007), cancer and stomach pain (given associations with oesophagus cancer and stomach cancer, see EURO-GBD-SE project), and heart disease (Ezzati et al., 2003). It is also likely that we will see an association with high BMI (although this evidence is inconclusive – (see Azagba & Sharaf, 2012) and therefore also low levels of physical inactivity and diabetes because of their associations with BMI.

We also expect associations with poor self-rated health from the core module.

Question wording:

E1 **CARD 43** Using this card, please tell me how often you eat fruit, excluding drinking juice?
INTERVIEWER: Frozen fruit should be included.

Three times or more a day	01
Twice a day	02
Once a day	03
Less than once a day but at least 4 times a week	04
Less than 4 times a week but at least once a week	05
Less than once a week	06
Never	07
(Don't know)	88

SUB CONCEPT NAME: Vegetable consumption

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Vegetable consumption is included because it is one of two items which together constitutes the most frequently applied measure of dietary intake (fruit and vegetable consumption) which has been shown to have beneficial effects on several health outcomes (see above).

Vegetable consumption can be measured directly and no further sub concepts are necessary. Salads and frozen vegetables should be included but potatoes and vegetable juices should be excluded. After all, frozen vegetables largely retain their nutritional value, and therefore have the same expected beneficial effects on the health outcomes as fresh vegetables. For vegetable juices, however, this is not necessarily true: although certain natural vegetable juices may also have beneficial effects on our health outcomes, vegetable juices often have high quantities of added sugars and/or salt, which may make them less beneficial for our health outcomes. It would be difficult to distinguish reliably between healthy and less healthy varieties of vegetable juice in the questionnaire. In contrast to other vegetables, little research supports a positive link between potato consumption and health outcomes.

Expected relationship with other sub concepts

Refer to details under the ‘fruit’ sub-concept.

Question wording:

E2 **STILL CARD 43** Using the same card, please tell me how often you eat vegetables or salad, excluding potatoes?
INTERVIEWER: Frozen vegetables should be included.

Three times or more a day	01
Twice a day	02
Once a day	03
Less than once a day but at least 4 times a week	04
Less than 4 times a week but at least once a week	05
Less than once a week	06
Never	07
(Don’t know)	88

References for Fruit and vegetable consumption

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COMPLEX CONCEPT NAME: Health care utilization

Describe the concept in detail, outlining the various sub concepts it comprises

Socioeconomic differences in the use of health care services have been widely reported. People in a lower socioeconomic position are less likely to use preventive health services (Veugelers and Yip 2003). Moreover, they tend to be more intensive users of general practitioners, while higher socioeconomic groups report significantly more specialist contacts, even when taking into account the generally poorer health of lower socioeconomic groups (Droomers and Westert 2004; van Doorslaer et al. 2004; Mielck et al. 2007). A number of possible reasons for such disparities have been suggested, including systematic differences by socioeconomic position in interpretation of symptoms and perception of the need for health care (Adamson et al 2003). However, only a few studies have been conducted to analyse such differences. For example, in the Netherlands a lower educational level has been found to be associated with a higher tendency to consult a doctor (van der Meer and Mackenbach 1998), and in the US, lower socioeconomic groups were more likely to report that they would access medical care immediately in response to a clinical scenario (Adamson et al. 2003). It has also been shown with ESS data that there are systematic differences of people's health care seeking behavior between welfare states belonging to different welfare regimes (Grosse Frie et al., 2010).

The QDT has extensive experience in this field. For example, Johan Mackenbach coordinates the AMIEHS project jointly with the London School of Hygiene & Tropical Medicine, which aims to develop a 'new' list of indicators (causes of death) for which mortality rates are likely to reflect variations in the effectiveness of health care, with health care being limited to primary care, hospital care and personalized health services (see LSHTM home page: http://www.lshtm.ac.uk/).

Perception of need for seeking primary health care was part of a module on 'health and care seeking' in Round 2 of the ESS. It was measured by the reported tendency to consult a doctor in case of four hypothetical symptoms (very sore throat, serious headache, serious sleeping problems and serious backache). Respondents were asked to whom they would go first for advice or treatment. For every symptom there were eight answer categories: (1) nobody, (2) friends or family, (3) pharmacist/chemist/drugstore, (4) doctor, (5) nurse, (6) the internet/web, (7) a medical helpline and (8) other practitioner. Adding to our knowledge about the reversed social gradients with respect to GP and specialist seeking behavior, one question should therefore also be added as to whether the respondent has been treated by a specialist the last year. However, this question only reflected health care use in hypothetical scenarios (Grosse Frie et al. 2010). To advance this, we propose asking about self-reported experiences of actual visits and hospitalizations. We therefore suggest drawing upon key questions from the European Community Household Panel (ECHP), by asking about hospital admissions, the number of visits to a general practitioner or medical specialist over the previous 12 months, which we know have important variations in OECD countries (van Doorslaer et al. 2006).

The key distinction for Round 7 is between secondary and primary care. The module will try to capture social inequalities in health care utilization (there are likely to be different patterns with regards specialist health care and generalist health care). There may be large cross national differences in means of accessing health care (especially specialists). For example, in many countries people can only access a specialist with a referral from a generalist practitioner. In other countries people can access a specialist directly.

Expected relationship with other complex and simple concepts

Socioeconomic differences in the use of health care services have been widely reported. People in a lower socioeconomic position are less likely to use preventive health services (Veugelers and Yip 2003). Moreover they tend to be more intensive users of general practitioner while higher socioeconomic groups report significantly more specialist contacts, even when taking into account the generally poorer health of lower socioeconomic groups (Droomers and Westert 2004 van Doorslaer et al. 2004; Mielck et al. 2007).

SUB CONCEPT NAME: Access to healthcare

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

While we expect actual utilisation of health care to be the most important determinant of health inequalities in the module, measures concerning access to health care (including affordability, trust or geographical distance) are also of interest.

The concept of “unmet need” may also be useful to measure variations in access. EU-SILC 2007 (Baert & De Norre, 2009) included the following question: “Was there any time during the last twelve months when, in your opinion, you personally needed a medical examination or treatment for a health problem but you did not receive it?” A follow-up question asked for perceived reason for the unmet need.

Direct questions on whether respondents have private health insurance and their geographical location (urban versus rural residence, to estimate availability of physicians) could also be useful in research on social inequalities in health care utilisation. The suggestion of asking a direct question on whether respondents have private health insurance has been discussed. It was felt that this could be a sensitive question in some countries where private health insurance is a legal requirement. In some countries the term ‘private’ may be complicated for some respondents, as there may be a hybrid public/private insurance system. It was agreed that this issue could be covered instead with contextual data.

Useful contextual data include number of doctors per 1000 population in various countries and regions. Other data of interest would be average levels of out-of-pocket expenses for the various services compared to average levels of income, the national prevalence of private health insurance, the availability of universal health care in a given country and whether there is ‘gate-keeping’ for secondary care.

Expected relationship with other sub concepts

Financial and geographical access to health care is expected to mediate the use of primary and secondary health services.

Question wording:

E14 **CARD 49** In the last 12 months, that is since [**MONTH, YEAR**], were you ever unable to get a medical consultation or the treatment you needed for any of the reasons listed on this card? **INTERVIEWER: Refer to the same month as the interview but of the previous year. For example, if the interview takes place in September 2014, use [September 2013].**

Yes	1	**ASK E15**
No	2	**GO TO E16**
(Don’t know)	8	

ASK IF CODE 1 AT E14

E15 **STILL CARD 49** Which of the reasons on the card explains why you were unable to get this medical consultation or treatment?

CODE ALL THAT APPLY.
INTERVIEWER PROBE: ‘Any others’?

Could not pay for it	01	**GO TO E17**
Could not take the time off work	02	
Had other commitments	03	
The treatment you needed was not available where you live or nearby	04	
The waiting list was too long	05	
There were no appointments available	06	
Other **(WRITE IN)**__________________________	07	
(Don’t know)	88	

ASK IF CODE 2 OR 8 AT E14
E16 Was that because...**READ OUT...**

... you were able to get any medical consultation or treatment you needed,	1
or, you did not need a medical consultation or treatment in the last 12 months?	2
(Don’t know)	8

SUB CONCEPT NAME: Use of alternative health care

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

According to an article in JAMA (Eisenberg et al., 1998) 42 percent of the US population used at least one alternative therapy in 1997. Use was more frequent among women than men (49 percent vs. 38 percent), and was most frequent (50 percent) in the 36-49 year age bracket. The use was higher in those with college education (51%) and with higher incomes. The authors note that the high use of alternative medicine is occurring in the setting of low insurance coverage. Still, the few studies available suggest that use of alternative medicine is more frequent in higher social classes, which is a similar relationship as observed for use of medical specialists.

Expected relationship with other sub concepts

A number of studies demonstrate that there are marked differences in both the demographic characteristics and health conditions of users of alternative medicine and non-users. A Canadian review (Wiles & Rosenberg, 2001) suggests that those with a higher level of education, particularly some college education, are also more likely to utilise alternative services (Astin, 1998; Eisenberg et al (1993;1998); Goldstein and Glik, 1998; Kelner and Wellman, 1997a-b; Kitai et al., 1998). The gradation for increasing education appears to be stronger for women (Millar, 1997).

There are a number of potential reasons for the importance of education, such as exposure to non-traditional forms of health in the course of education/reading or that patients educate themselves about illnesses and variety of possible treatments (Astin, 1998). Although users of alternative medicine may be better educated on average, it does not necessarily follow that they are better informed about the efficacy of alternative forms of treatment (Goldstein and Glik, 1998). It may also be that highly educated individuals are more willing to question the authority of conventional practitioners, and opt for alternative medicine.

Question wording:

ASK ALL

E19 **CARD 52** In the last 12 months, that is since [**MONTH, YEAR**], which of the treatments on this card have you used for your own health?
INTERVIEWER: Refer to the same month as the interview but of the previous year. For example, if the interview takes place in September 2014, use [September 2013].
PROBE: Which others?
CODE ALL THAT APPLY

Acupuncture	01
Acupressure	02
Chinese medicine[18]	03
Chiropractics	04
Osteopathy	05
Homeopathy	06
Herbal treatment	07
Hypnotherapy	08
Massage therapy	09
Physiotherapy	10
Reflexology	11
Spiritual Healing	12
(None of these)	55
(Don't know)	88

SUB CONCEPT NAME: Consultation of general practitioner

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

In a study by Van Doorslaer et al 2006 mainly using recent ECHP data, the mean number of GP visits ranged from about 2.1 (Greece) to about 5.2 visits (Germany). In the same study, prevalence of GP visits in the past year ranged from about 54% in Greece to about 87% in Belgium (Van Doorslaer et al. 2006).

Expected relationship with other sub concepts

Recent international studies have generally found general practitioner utilization to be equitably distributed by education (Stirbu et al 2011) and income (Van Doorslaer et al 2006) in European countries, adjusting for available measures of need (self-reported health status and age). Higher unadjusted utilisation of GP consultations is expected in low SES groups due to poorer health status.

Question wording:

E13 **CARD 48** In the last 12 months, that is since [**MONTH, YEAR**], with which of the health professionals on this card have you discussed your health?
INTERVIEWER: Refer to the same month as the interview but of the previous year. For example, if the interview takes place in September 2014, use [September 2013].
CODE ALL THAT APPLY.
INTERVIEWER PROBE: 'Any other'?
INTERVIEWER: include any form of communication and home visits.

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[18] meaning traditional Chinese Medicine not other forms of Asian medicine

	General Practitioner[19]	1
	Medical Specialist (excluding dentists)	2
	(None of these)	5
	(Don’t know)	8

SUB CONCEPT NAME: Consultation of medical specialist

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

A medical specialist is a doctor whose practice is limited to certain groups of patients, diseases or treatments. Treatment by medical specialists is considered secondary care, as opposed to primary care, and is treated as distinct from specialist care received while hospitalised. ‘Consultation during hospitalisation’ is excluded to avoid overlap with hospitalization, which is a separate sub-concept. Dentists should not be included. Examples of specialists are orthopedist / orthopedic surgeons, cardiologist allergologist, or pneumologist. Here is a much more extensive list: http://www.webmd.com/a-to-z-guides/medical-specialists-medical-specialists (WebMD, 2012).

In a study by Van Doorslaer et al 2006 concerning a group of OECD countries, the mean number of specialists visits in the past year ranged from about 0.5 (Ireland) to about 3.3 (Germany). In the same study, prevalence of specialist visits ranged from about 22% (Ireland) to about 64% (Austria).

Expected relationship with other sub concepts

Recent international studies have generally found medical specialist utilisation to be distributed in favour of high SES (Stirbu et al 2011, Van Doorslaer et al 2006) in European countries, adjusting for available measures of need (self-reported health status and age). Higher unadjusted utilisation of medical specialists in low SES groups is possible due to poorer health status in these groups.

Question wording:

See question wording for E13 (Consultation of general practitioner) above – same question wording used to capture Consultation of a medical specialist.

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COMPLEX CONCEPT NAME: Dimensions of mental wellbeing

Describe the concept in detail, outlining the various sub concepts it comprises

Mental health problems are a major public health issue. Worldwide depression is becoming one of the most important illnesses. Mental health is a considerable element of general well-being and quality of life. Moreover, psychological discomfort means not only personal suffering, but also has a significant impact on the immediate environment (such as relationships with partner or children) and the society. Mental health problems also have a major economic cost. Mental health complaints are a major cause of absenteeism and declining productivity at work (Lerner et al., 2004;Lerner & Henke, 2008). In addition, the total expenditures for psychotropic drugs and mental healthcare use have risen in most industrialized countries (Amin, 2012; Cassano & Fava, 2002; Casteels et al., 2010; Hermans, De Witte, & Dom, 2012).

On the one hand, people are worried about this increase of psychotropic (or psychoactive) drugs use and the prominent role of medication in mental health treatment. They often refer to the increasing medicalization of unhappiness and therefore the expansive treatment with antidepressants (Conrad, 2005, 2007). On the other hand, there is still unmet need and limited access to medical treatment of mental health problems in some at-risk populations. Not only in physical health, but also in mental health and mental health care use, there are social inequalities, both nationally as internationally (Empereur, Baumann, Alla, & Briancon, 2003; Olfson & Marcus, 2009).

Expected relationship with other complex and simple concepts

Marital status- The majority of the studies have shown the detrimental effects of divorce on mental health, with the divorced experiencing higher levels of depression, stress, and fear (Amato, 2000; Diener, Gohm, Suh, & Oishi, 2000; Wade & Cairney, 2000; Wade & Pevalin, 2004; Strohschein, McDonough, Monette, & Shao, 2005; Kalmijn & Monden, 2006).

Age- It is very well known that mental health problems increase with age. This increase is reflected in the use of care (Koopmans & Lamers, 2006). However, when we examine health care use, controlling for mental health status, the results of the influence of age are less consistent. The findings often depend on the age range of the sample.

Income- Research has already indicated that people with high incomes more often use specialized care, while those with low incomes more often contact a GP (Alegria, Bijl, Lin, Walters, & Kessler, 2000; Gouwy, Christiaens, & Bracke, 2008; Vasiliadis, Tempier, Lesage, & Kates, 2009).

Education- Research has observed that mainly the highly educated tend to contact specialized professional help, while the less educated more often use GP consultations (Alonso, 2004 et al.; Bijl & Ravelli, 2000; Gouwy et al., 2008; Svensson, Nygard, Sorensen, & Sandanger, 2009; Ten Have, Oldehinkel, Vollebergh, & Ormel, 2003; Tijhuis, Peters, & Foets, 1990; Vasiliadis et al., 2009).

Employment status- There are conflicting findings regarding the relationship between employment status and mental healthcare use. Some studies show that unemployed people are less likely to seek professional help when faced with depressive symptoms (Alonso et al., 2007; Gouwy et al., 2008), while other studies indicate a higher use of care among the unemployed (Bebbington et al., 2000; Bijl & Ravelli, 2000; Cairney & Wade, 2002; Isacson & Haglund, 1988).

SUB CONCEPT NAME: Depressive Feelings

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Depression is a major public health issue. This item is intended to measure feelings of depression using a single item. For the operationalization of depressive feelings, the first item of the 8-item version of the Centre of Epidemiological Studies Depression Scale (CES-D scale) (Radloff, 1977) is used. The wording below is the same used in E8 in ESS Round 3 and D5 in ESS Round 6.

Expected relationship with other sub concepts

When studying social inequalities in medical treatment for mental health problems, it is very important to take indicators of mental health status into account and to pay attention to gender differences. The differential expression hypothesis and stress theory argue that men externalize and women internalize stress and emotional problems (Cotton, Wright, Harris, Jorm, & McGorry, 2006; Dohrenwend & Dohrenwend, 1976). When both depressive feelings and the consumption of alcohol are used as indicators of mental health, this gendered expression of mental health problems should be taken into account.

To account for the co-morbidity between mental and physical health, subjective health is included as an additional indicator. Self-rated health is widely used as an indicator of need because it has a good prognostic value (Idler & Benyamini, 1997), even for mental health (Thielke, Diehr, & Unutzer, 2010).
Alcohol consumption and general health are already included in the questionnaire.

Question wording:

CARD 53 I will now read out a list of the ways you might have felt or behaved during the past week. Using this card, please tell me how much of the time during the past week…**READ OUT…**[20]

		None or almost none of the time	**Some of the time**	**Most of the time**	**All or almost all of the time**	**(Don't know)**
E20	…you felt depressed?	1	2	3	4	8
E21	…you felt that everything you did was an effort?	1	2	3	4	8
E22	…your sleep was restless?	1	2	3	4	8
E23	…you were happy?	1	2	3	4	8
E24	…you felt lonely?	1	2	3	4	8
E25	…you enjoyed life?	1	2	3	4	8
E26	…you felt sad?	1	2	3	4	8
E27	…you could not get going[21]?	1	2	3	4	8

SUB CONCEPT NAME: Sleep Quality

Describe the first sub concept in detail outlining any further sub concepts or specifying that it can be measured directly

Sleep complaints are a common symptom in the general adult population and have been frequently observed in lower SES individuals. White-collar workers report better sleep than blue-collar workers, in terms of the difficulty in falling asleep, waking up frequently in the night and early morning

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[20] The same translation for this battery should be used as in D5-D12 in ESS6.

[21] 'could not get going' in the sense of 'felt lethargic and lacked motivation'.

awakening. Individuals from disadvantaged social classes are more likely to have sleep disturbances.

During periods of severe economic recession in Finland, blue-collar workers were more likely to suffer from sleep problems than white-collar workers.

Previous research suggests that social inequalities in sleep could influence, in part, social inequalities in physical and, in particular, mental health (Sekine et al. 2006). Furthermore, among various aspects of sleep, quality aspects of sleep (i.e. subjective sleep quality, sleep latency and sleep disturbances) contributed more to the reduction in social inequalities in health than quantity aspects of sleep (i.e. sleep duration). Therefore, this module focuses rather on quality of sleep than on quantity.

Poor sleep quality includes difficulty in falling asleep, waking up frequently in the night and early morning awakening.

The item measuring sleep quality is included in the 8-item version of the Centre of Epidemiological Studies Depression Scale (CES-D scale) (Radloff, 1977), see above.

Expected relationship with other sub concepts

Although there have been relatively fewer studies on the impact of poor sleep quality on health, significant associations of sleep quality with physical and mental health have been observed. In addition, there is some evidence that sleep quality has a stronger impact on health than sleep quantity. Individuals of low socioeconomic status (SES) are likely to have poor sleep and poor health. Sleep quality may mediate the relationship between SES and physical and, in particular, mental health in men.

Question wording:

Please refer to question wording for E22 under the sub-concept ‘Depressive Feelings’ (above).

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SIMPLE CONCEPT NAME: Smoking

Describe the concept in detail

Tobacco is widely recognized as one of the most prominent causes of morbidity and premature mortality in Western Europe and North America. Each year, tobacco is responsible for approximately one fifth of all deaths (Danaei et al., 2009). Tobacco smoking is associated with an elevated risk of ischemic heart disease, hypertension, cardiovascular diseases, respiratory diseases, and multiple forms of cancer. Additionally, passive smoking (i.e., inhalation of smoke) is related to a heightened risk of lung cancer.

Although the association between smoking and morbidity and mortality is well-established, less is known about the social determinants of smoking, and variation in smoking behaviour across European countries. A study by Cavelaars et al. (2000) demonstrated that there are marked differences across Europe in the prevalence of smoking, as well as educational differences in smoking behaviour. This implies that smoking is strongly driven by social and cultural determinants. Most notably, differences in the prevalence of smoking between educational groups appeared to be particularly large in Northern Europe, and smallest in Southern Europe. Among Southern European women, the higher educated even appeared to smoke more than the lower educated. An article examining the trend in the educational gradient in smoking between 1985 and 2000 revealed that in most European countries the educational differences in smoking converge towards the pattern observed in the Northern European countries (Giskes et al., 2005). This implies that an increasingly selective group of Europeans from the lower socioeconomic strata will be affected by smoking-related diseases in the next few decades.

However, this earlier work on the social determinants of smoking in Europe was based on data that were not fully comparable; information on both smoking behaviour and the social background of respondents was collected through different survey questions and through different sampling designs. Moreover, most studies only included data from a limited number of Western European countries. In order to achieve an adequate and comprehensive comparison of smoking behaviour and the social determinants of smoking across Europe, it is crucial to gather comparable data on a large number of countries in both Western and Eastern Europe simultaneously.

Additionally, examining smoking behaviour in a large number of European countries would allow researchers to investigate the impact and effectiveness of smoking-related policies. Recently, several European countries have implemented smoking bans in public places. Furthermore, strong efforts have been made to keep youngsters from starting smoking (e.g. by obliging cigarette producers to place warnings on cigarette packs, and by increasing taxes on tobacco), and to encourage adults to quit smoking (e.g. by large media campaigns). By comparing multiple European countries, scholars will be able to assess the impact of these policies on smoking behaviour.

In sum, given the large impact of tobacco smoking on morbidity and mortality, and the considerable insights that could be gained from comparing the social determinants of smoking across a large number of European countries, we include measures of smoking behaviour in the new module on the social determinants of health for the ESS. ‘Years of smoking’ is not included in the module, given the space limitations. The most important issue is whether the respondent smokes and how much. Second hand smoke (passive smoking) is also an important policy concern but is a problematic item to formulate to capture the different environments that we would want respondents to include. It is felt that it would not be feasible to measure passive smoking accurately, comprehensively, and comparably within the scope of this module.

Question wording:

E4 **CARD 44** Now thinking about smoking cigarettes. Which of the descriptions on this card best describes your smoking behaviour?
INTERVIEWER: Include rolled tobacco but not pipes, cigars or electronic cigarettes.

I smoke daily	1	**ASK E5**
I smoke but not every day	2	
I don’t smoke now but I used to	3	**GO TO E6**
I have only smoked a few times	4	
I have never smoked	5	
(Don’t Know)	8	

ASK IF CODE 1 OR 2 AT E4

E5 How many cigarettes do you smoke on a typical day?

WRITE IN NUMBER OF CIGARETTES: ☐☐☐

(Don’t know) 888

References for Smoking

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SIMPLE CONCEPT NAME: Activity and Participation Limitations

Describe the concept in detail

Many people worldwide live with a disability, i.e. limitations in functioning. Overall prevalence is expected to increase due to demographic change and the growing importance of non-communicable disease and injury (Dans, A., 2011). To date, many epidemiological studies have used simple dichotomous measures of disability, even though the WHO's International Classification of Functioning, Disability, and Health (ICF) provides a multi-dimensional framework of functioning (WHO, 2011; Reinhard et al. 2013). The International Classification of Functioning, Disability, and Health (ICF) has rapidly become a guiding model for disability research and a key tool for both population-based and clinical understanding of disability (Badley, 2008). The ICF comprises a biopsychosocial model in which a person's functioning and disability is conceived as a dynamic interaction between health conditions and both environmental and personal contextual factors. The ICF provides a conceptual framework linking these components, together with classification schemes for environmental factors and for the two components of functioning and disability: (a) body functions and structures, and (b) activities and participation. The ICF defines ‘activity’ as the execution of a task or action by an individual, and ‘participation’ as involvement in life situations.

Expected relationship with other complex and simple concepts

Being in paid employment, having higher education or higher income is associated with lower levels of activity and participation limitation (Koukouli, et al. 2002; Reinhardt et al. 2011; Altmets, K. et al. 2011). Stronger social network utilization is also related to lower levels of A&P limitation, which is consistently observed across age groups.

ESS Core Question wording:

C8 Are you hampered[22] in your daily activities in any way by any longstanding illness, or disability, infirmity or mental health problem? **IF YES**, is that a lot or to some extent?

Yes a lot	1
Yes to some extent	2
No	3
(Don't know)	8

References for Activity and Participation Limitations

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SIMPLE CONCEPT NAME: Quality of housing

Describe the concept in detail

Poor housing conditions are associated with a wide range of health conditions, such as breathing problems (infections, asthma), injuries, and mental health.

The association between housing conditions and physical and mental ill health is well established. Specific housing-related factors that can affect health outcomes (reviewed by Bonnefoy et al., 2004) include: Agents that affect the quality of the indoor environment such as indoor pollutants (e.g. asbestos, carbon monoxide, radon, lead, moulds and volatile organic chemicals); cold, damp, housing design or layout (which in turn can affect accessibility and usability of housing), infestation, hazardous internal structures or fixtures, noise. There are also factors relating more to the broader social and behavioural environment such as

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[22] 'Hampered' = limited, restricted in your daily activities.

overcrowding, sleep deprivation, neighbourhood quality, infrastructure deprivation (i.e. lack of availability and accessibility of health services, parks, stores selling healthy foods at affordable prices), neighbourhood safety and social cohesion. Other factors identified include those relating to the broader macro-policy environment such as housing allocation, lack of housing (i.e. homelessness, whether without a home or housed in temporary accommodation), housing tenure, housing investment, and urban planning. See *UK National Institute for Clinical Excellence (NICE) evidence briefing (2005) Housing and public health: a review of reviews of interventions for improving health* for further details.

The World Health Organization LARES (Large Analysis and Review of European housing and health Status) project involves eight European countries. The aims are to identify and compare the existing health risks associated with a number of housing conditions. Evidence is needed to support the development of housing policies that promote health and are environmentally sustainable. Preliminary results of this project indicate a clear association between mental health and housing quality (particularly depression, anxiety and stress).

Expected relationship with other complex and simple concepts

Poor housing is expected to have a negative effect on general self reported health. Health conditions can also impact on an individual's housing opportunities. Studies have also found an association between housing deprivation in childhood and higher rates of hospital admissions and increased morbidity and mortality in adult life (Marsh et al., 1999).

The available evidence on the relationship between housing and health is still insufficient to adequately describe the health impact of housing. The LARES in-depth analysis provides new evidence of links between the health of inhabitants and their housing conditions, with focus on:

- indoor air pollution
- the effect of cold homes and dampness
- noise effects
- domestic accidents.

Question wording:

****F14a CARD 61**[23] Do any of the problems listed on this card apply to your accommodation?
INTERVIEWER NOTE: Yes to any problems on the card should be coded 'Yes'.
If respondent has more than one home, they should think about the accommodation
where they spend most of their time.

Yes	1
No	2
(Don't know)	8

CARD 61:

Mould or rot in windows, doors or floors
Damp walls or leaking roof
Lack of indoor flushing toilet
Lack of bath and shower[24]
Overcrowding
Extremely hot or extremely cold

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[23] **NEW QUESTION:** PART OF ROUND 7 ROTATING MODULE ON HEALTH.

[24] 'lack of' in the sense of 'there is neither a bath nor shower'.

References for Quality of Housing

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SIMPLE CONCEPT NAME: Provision of unpaid care

Describe the concept in detail
Care-giving can have a detrimental effect on carers' emotional health (stress, depression, and exhaustion), social activities, leisure time, energy levels, family relationships and access to heath services (Hayes & Knox, (1984; Kerr and Smith, 2001; Scholte op Reimer et al, 1998). There is a lack of large scale quantitative research into the impact of unpaid care on specific aspects of carers' physical health, but there is some evidence of a negative effect of caring on general self-rated physical health (Greenwood et al, 2008; Haug et al, 1999). Analysis of UK Census data by Carers UK indicated substantially poorer self-reported general physical health amongst carers than non-carers (Carers UK, 2004). There has also been some research investigating the negative impact of caring on carers' sense of competence (measured by the 27 item Sense of Competence Questionnaire (SCQ), derived from the family-crisis model and the Burden Interview) - Scholte op Reimer et al, 1998. Assessing Needs of Care in European Nations, (ANCIEN) is a research project financed under the 7th EU Research Framework Programme. ANCIEN concerns the future of long-term care (LTC) for the elderly in Europe (http://www.ancien-longtermcare.eu/). The project uses data from Eurobarometer 67.3 (2007). Respondents are first asked if they, or someone they are close to, have "ever been in need of any regular help and long-term care over the last ten years". If so, they are asked to consider the experience "that affected [them] most" and to identify their relationship(s) to up to two people concerned (for example, their partner, parents or other relatives) (QA9). Respondents are identified as potential "informal carers" if they identify someone who has, or has had, a long-term care need and the person involved is or was a partner, parent, child, sibling, another relative, friend, acquaintance, colleague or neighbour (QA11). Potential informal carers are then asked "do you or did you personally get involved in helping this person?" A show card indicates a number of possible responses (with multiple answers possible), including: "you are/were not personally involved in helping this person"; visiting regularly to keep company; cooking and preparing meals; doing shopping; cleaning and household maintenance; taking care of finances and everyday administrative tasks; help with feeding; help with mobility; help with dressing; help with using the toilet; help in bathing or showering; organising professional care; none of these; and "others" (QA11). According to this study, prevalence of informal caring (help with one or more 'activities of daily living' tasks) is 14% on average across all ANCIEN countries. Prevalence ranges from just over 10% in Denmark to over 18% in Spain, Estonia and Lithuania. The questions below are adapted from a single item in the UK Census.
Expected relationship with other complex and simple concepts

Informal caring is associated with various demographic variables and varies by country. Prevalence of informal caring tends to be much higher in women, and increases with age. It is expected to be associated with poor self-reported general health.

Question wording:

ASK ALL

E17 **CARD 50** Do you spend any time looking after or giving help to family members, friends, neighbours or others because of any of the reasons on this card? Do not count anything you do as part of your paid employment. **INTERVIEWER NOTE: Yes to any of the reasons on the card should be coded 'yes'.**

Yes	1	**ASK E18**
No	2	**GO TO E19**
(Don't know)	8	

ASK IF CODE 1 AT E17

E18 **CARD 51** In general, how many hours a week do you spend doing this? Please use this card.
INTERVIEWER: If respondent spends different number of hours each week, they should answer thinking about the time they spend on average per week.

(Less than 1 hour a week)	55
1-10 hours a week	01
11-20 hours a week	02
21-30 hours a week	03
31-40 hours a week	04
41-50 hours a week	05
More than 50 hours a week	06
(Don't know)	88

References for Provision of unpaid care

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SIMPLE CONCEPT NAME: Physical activity

Describe the concept in detail, outlining the various sub concepts it comprises

Physical activity status has changed dramatically in the last decades. With economic and industrial development in the last century, physically demanding work became less common, and more sedentary (mostly sitting) jobs emerged. Insufficient physical activity is associated with a number of health outcomes, such as ischemic heart disease, breast cancer, colorectal cancer and diabetes as well as falls and osteoporosis, osteoarthritis, lower back pain and prostate cancer (Ezzati et al., 2005). The World Health Organization estimates that 3.3% of mortality and morbidity worldwide are caused by insufficient physical activity. Thus, at least 2 million deaths and 20 million disability-adjusted years of life (DALYs) could be prevented, given an effective promotion of physical activity (Bull et al. 2004).

However, data on physical activity are not easily available in many countries. Especially data on activities across the different domains of work, domestic, transport and leisure time are lacking. Thus, estimating the magnitude of negative health outcomes promoted by insufficient activity is difficult. An international comparison of activity status and related health outcomes is even more complicated, as comparable data is hardly available.

Physical activity was formerly described as “planned, structured and repetitive bodily movement done to improve or maintain one or more components of physical fitness”. (Stephens & Caspersen, 1994). However, this definition focussed only on activities outside the work or leisure time and is thought to be insufficient. Blair and colleagues found a positive effect of less intensive physical activities (e.g., Blair and Jackson 2001). Nowadays, efforts are undertaken to improve moderate intensive activities - cycling, quick walking or swimming - rather than focussing only on high intensity activities (Bull et al. 2004).

The International Physical Activity Questionnaire (IPAQ) is an instrument to assess total physical activity and sedentary behaviour (see also: http://www.ipaq.ki.se). It does not focus only on activity outside work but combines the domains of work, domestic, transport and leisure time. It was developed as a good measure of activity status as well as being internationally comparable. It is publically available and easy to implement into questionnaires. A long and a short version are available. The short version, containing 7 questions, is a good instrument to be implemented into international surveys and has shown good reliability and moderate criterion validity (Craig et al. 2003). Please refer to ‘Craig et al. (2003) International Physical Activity Questionnaire: 12-Country Reliability and Validity, *Medicine and Science in Sports and Exercise, Vol. 35*, No. 8, pp. 1381–1395’ for further information about how the IPAQ questions were developed. A further paper by Craig et al. (n.d.) (unpublished - Google documents link here) about the development of the IPAQ suggests that walking is an extremely important sub-concept. During the design process it was decided that the existing IPAQ questions were overly long, complicated and burdensome for respondents, so a simpler, more general question was implemented.

The measurement of physical activity in the module is not only important given the burden attributable to insufficient activity from a public health perspective, but also because levels of activity are socially, economically and culturally determined. The way physical activity relates to social, economic and employment variables is likely to differ across countries. In addition, policies meant to enhance physical activity might differ across Europe. Through cross-nationally comparative data on physical activity, researchers should be able to examine how policies related to physical activity may have an impact on overall level of activity.

Expected relationship with other complex and simple concepts

We expect physical (in)activity to be associated with lower socioeconomic position, obesity, diabetes, heart disease, and poor self-rated health from the core module (Kurtze, Eikemo & Kamphuis 2013) and asthma (Clark & Cochrane, 1999).

Question wording:

E3 On how many of the last 7 days did you walk quickly[25], do sports or other physical activity for 30 minutes or longer?
INTERVIEWER: To be included, physical activity does not have to have been continuous.

WRITE IN NUMBER OF DAYS: ☐☐

(Don't know) 88

References for Physical activity

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[25] 'walk quickly' in the sense of 'walk briskly'.

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