PRIMARY CARE AND EQUITY: A MULTI-LEVEL PERSPECTIVE IN 31 EUROPEAN COUNTRIES

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"Begin at the beginning," the King said gravely, "
and go on till you come to the end; then stop."

-- Lewis Carroll, *Alice in Wonderland*

aan Mama en Oma

Primary care and equity: a multi-level perspective in 31 European countries

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Jens Detollenaere

Submitted to the Faculty of Medicine and Health Sciences in fulfilment of the requirements for the degree of Doctor in Health Sciences

Ghent 2017

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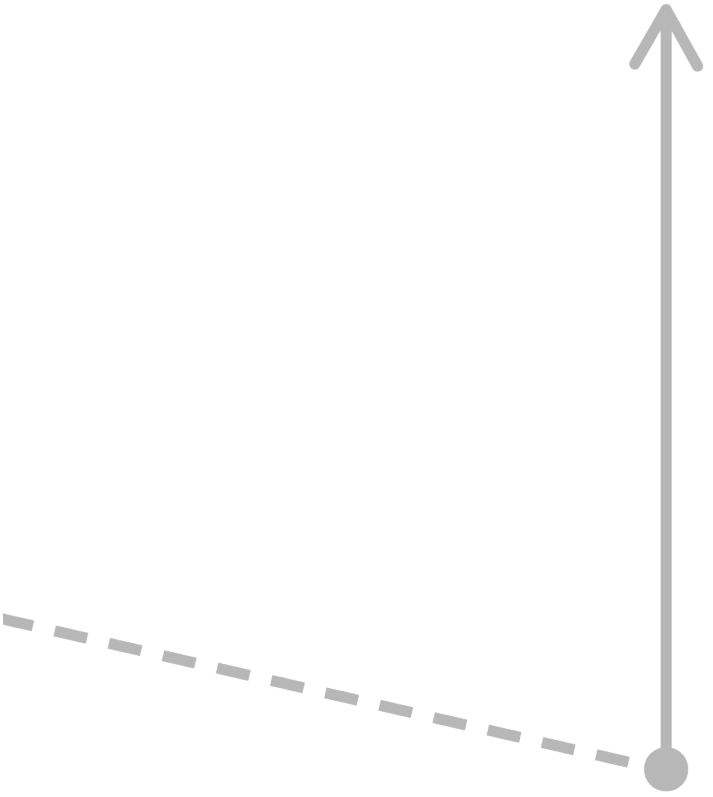
Acronyms and abbreviations

CDC	Centers for Disease Control and Prevention
CI	Confidence interval
COPD	Chronic Obstructive Pulmonary Disease
EC	European Commission
ED	Emergency department
ELINET	European Literacy Policy Network
EU	European Union
EXPH	Expert Panel on effective ways of investing in Health
GP	General practitioner
ICC	Intraclass correlation coefficient
IM	Infant mortality
ISCED	International Standard Classification of Education
LE	Life expectancy
MW	Mental wellbeing
OECD	Organisation for Economic Cooperation and Development
OR	Odds ratio
PC	Primary care
PHAMEU	Primary Health Care Activity Monitor for Europe
QUALICOPC	Quality and Costs of Primary Care in Europe
SE	Standard error
SES	Socioeconomic status
SRH	Self-rated health
UN	United Nations
VPC	Variance partition coefficient
WHO	World Health Organization

SUMMARY



Summary

A large body of literature provides evidence for beneficial effects of strong primary care on several health-related outcome measures. However, evidence on the association between this primary care strength and inequity in health and health care is inconclusive. Barbara Starfield associated the strength of a country's primary care system with more equity in that particular country, focusing on high-income countries. However, several critics argue that the results of her research are not necessarily transferable to the European context. Therefore, in 2009-2010, the European Commission ordered the development of the Primary Health Care Activity Monitor for Europe (PHAMEU), which measures the strength of primary care systems in the European context. This monitor makes a distinction between strength at the structure level (containing the governance, economic conditions, and workforce development dimensions) and at the process level (containing the access, continuity, coordination, and comprehensiveness dimensions). The association between European primary care strength as operationalised by PHAMEU and inequity in health seemed to be ambiguous. On the one hand, several dimensions of primary care strength are associated with lower inequity in self-rated health. On the other hand, no significant association between the dimensions of primary care strength and inequity in the prevalence of diseases such as diabetes and COPD. Consequently, the researchers recommended more in-depth research to disentangle the complex association between primary care strength and inequity in health and health care, preferably by combining macro level data on primary care strength with data from the meso and micro levels.

The dissertation partly fills this gap in the knowledge base regarding the association between primary care strength and equity in health and health care by merging data on the macro, meso, and micro level. The concrete research questions and hypotheses addressed in this doctoral dissertation are summarised in **Chapter 2**. **Chapter 3** describes the study design and development of the Quality and Costs of Primary Care in Europe (QUALICOPC)- and PHAMEU database and the additional data collection at four EDs in Belgium, which are used to answer our research questions. Combining these two databases yields data concerning the primary care systems in 31 European countries on the macro, meso, and micro levels. By including both high- and low income countries,

and also small European countries, demonstrating a wide divergence in primary care organisational compositions, the variation of the countries studied is richer than those of previous research.

The analysis of these data, in view of testing our research hypotheses, forms the basis of the research papers comprised in **Chapter 4**. Seven quantitative papers were written. Four of these papers focus directly on the association between primary care strength and several outcomes related to inequity in health and health care. The other papers build on the insight that accessibility of primary care is crucial in view of equity in health and health care. One paper explores the role of general practitioners' (GPs) person-centred attitudes with respect to accessibility. Two final papers examine why (vulnerable) patients bypass the primary care system. These research papers resulted in the following five main findings.

1. **Particular primary care strength dimensions are associated with more equity in health and health care**

Following the recommendation of Kringos, we study the association between primary care strength and inequity in health and health care by merging multilevel data. In line with what was found by Kringos, the results of the analysis reveals that this association is less straightforward than theoretically expected. Primary care strength at the structure level is positively associated with outcomes such as lower income inequality in life expectancy and mental wellbeing, and less financially driven postponement of care while not significantly associated with income inequality in self-rated health and postponement of care. Furthermore, also the continuity dimension of the process level is significantly associated with various indicators of equity in health. On the other hand, the association between primary care strength and inequity in health and health care is more ambiguous when focussing on the coordination and comprehensiveness dimensions of strength. For these dimensions, positive as well as negative associations are found. We discuss the access dimension in the following main finding.

2. **The access dimension of primary care strength, in particular, is associated with equity in health and health care**

A general pattern throughout this dissertation is the recurring significant association between the accessibility of a country's primary care system and equity in health and

health care in this country. In particular, our analyses indicate that countries with a more accessible primary care system show lower financially driven postponement, less inequity in unmet needs, and less inequity in subjective health. This finding confirms the importance of ensuring equitable access to (primary) health care.

3. Access to primary care in Europe is still associated with patients' socioeconomic status and migration background

Based on the previous main finding, we measure the extent to which the accessibility of European primary care systems is distributed equally. Our results show that a large proportion of European inhabitants, especially those with a lower socioeconomic status or migration background, still indicate difficulties in accessing primary care. This shows that despite many European countries have universal (or near-universal) health coverage, a critical access problem in Europe remains. Furthermore, this doctoral thesis shows that there are still large between- and within-country differences regarding accessibility, which violates several human and social rights treaties.

4. Health (care) literacy is a major determinant of why vulnerable patients bypass the primary care system

In the following step, we focus on individual aspects of access to health care. By interviewing patients self-referring to the ED during working hours in Belgium, we identify the reasons why patients bypass the primary care system. We determine that most patients perceive their health problem as serious and/or requiring advanced diagnostic testing. In addition, one fifth of the interviewed patients report not knowing where else to go with their problem. The latter finding mirrors a deficit in health (care) literacy among patients. However, it is important that a deficit in health (care) literacy is seldom or never exclusively attributable to patients, health care professionals, or the health care system.

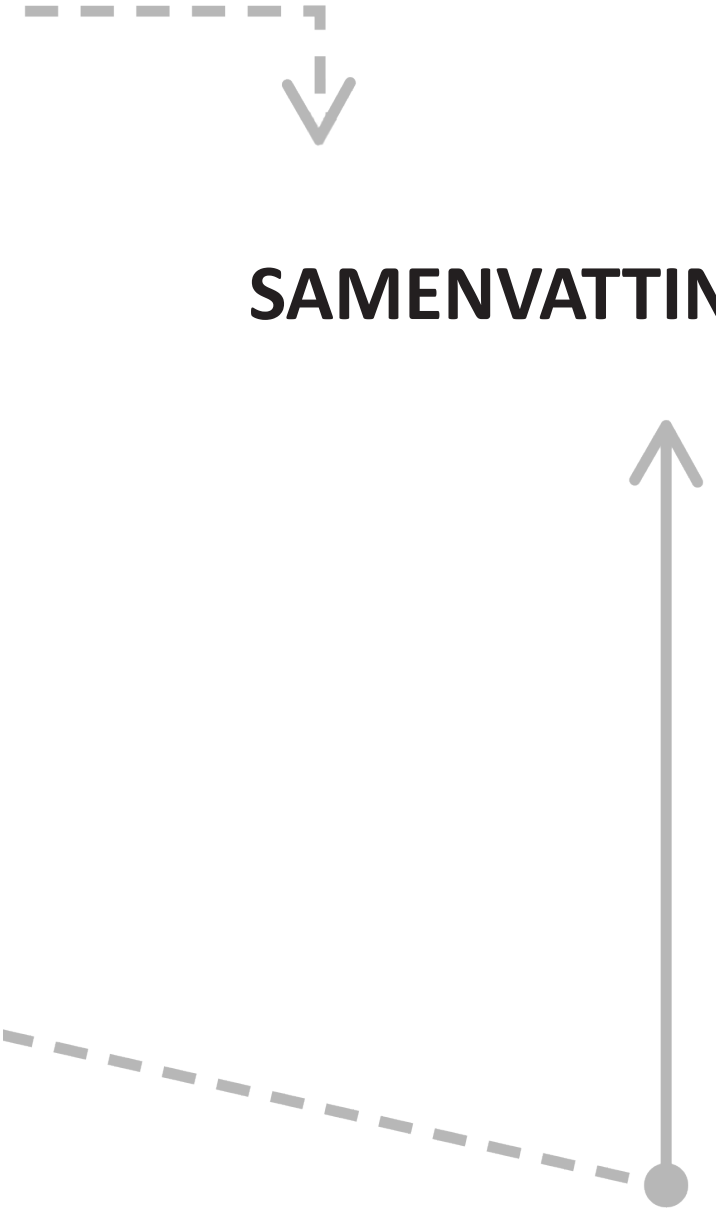
5. Person-centred GPs are associated with a lower social gradient in accessibility to primary care

As described in main finding 3, a significant amount of the variance in accessibility is attributable to GP (practice) characteristics. Therefore, we study the association between the person-centeredness of GP and accessibility to primary care and patient satisfaction. Our results show that a person-centred GP is associated with higher patient satisfaction

and less financially driven postponement of care, also in countries with weak or medium strong primary care system.

Besides their academic relevance, these main findings have several implications for current policy and practice discourse on primary health care in Europe. Three recommendations are key in this respect. First, policymakers should ensure equitable access to high quality (primary) health care, aligned with the need of all citizens in society. Second, interventions that address accessibility to health care should be complemented with the enhancement of health (care) literacy of a country's inhabitants. Finally, GPs in Europe can play an important role in providing equitable access to primary care, just by approaching their patients in a person-centred manner. In **Chapter 5** we discuss the policy relevance of this dissertation in more depth, together with some methodological reflections.

SAMENVATTING



Samenvatting

Een indrukwekkende hoeveelheid voorgaand onderzoek toont de positieve gezondheidsgerelateerde effecten van een sterke eerstelijnsgezondheidszorg aan. Wanneer het echter gaat om ongelijkheid[1] in gezondheid en gezondheidszorg gaat, kan geen eenduidige associatie met de sterkte van het eerstelijnsgezondheidszorgsysteem aangetoond worden. Barbara Starfield vond wat dat betreft dat een sterke eerstelijnszorg in een land geassocieerd is met meer gelijkheid binnen dat bepaalde land maar richtte zich daarbij enkel op landen met een hoog gemiddeld inkomen. Zodoende argumenteren verschillende bronnen dat de resultaten van haar onderzoek niet onmiddellijk generaliseerbaar zijn naar de Europese context. Op basis van deze kritiek liet in 2009-2010 de Europese Commissie de 'Primary Health Care Activity Monitor for Europe' (PHAMEU) ontwikkelen. Deze monitor brengt de sterkte van het eerstelijnsgezondheidszorgsysteem van 31 Europese landen in kaart. Binnen PHAMEU wordt de sterkte van de eerste lijn in een land bepaald door de mate van aanwezigheid van verschillende dimensies op het structuur- en procesniveau van de eerstelijnszorg. Het structuurniveau bestaat uit de volgende dimensies: sturing, economische randvoorwaarden en professionele ontwikkeling van de eerstelijnsgezondheidszorg. Het procesniveau wordt bepaald door de volgende vier dimensies: toegankelijkheid, continuïteit, coördinatie en uitgebreidheid van het aanbod binnen de eerste lijn. De resultaten van het onderzoek van Kringos over de associatie tussen de sterkte van het eerstelijnsgezondheidszorgsysteem volgens PHAMEU en ongelijkheid in gezondheid is ambigu. Aan de ene kant blijken uit haar onderzoek, zoals verwacht, bepaalde dimensies van een sterke eerste lijn positief geassocieerd met subjectieve gezondheid. Aan de andere kant vond ze geen significante associatie tussen een sterk eerstelijnsgezondheidszorgsysteem en ongelijkheid in de prevalentie van COPD en diabetes. Daarom was Kringos vragende partij voor toekomstig, diepgaander onderzoek gericht op de complexe associatie tussen de sterkte van het eerstelijnsgezondheidszorgsysteem en gelijkheid in gezondheid en gezondheidszorg. In het bijzonder riep Kringos op tot onderzoek aan de hand van gecombineerde data op het macro-, meso- en microniveau.

1 In de Engelstalige vakliteratuur wordt een onderscheid gemaakt tussen 'inequity' en 'inequality'. De Nederlandse taal laat, naar ons aanvoelen, niet toe dit etymologisch onderscheid te maken. Typisch worden beide woorden vertaald naar 'ongelijkheid'.

Dit doctoraal proefschrift bewandelt volledig het door Kringos uitgestippelde pad. De onderzoeksvragen en-hypotheses van dit proefschrift worden samengevat in **Hoofdstuk 2**. **Hoofdstuk 3** beschrijft het toegepaste onderzoeksdesign en de ontwikkeling van de gebruikte databanken: Quality and Costs of Primary Care in Europe (QUALICOPC) en PHAMEU. Door deze databanken te combineren is het mogelijk de eerstelijnsgezondheidszorg in 31 Europese landen op het macro-, meso-, en microniveau te kwantificeren en onze onderzoeksvragen te beantwoorden. De inclusie van zowel landen met een hoog gemiddeld inkomen als landen met een laag gemiddeld inkomen, zowel kleine als grote Europe landen, gekenmerkt door een brede divergentie in organisatorische modellen binnen de eerste lijn, zorgt ervoor dat onze variatie aan landen rijker is dan die in voorgaand onderzoek. Daarnaast verschaft dit hoofdstuk ook informatie rond de bijkomende dataverzameling op vier spoedgevallendiensten in België.

In **Hoofdstuk 4** worden de resultaten van dit proefschrift weergegeven. Aan de hand van zeven kwantitatieve artikels werden de onderzoeksvragen van dit doctoraat beantwoord. Vier artikels focussen daarbij rechtstreeks op de associatie tussen de sterkte van het eerstelijnsgezondheidszorgsysteem en verschillende uitkomsten die gerelateerd zijn aan ongelijkheid binnen gezondheid en gezondheidszorg. De andere artikels bouwen verder op het hierbij verworven inzicht dat in de eerste plaats een goede toegankelijkheid tot het eerstelijnsgezondheidszorgsysteem cruciaal is wanneer men ongelijkheid in gezondheid en gezondheidszorg wil aanpakken. Eén artikel exploreert wat dat betreft de rol van de persoonsgeoriënteerde attitude van de huisarts in de toegankelijkheid tot zorg. Ten slotte bestuderen twee artikels waarom (kwetsbare) patiënten de eerstelijnsgezondheidszorg omzeilen. Op basis van deze zeven onderzoeksartikels werden de volgende vijf kernbevindingen geformuleerd.

Naar aanleiding van de aanbeveling van Kringos et al., onderzoeken we in dit doctoraal proefschrift de associatie tussen sterke eerstelijnsgezondheidszorg en ongelijkheid in gezondheid en gezondheidszorg aan de hand van multilevel data. In lijn met Kringos' onderzoek, tonen de resultaten van onze analyses aan dat deze associatie minder eenvoudig is dan theoretisch verwacht. De sterkte van het eerstelijnsgezondheidszorgsysteem op het structuurniveau is positief geassocieerd met minder inkomensongelijkheid in levensverwachting en mentale gezondheid en minder uitstel van zorg omwille van financiële redenen. Echter, geen robuuste significante associatie tussen de sterkte

van het structuurniveau en uitkomstmaten zoals inkomensongelijkheid in subjectieve gezondheid en uitstel van zorg kan worden vastgesteld. Daarnaast is de continuïteitsdimensie van het procesniveau significant geassocieerd met verschillende indicatoren die gerelateerd zijn aan gelijkheid in gezondheid. De associatie tussen de coördinatie- en uitgebreidheidsdimensie van de sterkte van de eerstelijnsgezondheidszorg en ongelijkheid in gezondheid en gezondheidszorg is eerder ambigu. Voor deze dimensies werden zowel positieve als negatieve associaties gevonden. We gaan dieper in op de toegankelijkheidsdimensie van de sterkte van het eerstelijnsgezondheidszorgsysteem in de volgende kernbevinding.

1. **De toegankelijkheidsdimensie van sterke eerstelijnsgezondheidszorg is geassocieerd met meer gelijkheid in gezondheid en gezondheidszorg**

Een algemeen patroon doorheen dit doctoraal proefschrift is de terugkerende significante associatie tussen de toegankelijkheidsdimensie van sterke eerstelijnsgezondheidszorg enerzijds en gelijkheid in gezondheid en gezondheidszorg anderzijds. Onze analyses tonen aan dat landen met een toegankelijkere eerstelijnsgezondheidszorg minder uitstel van zorg (al dan niet omwille van financiële redenen), minder ongelijkheid in onvervulde zorgbehoeften en minder ongelijkheid in gezondheid kennen. Deze bevinding bevestigt het belang van het verzekeren van gelijke toegankelijkheid tot eerstelijnsgezondheidszorg en, bij uitbreiding, tot gezondheidszorg in het algemeen.

2. **Toegankelijkheid van de eerstelijnsgezondheidszorg in Europe is nog steeds geassocieerd met de socioeconomische status en migratieachtergrond van de patiënt**

Op basis van de voorgaande bevinding, gaan we na in welke mate Europa gelijke toegang tot zorg verschaft. De resultaten tonen aan dat een belangrijke proportie van de Europese burgers, in het bijzonder burgers met een lage socio-economische status of migratieachtergrond, nog steeds moeilijkheden ondervindt om toegang te krijgen tot de eerste lijn. Dit toont aan dat, ondanks het feit dat de meeste Europese landen universele (of quasi-universele) gezondheidsdekking verschaffen, Europa nog steeds kampt met een kritisch toegankelijkheidsprobleem tot gezondheidszorg. Daarnaast verstrekt dit doctoraal proefschrift evidentie voor het feit dat er nog steeds grote verschillen in toegankelijkheid tussen én binnen landen bestaat. Deze grote verschillen zijn

niet compatibel met de Mensenrechten en verschillende sociale en politieke rechten.

3. Gezondheids(zorg)vaardigheden zijn een belangrijke determinant waarom patiënten zich niet wenden tot de eerstelijnsgezondheidszorg

In de volgende stap focussen we op de individuele aspecten binnen toegang tot het gezondheidszorgsysteem. Aan de hand van vragenlijsten bij patiënten die zich binnen de kantooruren wenden tot Belgische spoedgevallendiensten zonder verwijzing van de huisarts, proberen we een zicht te krijgen op de redenen waarom bepaalde patiënten de eerstelijnsgezondheidszorg omzeilen. Op basis van ons onderzoek zien we dat de meeste patiënten dit doen omdat zij hun gezondheidsprobleem als dringend ervaren en/of gevorderde diagnostische tests vereist achten. Daarnaast geeft een vijfde van de respondenten aan niet te weten waar ze zich elders zouden moeten melden. Deze laatste bevinding geeft een tekort aan gezondheids(zorg)vaardigen weer. Desalniettemin is het belangrijk om te beseffen dat tekorten in gezondheids(zorg)vaardigen nooit exclusief te wijten zijn aan hetzij patiënten, gezondheidszorgverleners of het gezondheidszorgsysteem.

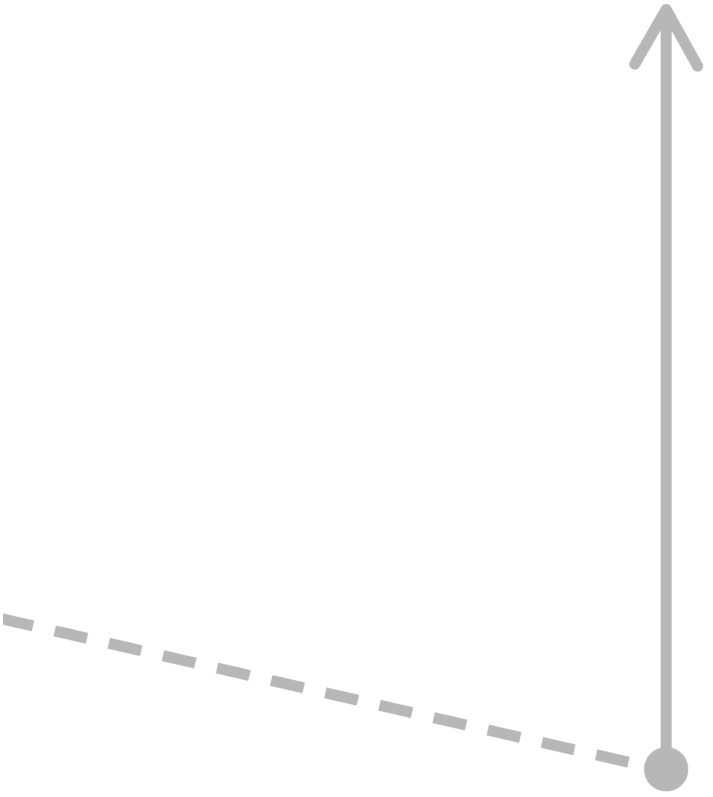
4. Persoonsgeoriënteerde huisartsen zijn geassocieerd met een lagere sociale gradiënt in toegankelijkheid tot de eerste lijn

Zoals beschreven in de derde kernbevinding, is een significante proportie van de variantie in toegankelijkheid tot de gezondheidszorg toe te schrijven aan huisarts(praktijk) karakteristieken. Daarom onderzoeken we ook de associatie tussen de persoonsgeoriënteerdheid van een huisarts en de toegankelijkheid tot zorg en patiënten-tevredenheid. De resultaten tonen aan dat een persoonsgeoriënteerde huisarts geassocieerd is met meer patiënten-tevredenheid en minder uitstel van zorg omwille van financiële redenen, zelfs in landen met een minder sterk eerstelijnsgezondheidszorgsysteem.

Naast hun academische relevantie, hebben de bevindingen van dit doctoraal proefschrift verschillende implicaties voor het huidige beleids- en praktijkdiscours rond eerstelijnsgezondheidszorg binnen Europa. In dit opzicht zijn drie aanbevelingen belangrijk. Ten eerste is het belangrijk dat beleidsmakers ervoor zorgen dat elke burger in overeenstemming met zijn (zorg)nood op een eenvoudige manier toegang krijgt tot de gezondheidszorg. Daarnaast moeten interventies die de toegankelijkheid verhogen gecomplementeerd worden met acties die gezondheids(zorg)vaardigheden uitbreiden.

Ten slotte kunnen Europese huisartsen door hun patiënten te benaderen op een persoonsgeoriënteerde manier de toegankelijkheid tot de gezondheidszorg minder ongelijk maken. In **Hoofdstuk 5** bediscussiëren we uitgebreider de relevantie van ons onderzoek voor beleid en praktijk, samen met enkele methodologische reflecties.

PROLOGUE



PROLOGUE

Inequity in health and health care is broadly documented in the existing literature (Black, 1982; Mackenbach et al., 2008; 2016; Marmot, 2005). To tackle this inequity, a wide range of interventions is proposed. One of these interventions is building a sustainable and strong primary care system (Van Lerberghe, 2008). Since the Alma Ata declaration in 1978 (World Health Organization, 1978), strengthening primary care has been prioritised to deal with specific challenges on the demand side (e.g. increasing complexity of health needs) and supply side (e.g. rising health care costs) in society.

Primary care is defined as the entry level of the health care system, providing accessible, comprehensive care in an ambulatory setting to patients in their own context on a continuous basis. In addition, primary care coordinates patients' care processes across the health care system (Starfield, 1994). Primary care is delivered through a wide range of health care professionals such as GPs[1], nurses, pharmacists, physiotherapists, psychologists, dieticians, optometrists, occupational therapists, dentists, and social workers (EXPH, 2014; Kringos et al., 2010). International evidence, mainly based on the work of Barbara Starfield, shows that stronger primary care results in better overall health outcomes of the country's citizens at lower costs (Macinko, Starfield & Shi, 2003; Starfield, Shi & Macinko, 2005).

However, research-based evidence on the relationship between the strength of primary care and (equity in) health outcomes is mainly based on US data. The exceptional studies on the European Union (EU) situation are limited to single-country studies or those based on a particular set of high-income countries, meaning their results are not necessarily generalizable to Europe.

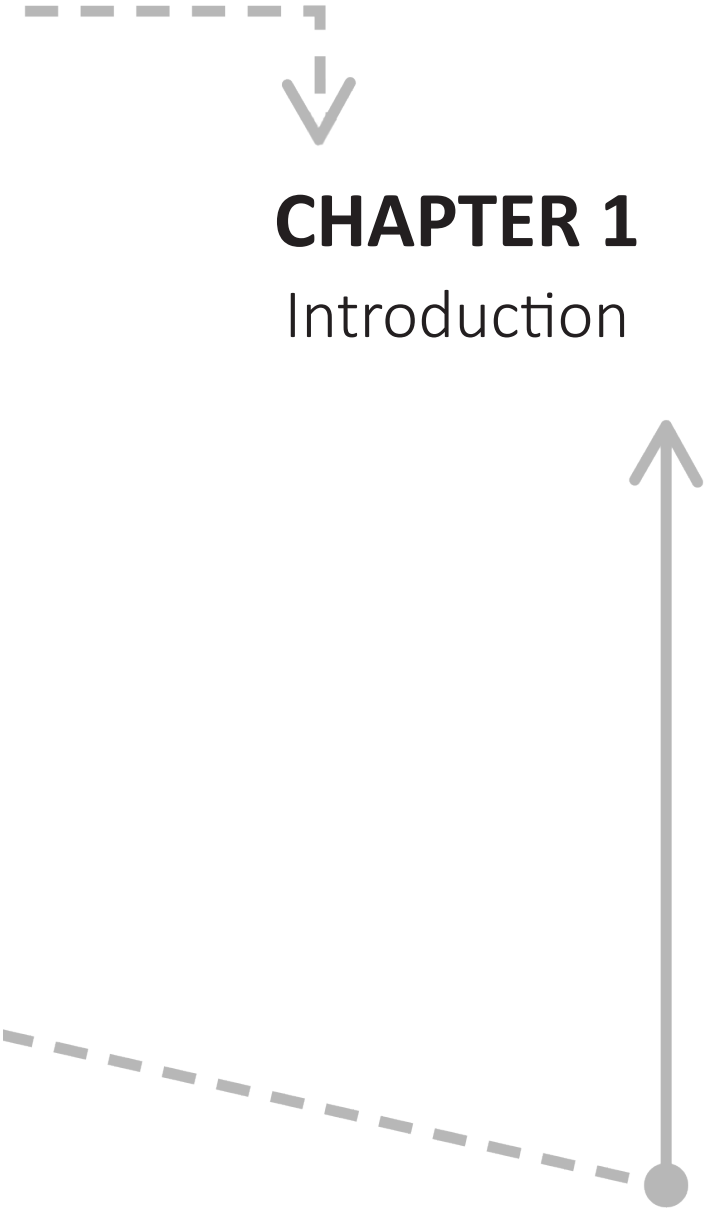
However, European primary care is characterised by large variation in primary care configurations, making it an optimal laboratory for comparative health care research in this context (Kringos, 2012). Unsurprisingly, in 2008, the European Commission called for research providing state-of-the art evidence on the effects of strong primary care

1 General practitioners in Europe are usually also called family physicians, family practitioners, or family medicine specialists. Throughout this doctoral thesis, we refer to all these physicians as GPs.

in terms of quality, costs, and equity of health (care) in Europe. Aligned to this call, two research projects, the 'Primary Health Care Activity Monitor for Europe' and 'Quality and Costs of Primary Care in Europe' were conducted in 2009-2010 and 2013, respectively.

This doctoral dissertation meets this research challenge (i.e. lack of a comprehensive overview of Europe) by investigating the association between the strength of European primary health care systems and socioeconomic inequity in health and health care in Europe. To this end, it reports on research in which multi-country data on these dynamics were analysed using state-of-the-art analysis tools.

The outline of this dissertation is as follows. **Chapter 1** introduces the relevant literature on inequity in health and health care, the beneficial effects of strong primary care systems in this regard, and their interaction. In addition, this chapter highlights the gaps in this evidence. The research aims, research questions, and corresponding hypotheses of this doctoral thesis are discussed in **Chapter 2**. In **Chapter 3**, the study design and development of the QUALICOPC- and PHAMEU databases and the additional data collection at four Belgian EDs, which were employed to answer our research questions, are described. Afterwards, the seven studies we conducted to test our research hypotheses are presented in **Chapter 4**. The last chapter, **Chapter 5**, provides the reader with an overall discussion of the study results and highlights the implications of our work for policymakers and practice as well as for further research.



CHAPTER 1

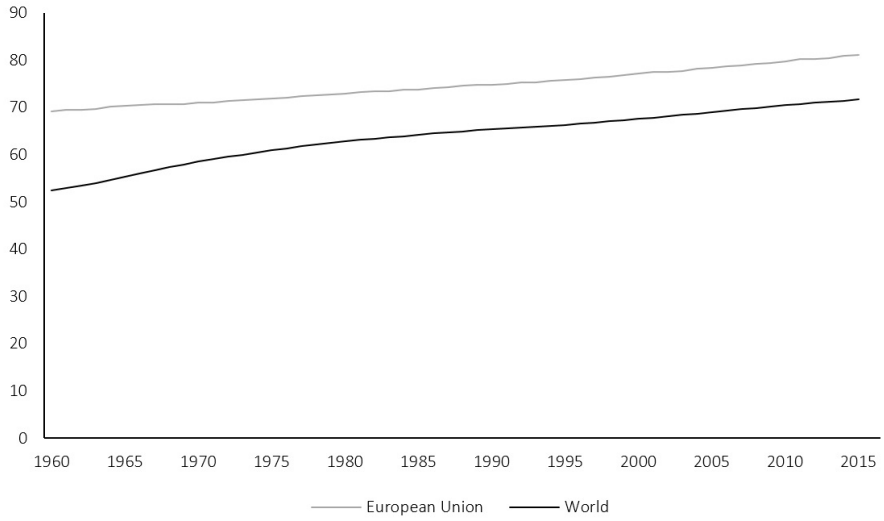
Introduction

INTRODUCTION

1. Inequity in health

The average life expectancy at birth in Europe is substantially higher than the world average. Figure 1 provides an overview of the evolution of life expectancy in Europe between 1960 and 2015. In 1960, a new-born baby in Europe was expected to live for approximately 69.3 years, while nowadays, they are expected to live to 81.1 years. Life expectancy has never been higher among European citizens and it will keep increasing (European Commission, 2014). This increased life expectancy is often viewed as a positive societal evolution for Europe, as it signals European progress in the quality of health care and produced nutrition (OECD, 2016).

Figure 1 Evolution of the life expectancy at birth, comparison between the European Union and the world (1960-2015)

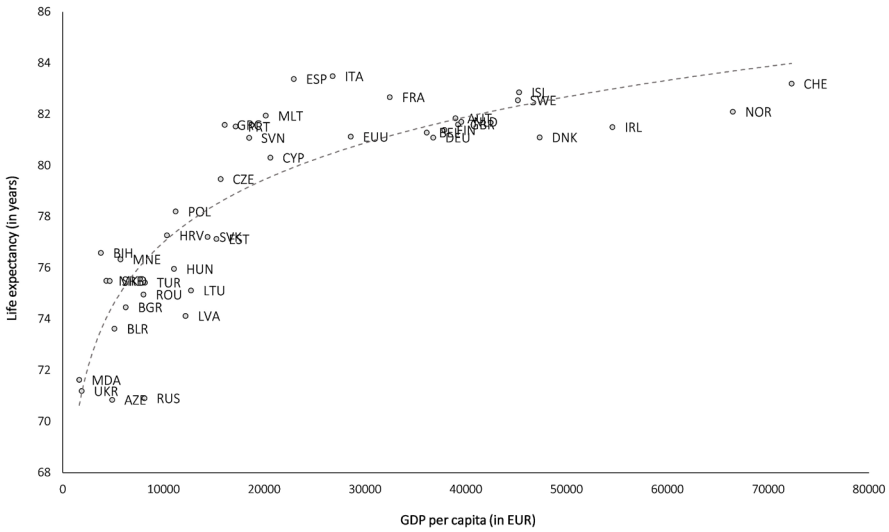


Source: World Bank (2017)

However, life expectancy in Europe is not equal for all European citizens. Large between- and within-country differences in life expectancy still exist. For example, regarding between-country differences, Figure 2 describes the Preston curve between gross domestic product per capita and life expectancy for European countries. This curve indicates that people born in richer countries can expect to live longer on average

than those born in poor countries. However, at a higher income level, the link with life expectancy flattens.

Figure 2 Gross National Product per capita (in EUR) and life expectancy in 42 European countries (indicated by their ISO 3166-1 alpha-3 code)



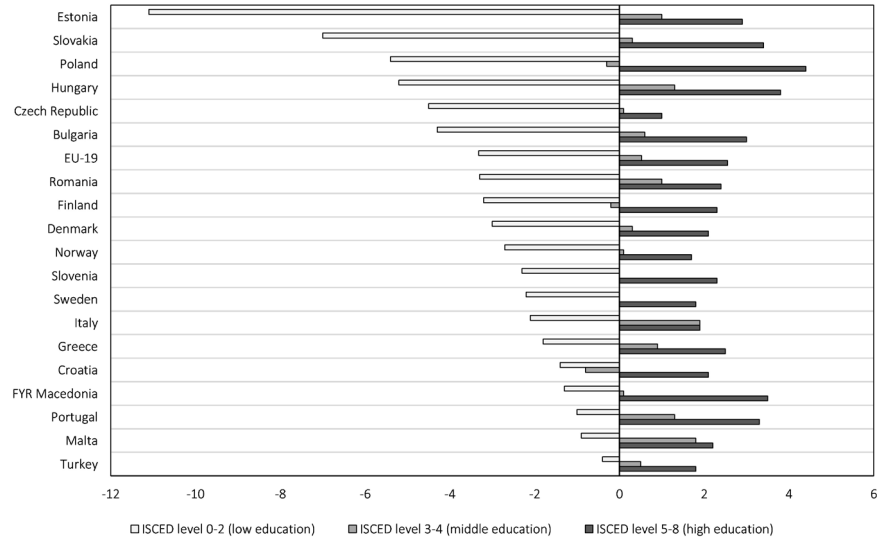
Source: World Bank (2017)

Note Because of its very high GDP per capita, Luxembourg was excluded to simplify the visualisation (life expectancy: 82.23; GDP per capita: 89028.00)

Note The World Bank provides data concerning GDP per capita in US $. GDP per capita is recalculated to euro using the exchange rate on 17 June 2017

In addition, life expectancy is not equally distributed within countries. Figure 3 depicts the deviation from the country's average life expectancy and the life expectancy of those with different education levels. We observe that in all countries, lower-educated subpopulations experience a lower life expectancy, while highly educated subpopulations experience a higher life expectancy compared to the country's average.

Figure 3 Life expectancy at birth, difference from the country's average (years), according to educational level (ISCED)



Source: Eurostat (2017)

Note For Sweden and Slovenia, the life expectancy at birth for the ISCED level 3-4 category equals the country's average

Life expectancy is also lower among groups with a lower socioeconomic status in terms of indicators other than education (e.g. income and ethnicity) (Chetty et al., 2016; Mayhew & Smith, 2016). Stringhini et al. (2017) showed that having a low socioeconomic status reduces life expectancy by 2 years (while obesity is associated with 0.7 years of life lost, high alcohol intake with 0.5 years, diabetes with 3.9 years, and hypertension with 1.6 years).

Social differences in health emerge for life expectancy and most conditions and illnesses. The association between socioeconomic factors and health, morbidity, and mortality is well established in the literature (Chetty et al., 2016; Mackenbach et al., 1997; Mackenbach et al., 2008; Mackenbach et al., 2016; Marmot, Shipley & Rose, 1984; Mayhew & Smith, 2016; Stringhini et al., 2011; Whitehead, 1992). For example, through a systematic review, Read, Grundy, and Foverskov (2016) provided a comprehensive overview of existing evidence on the social gradient in health and wellbeing in Europe. People with lower educational attainment, lower income, lower occupational class, or living in

a deprived area are more likely to report lower health status and lower quality of life. Recent numbers substantiate this for all Organisation for Economic Co-operation and Development (OECD) countries: 80% of the richest people report being in good health, while this percentage is only 60% among the poorest people (OECD, 2016). Likewise, non-communicable diseases are concentrated among the more vulnerable patient groups (Di Cesare et al., 2013). For example, McNamara et al. (2017) demonstrated that lower socioeconomic groups were more likely to have diabetes (OR: 2.36; CI: 2.05-2.71), obesity (OR: 1.93; CI: 1.54-2.41), and depression (OR: 3.12; CI: 2.42-4.03), increasing their need for health care (Droomers & Westert, 2004; Regidor et al., 2008; Westert et al., 2001). Therefore, health is characterised by a social gradient, not only between the rich and poor, but more generally as well. Health is usually poorer for those with a lower social position (Marmot, 2010; Whitehead & Dahlgren, 2006). Nevertheless, an important observation is that patients from higher socioeconomic groups are more likely to be diagnosed with particular medical conditions such as allergies or breast cancer (Geyer, 2000; Cunningham, 2010; Uphoff et al., 2015).

Part of the social differences in health can be attributed to relatively unchangeable determinants such as the clustering of genetic predisposition in lower socioeconomic groups. For example, the difference in prevalence of sickle cell anaemia among black and white populations is a genetic predisposition (CDC, 2017; Lorey, Arnopp, & Cunningham, 1996). However, much of these social differences are determined by underlying social mechanisms or pathways, namely (i) different power and resources, (ii) different levels of exposure to health hazards, (iii) same level of exposure leading to different impacts, (iv) life-course effects, and (v) different social and economic effects of being sick (Dahlgren & Whitehead, 2007). As these mechanisms or pathways are the product of (social) policy, they are avoidable, and therefore, they can be considered unfair.

The literature refers to this phenomenon as ‘inequity’, which is defined as systematic, unfair, unjust, and potentially avoidable differences among population groups defined socially, economically, geographically, or demographically (Hutt & Gimour, 2010; Starfield, 2011). Inequity differs from ‘inequality’, in which differences between population groups can be attributed to the aforementioned genetic predisposition or constitutional variations, or even to luck (e.g. a car accident).

After the ‘Great Recession’ manifested in 2008, statistics have reported higher suicide and mortality rates. These are attributed to mental and behavioural disorders, espe-

cially among citizens who lost their jobs, houses, and economic activities during the crisis (De Vogli, 2014). Related to this observation, several researchers warn that health inequities and social gradients have increased during the past ten years (Marmot et al., 2012; Marmot, 2013; Marmot, 2014), and consequently, Europe is facing 'a public health emergency' (De Vogli, 2014; Karanikolos et al., 2013; Marmot, 2014; Stuckler & Basu, 2013).

2. Inequity in health care

One cornerstone of the mission of the World Health Organization (WHO) advocates that equitable care, especially for disadvantaged populations, be provided in all countries worldwide (Van Lerberghe, 2008). Equity in health care refers to the extent of fairness in the way health care is financed, produced, and distributed, corresponding to a patient's need for care. Patients who are alike should receive the same treatment, referred to as 'horizontal equity', while patients who are not alike should be treated in the same unlike way, referred to as 'vertical equity' (Bayoumi, 2009; Cuyler, 2001; Goddard & Smith, 2001; Hanafin, Houston & Cowley, 2002).

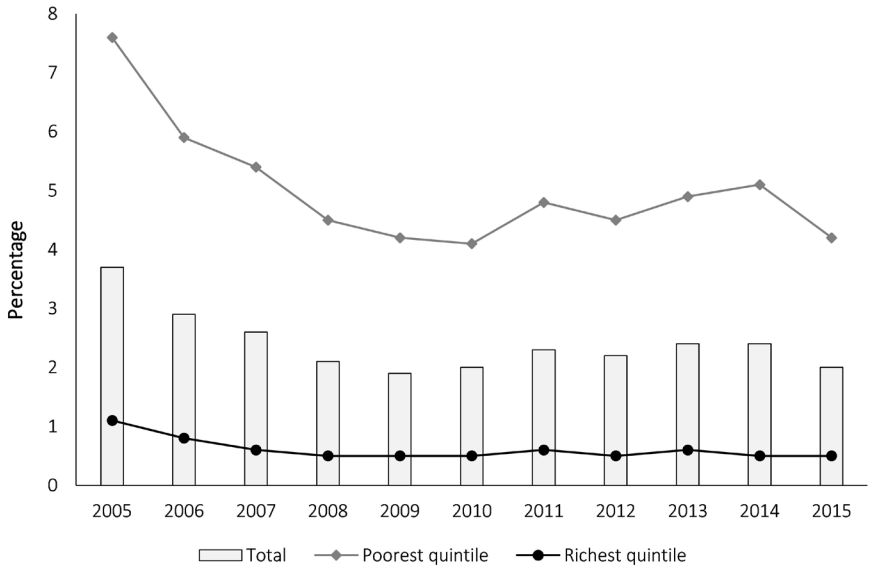
Tudor Hart (1971) described the phenomenon of inequity in health care in the 'inverse care law' stating that 'the availability of good medical care tends to vary inversely with the need for it in the population served'. Equitable health care should provide (i) equal access for equal need, (ii) equal treatment for equal need, and (iii) equal outcomes for equal need (Whitehead & Dahlgren, 2006).

2.1 Equal access for equal need

Achieving the highest attainable standard of health is a fundamental right for every human being. However, this encompasses having access to timely, acceptable, affordable, and qualitative health care (European Commission, 2017; European Union, 2010; United Nations, 1948; World Health Organization, 1946). Access to health care is defined as 'the ability to secure a specified range of services at a specified level of quality, subject to a specified maximum level of personal inconvenience and costs, whilst in the possession of a specified level of information' (Goddard & Smith, 2001). This definition implies that several determinants should characterise access to health care such as administrative, geographical, physical, financial, and organisational determinants.

To date, several socioeconomic groups across European countries still experience inadequate accessibility to health care services. Some barriers to primary care include a lack of available services near people's homes, waiting times, and financial motives (OECD, 2016). For example, Figure 4 shows the gap in unmet need for financial reasons between the poorest and richest quintile relative to the average percentage across the EU member states (2005-2015). On average, 2.4 % of European citizens indicated that they felt they needed care, but did not receive it for financial reasons (Eurostat, 2017). The poorest European citizens (situated in the poorest quintile) experience higher levels of unmet needs for financial reasons compared to their wealthier counterparts. In 2015, 4.2% of the poorest citizens reported unmet needs for financial reasons, while this percentage is only 0.5% among the richest citizens. This illustrates that access to health services remains inequitably distributed, even among high-income countries such as those in the European Union.

Figure 4 Percentage of the population indicating they experienced unmet need for medical care due to financial reasons, EU-27, 2005-2015



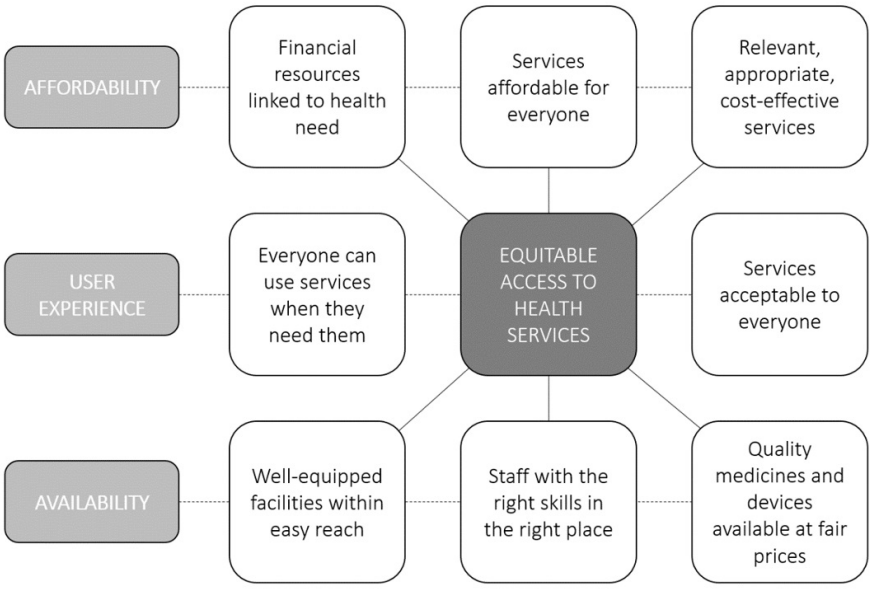
Source: Eurostat (2017)

The Expert Panel on effective ways of investing in Health (EXPH, 2016) argues that access to health services should be a major concern for the European Union and its individual member states for two reasons. First, recent data (cf. supra) shows the inequitable dis-

tribution of access to health services among several socioeconomic groups, making it a current hot issue. This persisting inequitable access to health care increased after the Great Recession in 2008 and conflicts with the right to health stated in the EU Charter of Fundamental Rights. Second, accessible health care leads to effective health care, making European citizens healthier and longer living. This improved population health subsequently drives economic growth through higher labour force participation and higher productivity (Dahlgren & Whitehead, 2007; McKee, Figueras & Saltman, 2011). As this economic growth is related to better health outcomes (Lauer et al., 2016), a multiplier effect is expected.

Recently, the Expert Panel on effective ways of investing in Health identified eight policy areas clustered in three dimensions to enhance the equitable access to primary health care services among European countries (EXPH, 2016). First, policymakers should focus on the affordability dimension. Financial resources should be aligned to the population's health needs, care should be affordable for all population groups, and should be relevant, appropriate, and cost-effective. Second, regarding the user experience dimension, all citizens of a country should have the ability to use care when they feel the need for it and this should be acceptable for everyone. In the last dimension, i.e. availability dimension, the Expert Panel recommends easy to reach and well-equipped health care facilities with a workforce that possesses the required skills. Figure 5 visualises this EXPH-framework for enabling equitable access to primary care.

Figure 5 Factors enabling equitable access to primary care



Source: authors' own representation, based on EXPH (2016)

In the previous paragraphs of this subsection, we focused mainly on results regarding the affordability of care, which is one factor to consider when designing equitable access to the health care system. However, policymakers should also focus on user experience and availability (EXPH, 2016).

2.2 Equal treatment for equal need

Equitable health care should provide health care tailored to the needs of patients independent of their gender, age, or socioeconomic status (Mackenbach et al., 2008). Nevertheless, research illustrates that even in countries with universal health coverage, lower-quality services are concentrated among those worse off (Van Doorslaer, Koolman & Puffer, 2002). For example, Canadian patients residing in deprived areas and suffering an acute coronary syndrome are less likely to receive cardiac catheterisation (Fabreau et al., 2014). In addition, a Belgian study investigated the social disparities in pain management among patients at the emergency department (ED). The results indicated that vulnerable patients have to wait 28 minutes longer to receive pain medication when experiencing moderate to severe pain, compared to their more wealthier

counterparts (Vanden Bûssche, 2013). Moreover, Agabiti et al. (2006) revealed that vulnerable patients in Italy suffering from hip pathology were more likely to be refused a total hip replacement than patients from higher social classes. Finally, using a systematic literature review, Aarts et al. (2010) found that patients with a lower socioeconomic status in Europe consistently demonstrate a lower chance of receiving curative treatment (i.e. surgery, radiotherapy, and/or chemotherapy) for colorectal cancer than did the patients with a higher socioeconomic status.

2.3 Equal outcome for equal need

When patients are in similar need and receive equal access to equal treatment, one expects this will lead to the same outcomes. However, literature shows that this is not the case. An Italian study demonstrated that among patients hospitalised for an acute myocardial infarct, low education was associated with a higher 30-day mortality and readmission rate to the hospital (Cafagna & Seghieri, 2017). This social gradient in mortality is also identified in other countries (Villanueva & Aggerwal, 2013) and for other diseases such as cancer (Burns et al., 2014; Chang et al., 2013; Wu et al., 2014). Furthermore, vulnerable patient groups are not only disadvantaged in mortality outcomes, but also in quality of life (Begley et al., 2011; Kramer et al., 2012; Mielck, Vogelmann, & Leidl, 2014). For example, Mielck, Vogelmann, and Leidl (2014) demonstrated that vulnerable patient groups with a chronic disease in Germany face a double burden: they have higher levels of health impairments on the one hand, and report lower health-related quality of life on the other.

3. How can health care systems tackle or enhance inequity?

Health care systems are defined as 'all the activities that aim to promote, restore, or maintain health' (World Health Organization, 2000). According to a wide body of literature, a well-functioning health care system, or particular elements within it, plays a major role in the battle against health inequity (Arnand & Barninghausen, 2004; Arnand & Ravaillion, 1993; Bokhari et al., 2007; Cutler et al., 2006; Mackenbach, 1996; McKee, 2002; Robinson & Wharrad, 2001). For example, Arnand & Barninghausen (2004) demonstrated that a higher density of human resources in the health care system is associated with lower maternal mortality, infant mortality and under-five mortality across countries. In addition, a higher health expenditure per capita results in lower

maternal mortality and under-five mortality (Bokhari et al., 2007). Health care systems can provide equitable access to high-quality care that is affordable even for vulnerable populations, build relationships across the boundaries of sectors/domains, tackle other social determinants of health by providing policymakers with a social agenda, and enable social action and participation (Gilson et al., 2007a).

However, health care systems can also embed or reinforce inequity in society (Gilson et al., 2007a). For example, health care systems focused on specialist care are likely to increase inequity (Starfield, Gérvas & Mangin, 2012). Western health care systems are increasingly characterised by disease-oriented care, focusing on specific patient groups or diseases/diagnoses (De Maeseneer & Boeckstaens, 2010; 2012; Starfield, Gérvas & Mangin, 2012). This disease-oriented paradigm leads to a fragmented and reductionist approach. Guidelines may expand this approach, as they exclude people with multimorbidity and consequently exclude the patient population with the greatest burden of morbidity. In addition, this paradigm increases inequity in health for disadvantaged patients. These patient groups are more likely to simultaneously suffer from multiple conditions and therefore require a more person-oriented approach to manage the complexity of their interacting diseases (De Maeseneer & Boeckstaens, 2010; 2012). According to Gilson et al. (2007a), the three key forces driving health system inequity are commercialisation and globalisation, health policy choices made by both international and national health system directors, and the bureaucratic culture in the public sector. Commercialisation of the health care system, for example, is driven by a neoliberal economic agenda such as privatisation, fiscal austerity, deregulation, free trade, and reduction in health expenditure to consolidate the role of the private sector in a country's economy and society (Haymes, de Haymes & Miller, 2014; Springer, Birch & MacLeavy, 2016). Research indicates that commercialised health systems are associated with inequitable accessibility and health outcomes (Mackintosh, 2003; Mackintosh & Koivusalo, 2005). Bond & Dor (2003) and Homedes & Ugalde (2005) argue that health policy choices are driven by a combination of international agencies, commercial actors, and higher income groups who enhance their individual power on the health care process. For example, international agencies were the main drivers for narrowing the primary care approach to a limited set of health care interventions with proven cost-effectiveness, offered through vertically managed health care programmes (De Maeseneer et al., 2007). These vertical managed health programmes, however, have the potential to undermine the comprehensiveness of the health care system and exac-

erbate health inequity (Garret, 2007; Starfield, 2011). Lastly, regarding the bureaucratic culture in the public sector, research shows that the management style in the public sector is characterised by a hierarchical, rigid, and rule-bound culture that encourages an authoritarian management style (Gilson, 2007b; Gilson, 2007c). The power in the health care process generally lies with the physician providing individualised curative care. While the health care process rather needs multidisciplinary teams which imped innovative action to promote health equity (Gilson et al., 2007a). Nevertheless, even the most perfect health care market will not be able to deliver a fair distribution among its beneficiaries if it does not allow equal access for equal need (Goldlee, 2007). To improve the future resilience of health care systems in Europe, they should be fiscally sustainable. Achieving additional efficiency gains in hospitals, pharmaceutical spending, administration, or other health spending will help meet growing needs with limited resources (OECD, 2016).

However, Marmot (2015) argues that not only access to high-quality health care will eliminate inequity from this planet. The social conditions in which people live, have a determing impact on access to health care, as they do on access to other aspects of society that lead to good health (such as housing, education, social and community networks).

In the next section, in line with the research aims outlined in the following chapter, we focus on how a particular component of the health care system, namely primary care and its strengths, is related to inequity in health and health care.

4. Primary care strength

The Alma Ata declaration in 1978 (World Health Organization, 1978) highlighted that strengthening the primary care level of health care systems should be prioritised to tackle several demographical, epidemiological, scientific, technological, cultural, and socioeconomic developments, as well as challenges related to globalisation. Thirty years later, the WHO endorses the same paradigm in its seminal work 'Primary Health Care—now more than ever' (Van Lerberghe, 2008). This report emphasises that (strong) primary care should be the foundation of the health care system and provide people-centred care and responsive health services close to the community.

In this doctoral dissertation, we focus on the definition of strong primary care used by Kringos et al. (2010) and Starfield (1994). Strong primary care is defined as *accessible* care that provides a *comprehensive* scope meeting the population's health needs, *coordinates* care across different health care levels, and provides a *continuous* doctor-patient relationship over time and different disease/illness episodes.

Various international studies provide evidence of the beneficial effects of strong primary care systems. These include better health outcomes (also for people with chronic diseases), fewer avoidable hospitalisations, and less unnecessary use of specialist services (Ashworth & Armstrong, 2004; Delnoij et al., 2000; De Maeseneer et al., 2003; Doescher, Franks & Saver, 1999; Franks & Fiscella, 1998; Friedberg, Hussey & Schneider, 2010; Hansen et al., 2015; Kringos et al., 2013; Macinko, Starfield & Shi, 2003; Sans-Corrales et al., 2006; Schellevis, Westert & De Bakker, 2005; Starfield, Shi & Macinko, 2005; van Loenen et al., 2014; van Loenen, 2016). Moreover, countries that organise their primary health care system using a gatekeeping role for their GPs can reduce unnecessary care and increase accessibility (Forrest & Starfield, 1996; Mark et al., 1996; Parchman & Culler, 1994; Parchman, Noel & Lee, 2005).

Using a systematic literature review, Starfield, Shi, and Macinko (2005) validated their six theoretical mechanisms in which primary care has beneficial effects on (inequity in) health:

i. Primary care expands the accessibility of the health care system, especially for relatively vulnerable population groups. It functions as the first contact point and provides entry to the rest of a country's health care system.

ii. Primary care elevates the quality of the health care system. It approaches patients holistically, therefore focusing on the medical condition within the context of a patient's other (health) problems, rather than only focusing on the disease. Because of these characteristics, primary care provides at least as high a quality of care for common medical conditions as specialist care.

iii. Primary care focuses more on prevention than specialist care. Especially in times where chronic conditions and multimorbidities keep increasing, prevention plays a fundamental role in primary care. Research

has shown that interventions focusing on breast-feeding, smoking cessation, healthy eating, and physical exercise have the most effect when applied within primary care (Shi, 1994).

iv. Primary care adds to the early management of health problems, and has the ability to anticipate medical conditions at an earlier stage, before they become more serious and require hospital or emergency care (Starfield, Shi & Macinko, 2005).

v. Primary care can reduce unnecessary and potentially harmful specialist care. Recent European research conducted by van Loenen (2016) demonstrated that stronger primary care helps to decrease avoidable secondary care use. Specialists are educated within a hospital, far away from the communities in which patients reside. However, if patients turn to specialist care for common medical conditions, they are more likely to be exposed to harmful diagnostic tests and therapies, both of which may decrease patient safety (Starfield, Shi & Macinko, 2005).

vi. The positive effects of the accumulation of the previous primary care characteristics.

Primary care in European countries is characterised by wide variation in organisational constructions. However, some features are common, for example, the GP as the first point of contact, organised around solo and group practices consisting of GPs, and the prevalence of traditional financing schemes (e.g. fee-for-service and capitation) (although blended forms of payment are increasing) (Groenewegen et al., 2015; OECD, 2016).

Although the literature describing the positive association of primary care on several outcomes is overwhelming, some studies show that strengthening a country's primary care system may inhibit some negative implications. Kringos et al. (2013) found that countries with a stronger primary care systems have both higher total health care expenditures, and a higher expenditure growth. Furthermore, decentralisation of the health care system with a focus on primary care can be associated strengthening the position of higher socioeconomic population groups that have more assets to find their

way through the health care system (Collins & Green, 1994). In addition, patients in countries that regulate access to secondary specialists services through a gatekeeping system show lower satisfaction rates with the health care system (Kroneman, Maarse, & Van der Zee, 2006; Van der Zee & Kroneman, 2007).

4.1 Operationalisations of primary care strength

Two major discourses dominate the scientific operationalisation of primary care strength in health services research. These are the Primary Care Assessment Tool developed by Barbara Starfield on the one hand, and the European Primary Health Care Activity Monitor for Europe developed by Dionne Sofia Kringos on the other. We elaborate on the general findings of both discourses and focus on their association with equity in the following subsection.

Barbara Starfield studied the effects of strong primary care systems in 18 OECD countries between 1970 and 1998. She developed the **Primary Care Assessment Tool (PCAT)** in which the essential components of primary care are examined at the aggregated macro level. These essential core components of primary care are (Starfield, 1998; Starfield & Shi, 2008) as follows:

i. First contact: role of primary care as the entry point to the health care system.
ii. Longitudinally: person-centeredness of the care provided over time.
iii. Comprehensiveness: ability of primary care to provide a wide range of services in response to the population's prevalent health needs.
iv. Coordination: the extent to which primary care professionals are able to support and integrate the care of problems addressed elsewhere.
v. Family orientation: ability of primary care to consider the context of the family when dealing with patients' health problems.
vi. Community orientation: responsiveness of primary care to health problems within the community.
vii. Cultural competence: capability of primary care to build relationships with different social groups.

At the country level, each component is measured by one indicator (score ranging from 0 to 2). The overall strength of a country's primary care system is then calculated as the sum of these seven indicators for the essential components (Macinko, Starfield & Shi, 2003).

However, Kringos et al. (2010) emphasised that capturing the complexity of primary care strength using Starfield's framework (one indicator for each component) may be too simplistic for European countries. Therefore, she recommended more detailed and process-oriented indicators for each component, and developed the PHAMEU monitor in 2009 to measure primary care strength within the European context.

Dionne Sofia Kringos measured primary care strength in Europe for five primary care dimensions by developing the **Primary Health care Activity Monitor for Europe (PHAMEU)**. According to this framework, the five essential primary care strength dimensions are (Kringos, 2012; Kringos et al., 2010) as follows:

i. Structure dimension: the way in which a primary health care system is organised. It is operationalised by defining it according to strong national governance, pro-primary care economic conditions at the national level, and workforce development that supports primary care.
ii. Access dimension: the ease with which patients can reach the primary care system in a country. It should not be determined by a patients' demographic or socioeconomic status, but be easily accessible for all members of society.
iii. Continuity dimension: ability of the GP to consider the patient's medical history and personal living situation and to build a long-lasting relationship with the patient.
iv. Coordination dimension: competence of primary care professionals to guide the patient through the health care system and collaborate with other health professionals to meet the patient's health needs (Starfield, Shi & Macinko, 2005).
v. Comprehensiveness dimension: responsiveness to patients' expectations and health needs.

Table 1 Dimensions and their features of the Primary Health care Activity Monitor for Europe

STRUCTURE	Governance	Primary care goals
		Policy on equality in access to primary care
		(De)centralization of primary care management and service development
		Primary care quality management infrastructure
		Patient advocacy
		Multidisciplinary collaboration
	Economic conditions	Primary care expenditure
		Primary care coverage
		Remuneration system of primary care workforce
		Income of primary care workforce
	Workforce development	Profile of primary care workforce
		Status and responsibilities of primary care disciplines
		Primary care workforce supply and planning
		Academic status of primary care
		Medical associations
PROCESS	Access	Density primary care workforce
		Geographic availability of primary care service
		Accommodation of accessibility
		Affordability of primary care services
		Acceptability of primary care services
	Continuity	Longitudinal continuity of care
		Informational continuity of care
		Relational continuity of care
	Coordination	Gatekeeping system
		Skill-mix of primary care providers
		Collaboration of primary- and secondary care
		Integration of public health in primary care
	Comprehensiveness	Medical equipment available
		First contact for common health problems
		Treatment and follow-up of diseases
		Medical technical procedures
		Preventive care
		Mother and child & reproductive health care
		Health promotion

Source: author's own representation, based on Kringos (2012)

The careful reader might notice that this framework, specifically the process dimensions, is related to the Primary Care Evaluation Tool (PCET) developed by the WHO. However, PCET is more relevant as a policy instrument than scientific tool, based on how it was developed. The PCET and its indicators were assembled using input from experts and not through a systematic literature review, in contrast to the PHAMEU framework.

As this doctoral dissertation focuses on the European context, we use the framework developed by Kringos to analyse our research questions. Therefore, we elaborate on Kringos' operationalisation of primary care strength in Chapter 3.

4.2 Association between primary care strength and equity in health and health care

Strong primary care is needed to provide continuous, comprehensive, and coordinated care for the entire population of a country. Specifically, Starfield, Shi, and Macinko (2005) and Boerma, Hutchinson, and Saltman (2015) argue that strong primary care can also play an important role in reducing social health inequalities.

Despite overwhelming evidence of the benefits of primary care, the results of the effect of strong primary care on equity measures are inconclusive and characterised by considerable divergence. This doctoral dissertation assesses the association of primary care strength and inequity in health and health care, and by doing so, partly tackles the gap in the current available evidence.

According to De Maeseneer et al. (2007), primary care is well positioned to contribute to equity in health care by improving accessibility as well as contributing to social cohesion and empowering patients, all delivered through high-quality care. As mentioned earlier, primary care ensures population coverage by functioning as the entry level to the health care system. This feature varies between countries; however, most patients seek care from their primary health care professional as the first point of contact. Furthermore, it has the potential to secure continuity of care through several disease episodes and offer a comprehensive set of coordinated generalist care embedded in the patient's own context (Chetty et al., 2016).

Starfield, Shi, and Macinko (2005) showed that countries with a higher density of primary care doctors reduce the negative effects of social inequality. According to their study, higher ratios of primary care professionals are associated with lower neonatal and infant mortality, lower stroke mortality, and higher subjective health and birth weight in areas high in income inequality. For example, people living in countries high in income inequality are 33% more likely to have poor health if the primary care is weak. Their results are not necessarily generalizable to the European context for (at least) two reasons. One, the analyses in this study were performed at the macro level and next, they were mainly conducted on data for high-income OECD countries. Kringos et al. (2010) criticised this approach, arguing that capturing the complexity of primary care strength using one indicator for each component is too simplistic for European countries. Furthermore, Europe is characterised by large variation in primary care systems, making it difficult to transfer the results to this setting. Therefore, the aim of this thesis focuses on European countries, and includes a comprehensive overview of the primary care systems in these countries.

Kringos et al. (2013) demonstrated that the effect of primary care strength in Europe on inequity in self-rated health, diabetes, and COPD is not as straightforward as expected. They found an inverse effect of the structure and continuity dimension on inequity in self-rated health. In other words, the better a country developed the structure or continuity dimension of its primary care system, the less inequity in self-rated health. In contrast, there was no significant association between the primary care strength dimensions and inequity in diabetes or COPD. However, other authors reflected that this finding may be influenced by the fact that the unit of analysis in Kringos et al. (2013) is the primary health care system at the macro level, while the meso and micro levels might be more important here, showing a second gap in the available research (Haggerty et al., 2013). To fill these gaps, we used macro, meso, and micro level data in this doctoral dissertation. As a consequence, we were able to evaluate the effect of national (macro), GP practice (meso), or patient (micro) characteristics on inequity in health and health care.

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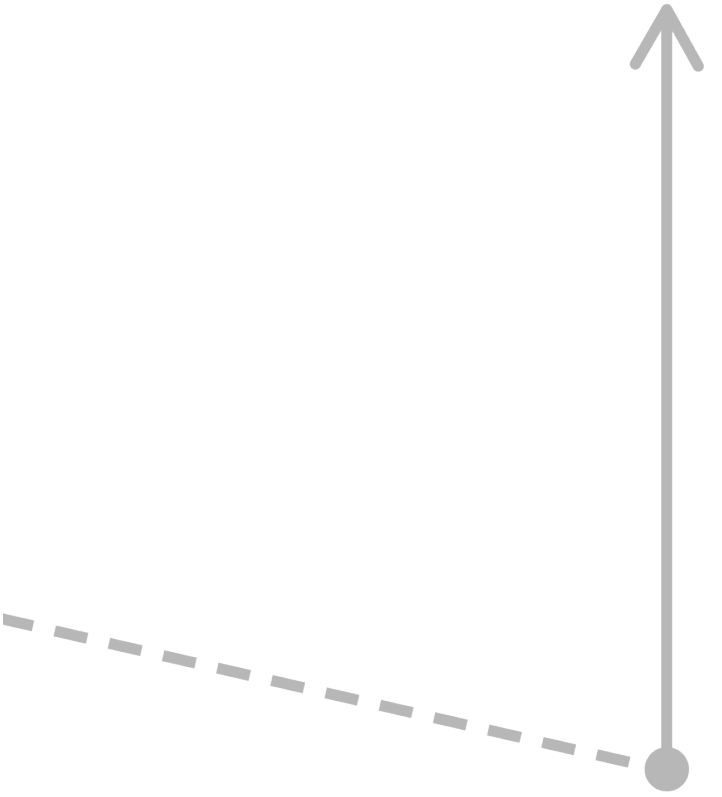
CHAPTER 2

Research aims and hypotheses



RESEARCH AIMS AND HYPOTHESES

The doctoral research presented in this thesis initially started with the central aim of assessing the association between the strength of primary health care and socioeconomic inequity in health (care) in Europe. To achieve this aim—and answer the related first main research question—we investigated this association in terms of the various aspects of inequity and its related outcomes such as income driven inequity in (general) health, inequity in unmet needs, postponement, and (financially driven) postponement.

Based on the insights gained in the first Results-chapter(s), we formulated new research questions to further increase insights into the complex relationship between primary care strength and inequity in health and healthcare. First, the access dimension within primary care strength was revealed as the only strength dimension robustly associated with inequity (related) measures. Second, inequity in health care could only partly be explained at the country level (i.e. where primary health care strength is situated). Therefore, the later research questions focus on access to health care and are situated (partly) at the micro and meso levels, rather than at the macro level. Specifically, we investigated whether access to European primary care is equitable (research question 2), whether a person-centred GP is associated with lower inequity in access (research question 3), and why patients by-pass primary care (research question 4).

Figure 1 provides an overview of the aforementioned research questions and the corresponding hypotheses (H). In total, we conducted seven quantitative studies to answer our research questions and test our hypotheses. All the related manuscripts are submitted to, accepted for publication in, or published in international, peer-reviewed journals ranked in the first impact quartile on Web of Science. In the following sections, we discuss and motivate our research questions and hypotheses more in depth.

Figure 1 Overview of the main research questions of this doctoral thesis, the hypotheses and the research chapters

Research question 1 Is the strength of primary health care associated with lower inequity in health (care) in Europe?

International evidence shows that strengthening a country's primary care system increases the ability to cope with several societal challenges such as the aging population (aligned to the escalating prevalence of chronic conditions), increasing health inequalities, and increasing health expenditure, which leads to higher cost effectiveness (Andersen, 1995; Blumenthal, Mort & Edwards, 1995; Boerma et al, 2010; Burström, 2002; Goddard & Smith, 2001; Hansen et al, 2015; Kringos, 2012; Kringos et al, 2013; Macinko, Shi & Starfield, 2003; Mackenbach, Meerding & Kunst, 2011; Starfield, 1994; Starfield, 2005; Van Lerberghe, 2008; Whitehead & Hanratty, 2004). However, to the best of our knowledge, the association between primary care strength and inequitable health (care) in the European context has not been extensively studied.

Chapter 4.1 assesses the effect of primary care strength on the inverse association between income inequality and health. Hereto, data from the European Social Survey are linked with data from the Primary Health Care Activity Monitor for Europe (PHAMEU). In **Chapter 4.2** and **Chapter 4.3,** we explore the effect of primary care strength on the rates of postponement and financially driven postponement respectively. For these two chapters, data from the PHAMEU database were linked with those from the QUALICOPC

database. **Chapter 4.4** describes the association between strength indicators of primary care and inequity in unmet needs. The chapter is based on data from the European Union Statistics on Income and Living Conditions study and the PHAMEU database.

Table 1 Overview of chapters for research question 1, their (in)dependent variables, and the corresponding hypotheses

Chapter	Dependent variables	Main independent variables	Hypotheses
4.1	Health ° [and] °°° Income inequality °°°	Primary care dimensions according to the PHAMEU framework by Kringos (2012) °°°	**H 1.1** Stronger European primary care systems are associated with a lower negative impact of income inequality on health.
4.2	Postponement of care °		**H 1.2** Stronger European primary care systems are associated with lower postponement rates.
4.3	Financially driven delay °		**H 1.3** Stronger European primary care systems are associated with lower rates of financially driven delay.
4.4	Inequity in unmet need °°°		**H 1.4** Stronger European primary care systems are associated with less inequity in unmet need.

°°° indicates that this variable is situated at the national level

°° indicates that this variable is situated at the GP level

° indicates that this variable is situated at the patient level

Research question 2 Is access to primary health care in Europe equitable?

The findings related to the previous research question associates specifically one primary care strength dimension with inequitable health (care), namely access. In fact, the access dimension within primary care strength is the only one demonstrating a recurring significant (inverse) association with inequity measures. Therefore, in the context of our second research question, we explore the accessibility of European primary care systems and—coming full circle—identify whether this accessibility is equally distributed. Access to primary health care is in current doctoral dissertation operationalised by the indicators “postponement of care” and “financially driven postponement of care”. Referring back to the Expert Panel on effective ways of investing in Health framework

regarding equitable access to health services, the indicator "postponement of care" is part of the factor that every citizen can use services when they need them from the user experience dimension. Financially driven postponement is also part of the latter factor/dimension and part of the affordability dimension (factor "services should be affordable for everyone").

In addition to the goals mentioned when discussing research question 1, **Chapter 4.2** describes the social gradient (in terms of patients' income, education, ethnicity, and gender) in postponing care in Europe. In **Chapter 4.3**, postponement is narrowed to postponing care for financial reasons. This chapter identifies the income subgroups more at risk for financially driven postponement of care. For both chapters, data from the QUALICOPC database were used. While previous literature focused on one or a selection of European countries (and often only on wealthier countries), both studies contribute by providing a comparative overview for Europe.

Table 2 Overview of the chapters for research question 2, their (in)dependent variables, and the corresponding hypotheses

Chapter	Dependent variables	Main independent variables	Hypotheses
4.2	Postponement of care °	Gender ° Age ° Education ° Income ° Ethnicity °	**H 2.1** Postponement of GP care differs between European countries. **H 2.2** There are social differences in postponement rates according to patients' income, education, ethnicity, and gender in Europe.
4.3	Financially driven delay °	Income °	**H 2.3** Low income groups are more likely to postpone GP care because of financial reasons.

°°° indicates that this variable is situated at the national level

°° indicates that this variable is situated at the GP level

° indicates that this variable is situated at the patient level

Research question 3 Can a person-centred GP mediate inequitable access to health care in Europe?

The results of research question 1 show that a significant proportion of the variance of (financially driven) postponement of care can be attributed to GP (practice) characteristics. In addition, the macro dimension 'workforce development' of primary care strength demonstrates a significant association with inequity. Therefore, in **Chapter 4.5**, we deepen this observation by investigating whether a better-developed workforce (in terms of the GP's person centeredness) is associated with lower financially driven delay of care. This hypothesis is analysed by merging the QUALICOPC and PHAMEU databases. Based on this data, we can assess this association controlling for the primary care strength of European countries.

Table 3 Overview of the chapters for research question 3, their (in)dependent variables, and the corresponding hypotheses

Chapter	Dependent variables	Main independent variables	Hypotheses
4.5	Financially driven delay °	Person centeredness of GP °°	**H 3.1** Country differences in financially driven postponement rates can partially be ascribed to person-centred characteristics of the GP. **H 3.2** Person-centred GPs can mediate for the financially driven delay of care.

°°° indicates that this variable is situated at the national level
°° indicates that this variable is situated at the GP level
° indicates that this variable is situated at the patient level

Research question 4 Why do patients bypass primary care?

In the context of our last main research question, we focus on individual patient aspects of access to health care. Despite a relatively strong primary care system in Belgium (Kringos, 2012), the incidence of Belgian patients who go to the ED is still higher than in neighbouring countries, while a large proportion of the conditions of these patients could be treated within the primary care setting (Van den Heede et al., 2016). Among health care professionals, there is a dominating misconception that self-referring patients attend the ED with inappropriate conditions, because they do not have to pay immediately at these health care facilities (Van den Heede et al, 2016). **Chapter 4.6**

aims to explore whether this is a main explanation or whether other reasons explain why self-referring patients attend the ED. Hereto, data was collected through face-to-face survey interviews with more than 700 Belgian patients. The novelty of this study is that it was conducted during daytime hours, while most previous studies (in other countries) were conducted after hours. This is relevant within this context, as during daytime hours, other facilities (in particular, primary care facilities) are easily accessible.

One particular reason why patients may bypass primary care might be that they are not fully satisfied with their GP. In **Chapter 4.7** we hypothesise that this is especially the case among lower socioeconomic patient groups. To test the hypothesis of this final Results-chapter, again we rely on data from the QUALICOPC study.

Table 4 Overview of the chapters for research question 4, their (in)dependent variables, and the corresponding hypotheses

Chapter	Dependent variables	Main independent variables	Hypotheses
4.6	Reason for choosing the ED without referral during daytime hours °	Gender ° Age ° Education ° Income ° Regular GP °	**H 4.1** Self-referring patients attend the ED because of financial reasons. **H 4.2** The reasons patients attend the ED without referral differ between different socioeconomic groups. **H 4.3** The reasons self-referring patients opt for the ED differ between patients who have a regular GP and those who have no regular GP.
4.7	Patient satisfaction °	Gender ° Age ° Education ° Income ° Ethnicity °	**H 4.4** Lower socioeconomic patient groups are more likely to be dissatisfied with their GPs.

°°° indicates that this variable is situated at the national level
°° indicates that this variable is situated at the GP level
° indicates that this variable is situated at the patient level

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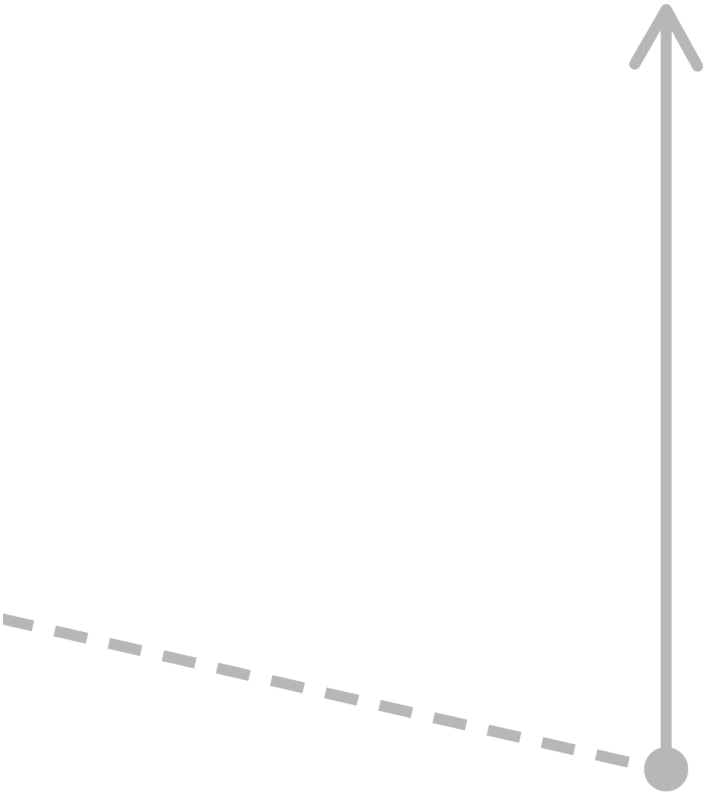
CHAPTER 3

Methods



METHODS

1. Data

This doctoral dissertation is primarily based on data collected within the frameworks of two European projects: (i) the Quality and Costs of Primary Care in Europe (QUALICOPC) and (ii) the Primary Health Care Activity Monitor for Europe (PHAMEU). In the following section, we provide the reader with an introduction to the construction of both databases. For the analyses in Chapter 4.6, additional data was collected at four emergency departments Belgium.

1.1 Quality and Costs of Primary Care in Europe

The QUALICOPC database is the result of a cross-sectional multi-country study with surveys in 31 European countries (the EU 27 [excluding France], FYR Macedonia, Iceland, Norway, Switzerland, and Turkey) and 3 non-European countries (Australia, New Zealand, and Canada). Figure 1 provides a map with an overview of the included countries. In each country, an average of 220 GP practices (with a minimum of 80 GP practices in small countries) were selected to participate in the study. Random sampling was used to select GPs in countries that have national GP registers. When a country only has regional registers, regions representing the national context were selected by random sampling (and within these regions GPs were selected in a random way). If a country only has a list of the facilities in that particular country, a random selection of this list was made (Schafer et al., 2011).

Figure 1 Overview of the included countries in the QUALICOPC study

Source: authors' own representation

Between October 2011 and December 2013, trained fieldworkers were sent to the participating GP practices and consecutively invited patients (aged 18 years or older) who had just undergone a face-to-face consultation with their GP during regular working hours to fill in the questionnaire. This was repeated until ten surveys were collected. The first nine patients willing to participate completed a questionnaire that probed the patient about her/his experiences during the consultation and the primary care system in general. The tenth patient completed a survey about her/his values regarding primary care. In addition, one GP per practice or health centre completed a survey. Finally, the fieldworker completed a questionnaire about the accommodation of the practice facility. The reader can find these questionnaires in Appendix 1 of this dissertation. For more details regarding the study protocol and questionnaire development, we refer to Schäfer et al. (2011), Schäfer et al. (2013) and Schäfer (2016).

Ethical approval was acquired in accordance with the legal requirements in each included country. The surveys were carried out anonymously. A detailed overview of the ethics committee in each country is provided by Schäfer (2016).

Data collection resulted in a database comprising information concerning the patient experiences of 61,931 patients, patient value information of 7,270 patients, and survey information from 7,183 GPs (database 4.2, November 2014). In most papers, we focused solely on the data for the European countries (i.e. excluding Australia, Canada, and New Zealand). QUALICOPC provides European data for the experiences of 54,582 patients, the values of 6,129 patients, and 6,328 GPs (database 4.2, November 2014).

1.2 Primary Health Care Activity Monitor for Europe

The PHAMEU project intended to produce a database comparing European primary care systems in various dimensions. The development of the PHAMEU consisted of four sequential steps:

i. identification of relevant primary care dimensions and features through a systematic literature review,
ii. selection of adequate indicators within the selected primary care dimensions,
iii. evaluation of the indicators by European primary care experts, and
iv. piloting the feasibility of the PHAMEU monitor in 31 European countries.

In the first step, the PHAMEU researchers identified the relevant primary care dimensions and features using a systematic literature review (Kringos et al, 2010a). This systematic literature review resulted in ten core dimensions, which shape the European primary care system. These dimensions can be assigned to one of the levels within the Donabedian (1980) framework, which are structure, process, and outcome.

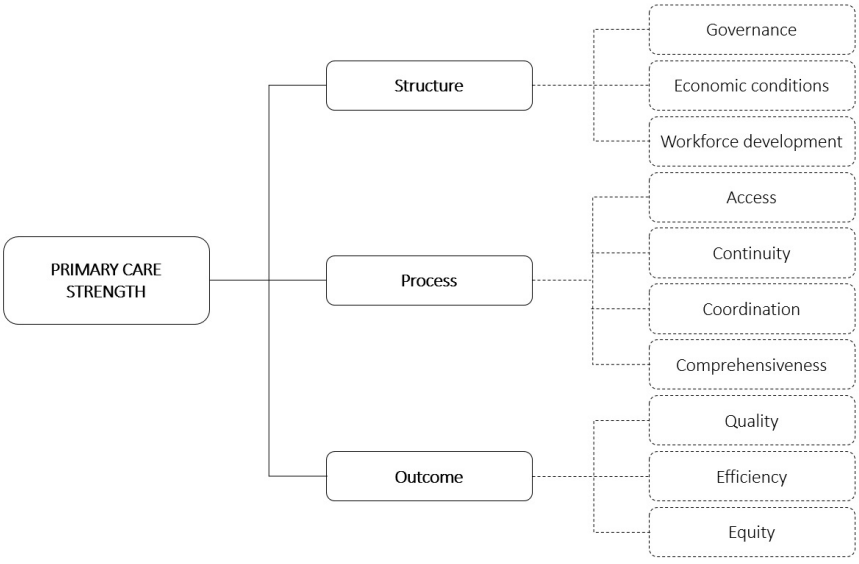
The structure level comprises three dimensions: (i) governance, (ii) economic conditions, and (iii) workforce development (Kringos et al, 2010b; Kringos, 2012). The governance dimension oversees all aspects of primary care and includes information about the existence of primary care policies and regulations (for example, information about the (un)equal distribution of primary care providers and facilities). The availability of financial resources for primary care and the population's coverage for primary care services are two examples of items included in the economic condition dimension. Information about health care providers including age, training, and workload is summarised in the workforce development dimension.

The process level consists of the dimensions (i) access, (ii) continuity, (iii) coordination, and (iv) comprehensiveness (Kringos et al, 2010b; Kringos, 2012). The access dimension contains indicators of national and geographic service supplies and the organisation of access to practices. Conditions related to enduring doctor-patient relationships are measured in the continuity of care dimension. The coordination of the care dimension contains, for example, collaborations within primary care with secondary care, the skill-mix of professionals, and the existence of a gatekeeping system. The scope of services offered to patients at the primary level is captured in the comprehensiveness dimension.

The outcome level comprises the dimensions (i) quality, (ii) efficiency, and (iii) equity (Kringos et al, 2010b; Kringos, 2012). The quality dimension of primary care refers to the extent to which health services meet the needs of patients and standards of care. Efficiency resembles the balance between the levels of resources used in the health care system to reach successful outcomes. Finally, the (absence of) systematic and potentially remediable differences in health (care) across the population are captured in the equity dimension.

Figure 2 provides an overview of the different levels and corresponding dimensions of the PHAMEU monitor.

Figure 2 Levels and dimensions of the Primary Health Care Activity Monitor for Europe (PHAMEU)



Source: authors' own representation, based on Kringos (2012)

In the second step of the development of the PHAMEU monitor, the research team identified indicators for all ten dimensions. These indicators were identified in selected publications within the systematic literature review of step 1, and additional indicators were collected using international databases (i.e. Eurostat, the World Bank, OECD Health Data, and WHO 'Health for All'). In case there were no indicators for a dimension, the research team developed new measurable indicators. In this step, 551 indicators were identified.

The aim of step 3 was to shorten the list of 551 indicators to end up with a feasible set of essential indicators. This was accomplished through an expert evaluation. Experts scored each indicator on its suitability for describing and comparing European primary care systems using a four-point Likert scale. The expert evaluation resulted in 143 essential indicators describing nine of the ten dimensions (i.e. governance, economic conditions, workforce development, access, continuity, coordination, comprehensiveness, quality, and efficiency). The indicators within the equity dimension obtained a relatively low score in the expert evaluation. The reason for this low score is that the consulted experts argued that the proposed indicators to measure equity were influenced by various factors (such as social conditions in which citizens live and work) other than just disparities in primary care access and use. Therefore, no indicators measuring the equity dimension were embedded in the PHAMEU monitor. However, equity was integrated in various other indicators/dimensions. For example, one indicator called 'policy on equality in access' is categorised in the governance dimension and another, 'affordability of primary care services', in the access dimension.

In the fourth and last step, the national coordinators for 31 European countries were asked to score primary care in their country for the remaining indicators in the PHAMEU monitor. They were asked to use the best available data from several relevant sources such as large international databases (e.g. World Health Organization, Organization for Economic Co-operation and Development), publications of the European Observatory on Health Systems and Policies, and national statistical databases.

Initially, the PHAMEU database only included data for 31 European countries. However, to link primary care strength with the QUALICOPC database, additional data was collected for Australia, Canada, New Zealand, and FYR Macedonia using the same indicators as in the PHAMEU study. This additional data collection was conducted in collaboration with the research team of the Netherlands Institute for Health Services Research (NIVEL).

Detailed information concerning the development and composition of the PHAMEU database is published elsewhere (Kringos et al, 2010a; Kringos et al, 2010b; Kringos, 2012; Boerma, Hutchinson & Saltman, 2015).

1.3 Data collected at four emergency departments in Belgium

In addition, for the analyses presented in Chapter 4.6, trained fieldworkers collected data at four EDs in Flanders, Belgium. Prior to the data collection, these fieldworkers received a one-on-one introduction in the data collection, confidentially and deliverables. Data were collected during daytime hours (Monday-Friday, between 8.00 AM and 6.00 PM). The four EDs that were included were:

i. AZ Zeno hospital at Knokke-Heist (West-Flanders): between September 2014 and March 2015;

ii. Sint-Andries hospital at Tielt (West-Flanders): between July and September 2015;

iii. Sint-Lucas general hospital at Ghent (East-Flanders): between July and September 2015; and

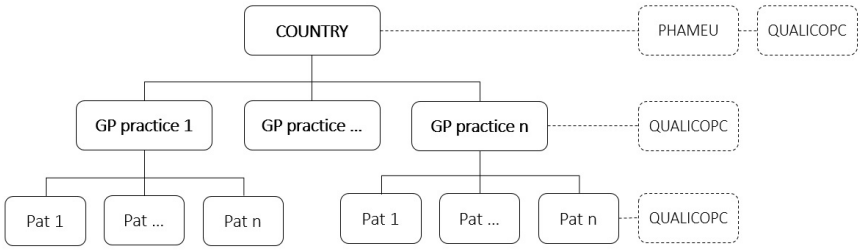
iv. Groeninge general hospital at Kortrijk (West-Flanders): between July and September 2015.

The fieldworkers were instructed to invite all adult patients (≥ 18 years) to participate in the study at the aforementioned EDs. Exclusion criteria were: (i) referral by a GP, (ii) suffering from a life-threatening or urgent health condition, and (iii) entering the ED by ambulance or mobile urgency group. Consecutive patients were also excluded when they attended the ED for the second time. When patients were willing to participate in the study, they were questioned by means of a face-to-face survey interview. This survey included socio-demographic information and a list of 16 reasons that were mainly based on the dimensions of the behavioural model of access to health care (Andersen & Newman, 1973; Andersen, 1997). This survey was also translated into French, English, Turkish and Arabic using a forward-backward translation procedure. Ethical approval for this data collection was acquired by the Ethics Committees of Ghent University hospital, AZ Zeno hospital, Sint-Lucas general hospital, and Groeninge general hospital.

2. Statistical analyses

The data analysed in this thesis mainly had a hierarchical structure: country level data from PHAMEU and QUALICOPC, QUALICOPC data on GP practices nested within these countries, and QUALICOPC information on patients nested within these GP practices. Given this hierarchical structure, most of the presented results were analysed using multilevel modelling. Multilevel modelling allowed us to evaluate the importance of each level (i.e. patient, GP practice, and country) with respect to a particular outcome independently and to decompose the variance in this outcome into three independent components (Hox, Moerbeek & van de Schoot, 2010). Figure 3 provides an overview of the nesting of the data. At the country-level data is extracted from both PHAMEU and/or QUALICOPC, while at the GP practice and patient-level data is only used from the QUALICOPC database.

Figure 3 Nesting of the data



Source: authors' own representation

More detailed informationregarding the statistical analyses in each paper can be found in the Methods sections of that particular paper in the following chapters.

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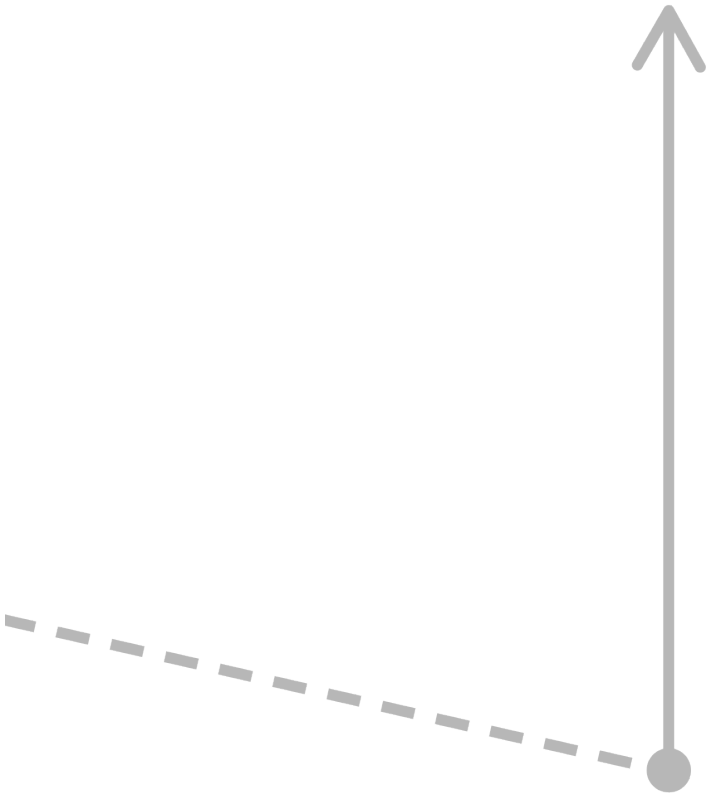
CHAPTER 4

Results



RESULTS

CHAPTER 4.1:

Detollenaere, J., Desmarets, A., Boeckxstaens, P., & Willems, S. (2017). The link between income inequality and health in Europe, adding strength of primary care to the equation. Social Science & Medicine, Under review after resubmission.

Author contributions: SW and JD conceptualised the study design. AD and JD performed the statistical analyses. AD, PB, and JD drafted the manuscript. SW coordinated the study and provided feedback on the draft of the paper.

CHAPTER 4.2:

Detollenaere, J., Van Pottelberge, A., Hanssens, L., Pauwels, L., & Willems, S. (2017). Postponing a general practitioner visit: describing social differences in 31 European countries. Health Services Research. *Published online*. DOI: 10.1111/1475-6773.12669.

Author contributions: AV, LH, SW, and JD contributed to the design of the study. AV, LH, and JD performed the analyses and wrote the paper. TVL, LP, and SW gave feedback on the draft of the manuscript. JD revised the manuscript in correspondence with feedback of the reviewers. SW coordinated the study.

CHAPTER 4.3:

Detollenaere, J., Van Pottelberge., A., Hanssens, L., Boerma, W., Gress, S., & Willems, S. (2016). Patients' financially driven delay of GP visits: is it less likely to occur in stronger primary care systems? Medical Care Research and Review. *Published online.* DOI: 10.1177/1077558716682710.

Author contributions: AV, JD, LH, WB, SG, SW, and JD participated in the conceptualisation of the study. AV and JD performed the statistical analyses and drafted the manuscript. LH, WB, SG and SW provided thorough feedback of the manuscript. JD reworked the manuscript following the feedback of the reviewers and SW coordinated the study.

CHAPTER 4.4:

Detollenaere, J., Hanssens, L. Vyncke, V., De Maeseneer, J., & Willems, S. (2017). Do we reap what we sow? Strength of primary care versus inequity in European unmet health care needs. PLoS One. 12 (1), e0169274.

Author contributions: LH, SW, and JD conceptualised the study design. JD performed the statistical analyses and wrote the original draft. LH, VV, JDM, and SW provided thorough feedback on the draft of the paper. JD revised the manuscript following the comments of the reviewers.

CHAPTER 4.5:

Detollenaere, J., Boeckxstaens, P., & Willems, S. (2017). Association between person-centeredness and financially driven postponement in European primary care. Canadian Medical Association Journal, *Under review after resubmission*.

Author contributions: JD, PB, and SW conceptualised the study design of the manuscript. JD ran the analyses and drafted the manuscript. PB and SW provided thorough feedback on the draft of the manuscript.

CHAPTER 4.6:

Detollenaere, J., Boucherie, J., & Willems, S. (2017). Reasons why self-referring patients attend the ED during daytime hours, and differences among socioeconomic groups? European Journal of General Practice, *Under review.*

Author contributions: JB and JD participated in the conception of the study, ran the analyses and drafted the manuscript. JD coordinated the data collection of the study. SW participated in the conception of the study, supervised the overall project and provided thorough feedback on the draft of the manuscript.

CHAPTER 4.7:

Detollenaere, J., Hanssens, L., Schäfer, W., & Willems, S. (2017). Can you recommend me a good GP? Describing social differences in patient satisfaction in 31 European countries. International Journal for Quality in Health Care, *Accepted.*

Author contributions: LH, SW, and JD participated in the conception of the study. JD performed the statistical analyses and drafted the manuscript. WS offered support in analysing the data. LH, WS, and SW provided feedback on the draft of the manuscript. SW coordinated the study. JD revised the manuscript based on the feedback of the reviewers.

4.1

The link between income inequality and health in Europe, adding strength dimensions of primary care to the equation

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Ann-Sophie Desmarest
Pauline Boeckxstaens
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Detollenaere J., Desmarest, A.S., Boeckxstaens, P., & Willems, S. (2017). The link between income inequality and health in Europe, adding strength dimensions of primary care to the equation. Social Science & Medicine, *Under review after resubmission.*

ABSTRACT

Income inequality has been clearly associated with reduced population health. A body of evidence suggests that a strong primary care system may mitigate this negative association. The aim of this study is to assess the strength of the primary care system's effect on the inverse association between income inequality and health in Europe. Health is operationalised using four cross-sectional outcomes: self-rated health, life expectancy, mental well-being, and infant mortality. Strength of the primary care system is measured using the framework of the Primary Health Care Activity Monitor Europe, and income inequality by the Gini coefficient. Multiple regression models with interaction terms were used. The results confirm that especially the structure and continuity dimension of primary care strength can buffer the inverse association between income inequality and health. European policymakers should therefore focus on strengthening primary care systems in order to reduce inequity in health.

Keywords: Europe, primary care, strength, income inequality, health, Gini

INTRODUCTION

High-income countries suffer from an increasing income inequality. In Europe, one out of four adults and one out of three children are currently at risk of poverty or social exclusion (OECD, 2015; Stiglitz et al., 2014). A country's income inequality is clearly associated with a reduced population health (Babones, 2008; Wilkinson and Pickett, 2006, 2010). Therefore, reducing income inequality within and among countries has become an issue richly debated among policymakers to the extent that it is included as a core goal of the 2030 agenda for sustainable development (Moon, 2013; Obama, 2014; OECD, 2015; UN, 2015). More unequal societies have a shorter life expectancy, a higher prevalence of HIV infection, rates of mental illness, and obesity (Babones, 2008; De Vogli et al., 2005; Drain et al., 2004; Hales et al., 1999; Kondo et al., 2009; Offer et al., 2012; Pickett et al., 2005; Ram, 2006; Subramanian and Kawachi, 2004; UN, 2015; Wilkinson, 1996; Wilkinson and Pickett, 2006). Wilkinson's (1996) seminal work demonstrated this inverse association across different (health) outcomes.

Starfield (2001) has been the first author to hypothesise that a strong primary care may moderate the negative impact of income inequality on health through providing accessible care (especially for vulnerable patients), providing better quality care with a greater focus on prevention, adding to early management of health problems and reducing unnecessary and potentially harmful specialist care (Starfield et al., 2005). This theory has been supported by a large body of evidence (Babones and Turner, 2003; Dabla-Norris et al., 2015; Kringos, 2012; Shi et al., 1999; Starfield, 1998; WHO, 2008, 2009). Moreover, countries with poor primary care orientation are documented to have poor health outcomes on average (Shi, 1992, 1994, 1995; Starfield, 1994, 1998). Strong primary care is defined as accessible care that provides a comprehensive scope meeting the population's health needs, coordinates care across different health-care levels, and provides a continuous provider-patient relationship over time and different disease/illness episodes (Kringos et al., 2010a; Starfield, 1994).

According to Kringos (2012), strengthening the primary care system has been a priority in many European countries. However, the motivations, as well as the approaches and models of primary care reforms, differ significantly between countries (Masseria et al., 2009). Because of this diversity, different configurations of primary care exist across Europe. Various health-care professionals are involved in primary care delivery; however, GPs are usually the main primary care actors and guides through the health care

system (Kringos et al., 2015). European GPs are usually self-employed and paid through a blended fee-for-service and capitation payment system. Furthermore, most European countries regulate the patient flow to secondary health care by implementing: (i) a gatekeeping role for GPs, and (ii) financial stimuli (Masseria et al., 2009). Only recently has a standardised instrument for describing and comparing the strength of European primary care systems, the European Primary Care Monitor, been developed. To the best of our knowledge, no study to date has examined the assumed moderating effect of primary care on the association between income inequality and health in Europe.

Therefore, the aim of this study is to assess the effect of primary care on the inverse association between income inequality and health in Europe. Considering the equity-producing effect of primary care on health outcomes (Starfield, 2001), we hypothesise that European countries with relatively stronger primary care systems buffer the negative impact of income inequality on health. This improved health among a country's citizens is extremely relevant because it drives economic growth through higher labour force participation and higher productivity (Dahlgren and Whitehead, 2007; McKee et al., 2011).

METHODS

Data

In order to answer the research question, two international databases were used: the European Social Survey (ESS) and the Primary Health Care Activity Monitor Europe (PHAMEU) database.

The ESS is an academically driven biennial cross-national survey that is conducted by the ESS European Research Infrastructure Consortium. In this survey, data on Europe's social conditions are assembled, interpreted, and disseminated. A strict random probability sampling, a minimum target response of 70% (nevertheless this response rate is not obtained in all included countries, see Appendix Exhibit A1) and rigorous translation protocols are applied. In the sixth round of the survey, from which the data are used in this study, 29 European countries participated.

PHAMEU is the result of the European Commission–funded project from 2009 to 2010, which aims to describe and compare primary care strength in 31 European countries (WHO, 2009). The development of this database consisted of four steps (Kringos et al., 2010a, 2010b): (i) the identification of relevant primary care dimensions and features using a systematic literature review, (ii) selection of adequate indicators within the primary care dimensions, (iii) evaluation of the adequate indicators by European primary care experts, and (iv) pilot testing of the feasibility of the monitor. In this last step, national coordinators in 31 European countries scored all the retained indicators. They used the most recent and best data available from several sources, such as international databases (WHO or Organization for Economic Co-operation and Development), publications of the European Observatory on Health Systems and Policies, and national databases.

For more information regarding these databases, we refer the reader to the Norwegian Centre for Research Data (2012), Kringos (2012), Kringos et al. (2010a), and Kringos et al. (2010b) respectively.

Sample

European countries were chosen as the unit of analysis. Countries had to be included in both the ESS and PHAMEU databases. This resulted in a sample of 45,007 respon-

dents[1] nested in 24 European countries. However, all dependent variables (except for self-rated health and mental well-being) are aggregated on the macro level. Exhibit 1 provides an overview of the countries included.

Figure 1 Overview of the included countries in the study

Population health

Population health is operationalised using four outcomes: (i) estimates of life expectancy at birth (2011), (ii) infant mortality (2012), (iii) self-rated health (2012), and (iv) mental well-being (2012). Life expectancy and infant mortality are both aggregated macro-level variables provided by the ESS database. Self-rated health and mental well-being are individual variables based on responses of individual respondents; however, they are also extracted from the ESS database.

Life expectancy in the ESS database is operationalised following the definition of the OECD. It is how long, on average, a newborn can expect to live if current death rates do

1 In this ESS round 53.6% of the respondents were female, while 46.4% were male. The average age among respondents was 48.91 years. Concerning the educational level, 11.6% of the respondents had a ES-ISCED I-level, 18.7% ES-ISCED II-level, 36.7% ES-ISCED III-level, 11.9% ES-ISCED IV-level, and 20.9% ES-ISCED V-level. With regard to ethnicity, 5.9% of the respondents belonged to an ethnic minority group, while 94.1% did not.

not change (OECD, 2016a), and it defines "infant mortality" as the number of deaths of children less than one year old, expressed per 1,000 live births (OECD, 2016b). "Self-rated health" is a subjective measure of health which has been commonly used in the literature on income inequality (Mansyur et al., 2008). It was measured by asking the ESS respondents the following question: "How would you describe your state of health?" Respondents had to choose the best applicable answer from a 5-item ordinal scale (very good, good, fair, bad, very bad). The subjective measurement of health is commonly used (McDowell, 2006; Oswald and Wu, 2012); however, it is also a valid predictor of the actual health status of respondents (Idler and Benyamini, 1997; Snead, 2014). Furthermore, measuring health through the respondents has the advantage that it is able to capture health indicators that are difficult to measure by physical measurements (such as pain, suffering, or depression) (McDowell, 2006). In this study, mental well-being is considered an indicator for people's views on acquiring money and possessions, as well as their desires to be famous and good-looking in the eyes of others. It is an indicator of the degree to which they are at risk for depression, anxiety, personality disorders, and substance abuse (Wilkinson and Pickett, 2010). This variable was based on the answers to the ESS question "How happy are you?", which were ranked on an 11-item ordinal scale, ranging from 0 (extremely unhappy) to 10 (extremely happy). This was the only variable that measures mental well-being available in the ESS database.

Income inequality

Following several authors and research institutions, income inequality can be seen as one of the dimensions of inequality (Babones, 2008; Kawachi et al., 1997; Lynch and Kaplan, 1997; OECD, 2015, Wilkinson and Pickett, 2006, 2010). The term income is defined by the ESS as "household disposable income in a particular year. It consists of earnings, self-employment, and capital income and public cash transfers; income taxes and social security contributions paid by households are deducted" (OECD, 2016c). Consequently, income inequality refers to the difference in income distribution (OECD, 2015).

Income inequality was measured using the Gini coefficient, a commonly used indicator of income inequality. The Gini coefficient is based on the Lorenz curve, a cumulative frequency curve that graphically shows the cumulative share of total income. It ranges from 0 to 1, which indicate perfect equality and perfect inequality, respectively (Goldthorpe, 2010; Leigh et al., 2009). The main advantages of the Gini coefficient as the measure for inequality is that this coefficient is based on a ratio analysis which entails

a reliable measure for the entire population (in contrast to per capita income or gross domestic product which are an underrepresentation of a large part of the population). Furthermore, because the cumulative population and its cumulative share of income, which are required to calculate the Gini coefficient, are normalised, this ensures that the coefficient is not sensitive to the specifics of the income distribution (Allison, 1978; Litchfield, 1999). Lastly, to the best of our knowledge, only Gini coefficients are widely available to be used in a cross-national study of the correlates of inequality (Babones, 2008). In this study the Gini coefficient for 2011 was used and was estimated by the ESS team.

Operationalisation strength PC system

According to Kringos (2012) the strength of a primary care system is determined by two levels (i.e. the structure level and process level). The structural level consists of three dimensions: governance, economic conditions, and workforce development, whereas the process level consists of the dimensions' access, continuity of care, coordination of care, and comprehensiveness of care. Kringos (2012) defines the governance indicator as the vision and direction of health policy exerting influence through advocacy, regulation, as well as the collection and use of information. Economic conditions can be summarised as the funding and expenditures of health care, and the income and remuneration of the primary care workforce. Workforce development refers to the profile of primary care providers, as well as their position in the health-care system. Subsequently, the access dimension reflects the availability, accessibility, affordability, and acceptability of primary care services. Continuity of care represents longitudinal, informational, and relational continuity of care. The coordination of care dimension is defined as the ability of primary care providers to coordinate use of other levels of health care. Finally, comprehensiveness of care refers to the range of available primary care services to meet patients' health-care needs.

PHAMEU provides, for each of the aforementioned seven dimensions, a scale from 1 to 3 for each country (a higher score indicates a stronger primary care dimension) (2012). Due to multicollinearity issues (and in line with the research Kringos (2012)), the three dimensions of the structural level of primary care were calculated as one continuous variable, namely primary care structure, which is the arithmetic mean of a country's scores for government, economic conditions, and workforce development.

Statistical analyses

In order to study our research aim, data were analysed using regression analysis with interaction terms. However, first, normality of all variables was assessed using the Shapiro-Wilk test. The dependent variables mental well-being and self-rated health were measured on an ordinal scale with 11 and 5 response categories, respectively. In this study, the outcome mental well-being approached normality in many countries and therefore the authors decided to treat this variable as a continuous variable (Mansyur et al., 2008; Snijders and Bosker, 2012). However, self-rated health showed signs of heteroscedasticity, as well as uneven spacing between the different categories. As a result, the latter was treated as a dichotomous variable. Furthermore, the distribution of the continuous variables life expectancy, infant mortality, mental well-being, and income inequality were highly skewed, and therefore rejected by the normal distribution hypothesis. Consequently, these variables were logarithmically transformed (base 10).

A systematic overview (database and operationalisation in the analyses) of the used variables in the analyses is provided in Appendix 2. Appendix 3 describes the data for each included country.

Second, the dependence between income inequality, the aforementioned strength dimensions, and all outcome variables (with the exception of self-rated health) was tested using Pearson's correlation coefficients. There were no multicollinearity issues; hence, no variables required exclusion. The full correlation matrix can be consulted in Appendix 4.

In order to assess the impact of primary care strength on the association between income inequality and health, a binary logistic regression for the dichotomous outcome variable self-rated health (Table 2) and a multiple linear regression for the continuous outcome variables was conducted (Table 3 and 4). The interaction terms provide log odds of the independent variables expressing the increase in the probability of the health outcome, when the strength dimension change is one unit, holding all other variables in the equation model constant. In each paragraph first the main effect for the particular strength dimension will be explained, followed by the description of the interaction term. For a step-by-step construction of these multiple regression analyses, we kindly refer the reader to the Appendix 5 up to Appendix 8. All interaction terms are plotted in Appendix 9 to Appendix 28. In each figure, the dashed line represents

the median score for that particular dimension, the dotted line the highest score and the full line the lowest score of the represented dimension. The data in this study were analysed with the use of SPSS (IBM, version 23.0.0). The level of statistical significance was set at $p \leq 0.05$.

RESULTS

Association income inequality and health outcomes, controlling for primary care strength dimensions

The logistic regressions without interaction-terms show that higher income inequality is associated with lower self-rated health, life expectancy, mental well-being and higher infant mortality (Table 1). A better-developed primary care structure is associated with higher life expectancy, mental well-being, and infant mortality. A more accessible primary care system is associated with lower self-rated health, life expectancy, and mental well-being. Furthermore, a higher score on the continuity and coordination dimension is associated with higher self-rated health, life expectancy, mental well-being and lower infant mortality. A more comprehensive primary care is associated with lower life expectancy and infant mortality.

Table 1 Multiple regression model for the association between Gini coefficient for income inequality, primary care strength indicators, and the outcomes of health

	Self-rated health B (S.E)	Life expectancy B (S.E)	Mental well-being B (S.E)	Infant mortality B (S.E)
Gini	- 4.452 (0.211) ***	- 0.105 (0.001) ***	- 8.160 (0.193) ***	2.769 (0.052) ***
Structure	- 0.115 (0.100)	0.054 (0.001) ***	1.237 (0.092) ***	1.737 (0.025) ***
Access	-1.563 (0.092) ***	- 0.054 (0.001) ***	- 1.134 (0.083) ***	0.039 (0.023)
Continuity	2.840 (0.295) ***	0.054 (0.001) ***	7.243 (0.273) ***	- 2.435 (0.074) ***
Coordination	0.894 (0.062) ***	0.007 (0.001) ***	1.420 (0.056) ***	- 0.765 (0.015) ***
Comprehensiveness	- 0.094 (0.085)	- 0.018 (0.001) ***	- 0.099 (0.078)	- 0.492 (0.021) ***
Intercept	2.861 (0.725) ***	1.953 (0.002) ***	- 0.513 (0.673)	2.827 (0.183) ***
R2	0.028	0.279	0.065	0.198

All significant results are indicated in bold

* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

Logistic regression models, with interaction terms

The impact of primary care strength dimensions on the association between income inequality and four health outcomes was assessed using interaction terms.

Buffering effect

Primary care structure and continuity dimensions have a buffering effect on the adverse (positively for infant mortality) association between income inequality and life expectancy, mental well-being, and infant mortality (Table 3 and 4); this means that the association between income inequality and these health outcomes decreases when a country is strengthening its primary care structure and continuity dimension. For example, for every increase of 1 SD on the score of the structure dimension (i.e. 0.145), the association between income inequality and life expectancy falls by about 5% (≈ [0.145*0.004]/-0.012). In addition, for every increase of 1 SD on the score of continuity (i.e. 0.041), the association between income inequality and life expectancy falls by about 2% (≈ [0.041*0.035]/-0.084). By contrast, the structure and continuity dimension have no significant effect in the analysis of self-rated health (Table 2).

Aggravating effect

The interaction effects show that the association between income inequality and self-rated health, life expectancy, mental well-being, and infant mortality is aggravated when strengthening the comprehensiveness dimension (Table 2-4). For example, when a country has an average income inequality, life expectancy was found to decrease by 0.008 when comprehensiveness is increased by 1 unit. The interaction effect shows that the association with a positive effect between income inequality and comprehensiveness will be stronger when increasing this primary care dimension.

Mixed effect

The analyses reveal mixed results for the access and coordination dimensions. Access has a buffering effect for the adverse association between self-rated health, life expectancy, mental well-being and income inequality (Table 2 and 3). But the access dimension aggravates the positively related association between infant mortality and income inequality (Table 4).

For primary care coordination, the association between income inequality and self-rated health, life expectancy, and infant mortality increases (aggravating effect) when a country is strengthening its primary care coordination dimension (Table 2-4). Notwithstanding, coordination has a buffering effect on the adverse association between mental well-being and income inequality (Table 3).

Table 2 Binary logistic regression model for the association between Gini coefficient, PC strength dimensions, interaction terms and self-rated health

	Model 2.1	**Model 2.2**	**Model 2.3**	**Model 2.4**	**Model 2.5**
	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)
Gini	- 0.020 (0.046)	- 0.854 (0.062) ***	0.162 (0.167)	0.082 (0.025) ***	0.913 (0.055) ***
Structure	- 0.131 (0.071)				
Access		- 1.261 (0.076) ***			
Continuity			0.264 (0.266)		
Coordination				0.201 (0.047) ***	
Comprehensiveness					- 0.018 (0.080)
Gini * structure	- 0.019 (0.020)				
Gini * access		0.344 (0.027) ***			
Gini * continuity			- 0.096 (0.070)		
Gini * coordination				- 0.084 (0.014) ***	
Gini * comprehensiveness					- 0.401 (0.023) ***
Intercept	0.942 (0.159) ***	3.492 (0.172) ***	0.022 (0.631)	0.295 (0.081) ***	0.745 (0.193) ***

All significant results are indicated in bold

* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3 Multiple linear regression model for the association between Gini coefficient, PC strength dimensions, and interaction terms for life expectancy and mental well-being

	Life expectancy					**Mental wellbeing**				
	Model 3.1.1	**Model 3.1.2**	**Model 3.1.3**	**Model 3.1.4**	**Model 3.1.5**	**Model 3.2.1**	**Model 3.2.2**	**Model 3.2.3**	**Model 3.2.4**	**Model 3.2.5**
	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)
Gini	- 0.012 (0.001) ***	- 0.037 (0.001) ***	- 0.084 (0.001) ***	0.005 (0.001) ***	0.035 (0.001) ***	- 0.502 (0.043) ***	- 2.186 (0.058) ***	- 4.105 (0.158) ***	- 0.433 (0.023) ***	1.635 (0.051) ***
Structure	0.029 (0.001) ***					1.845 (0.066) ***				
Access		- 0.030 (0.001) ***					- 0.126 (0.070)			
Continuity			0.055 (0.002) ***					4.983 (0.252) ***		
Coordination				0.003 (0.001) ***					1.326 (0.044) ***	
Comprehensiveness					- 0.008 (0.001) ***					0.271 (0.073) ***
Gini * structure	0.004 (0.001) ***					0.168 (0.019) ***				
Gini * access		0.016 (0.001) ***					0.912 (0.025) ***			
Gini * continuity			0.035 (0.001) ***					1.685 (0.067) ***		
Gini * coordination				- 0.003 (0.001) ***					0.198 (0.013) ***	
Gini * comprehensiveness					- 0.015 (0.001) ***					- 0.713 (0.021) ***
Intercept	1.833 (0.001) ***	1.967 (0.001) ***	1.766 (0.004) ***	1.893 (0.001) ***	1.920 (0.001) ***	3.045 (0.149) ***	7.511 (0.157) ***	- 4.654 (0.597) ***	4.927 (0.076) ***	6.644 (0.177) ***
R^2	0.147	0.234	0.162	0.098	0.247	0.049	0.060	0.047	0.051	0.060

All significant results are indicated in bold
* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4 Multiple linear regression model for the association between Gini coefficient, PC strength dimensions, and interaction terms for infant mortality

	Infant mortality				
	Model 4.1.1	**Model 4.1.2**	**Model 4.1.3**	**Model 4.1.4**	**Model 4.1.5**
	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)
Gini	0.186 (0.012) ***	- 0.824 (0.016) ***	0.781 (0.045) ***	0.004 (0.007)	- 0.009 (0.015)
Structure	0.946 (0.019) ***				
Access		0.198 (0.020) ***			
Continuity			- 1.322 (0.072) ***		
Coordination				- 0.008 (0.013)	
Comprehensiveness					- 0.153 (0.021) ***
Gini * structure	- 0.065 (0.005) ***				
Gini * access		0.382 (0.007) ***			
Gini * continuity			- 0.309 (0.019) ***		
Gini * coordination				0.025 (0.004) ***	
Gini * comprehensiveness					0.024 (0.006) ***
Intercept	0.454 (0.042) ***	2.137 (0.044) ***	5.715 (0.171) ***	2.589 (0.022) ***	2.938 (0.051) ***
R^2	0.130	0.141	0.083	0.083	0.076

All significant results are indicated in bold

* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

DISCUSSION

European primary care is characterised by large diversity in configurations (Masseria et al., 2009). Various health-care professionals are involved in primary care delivery; however, GPs are usually the main primary care actors and guides through the health-care system (Kringos et al., 2015). European GPs are usually self-employed and paid through a blended fee-for-service and capitation payment system. Furthermore, most European countries regulate the patient flow to secondary health care by implementing: (i) a gatekeeping role for GPs, and (ii) financial stimuli (Masseria et al., 2009). In this study we assessed the effect of primary care on the inverse association between income inequality and health in Europe.

This study confirmed the inverse association between income inequality and health in Europe. Countries with large income differences showed a tendency for poor self-rated health, short life expectancy, high rates of infant mortality, and poor mental well-being. These results are in line with previous studies (Babones, 2008; Wilkinson and Pickett, 2006, 2010). However, it has been observed that evidence confirming the negative association between income inequality and health outcomes is in most cases found in the United States as well as in other countries with comparable or even worse income inequality (Kawachi et al., 1997; Lynch and Kaplan, 1997). By contrast, a recent study in Europe by Hu et al. (2015) did not find a significant association between income inequality and health. In order to explain this paradox, the authors argued that the countries in their sample were more egalitarian than the United States. Nonetheless, the study of Hu et al. (2015) is based on data from before the financial crisis in 2008 and 2009, whereas present study used data from 2011 and 2012 when income inequality had already dramatically increased in Europe (OECD, 2013; Stiglitz et al., 2014). This may explain why the association between income inequality and health in Europe proved to be significant in our study.

Furthermore, it became clear from the sample of 24 European countries that some primary care strength dimensions can reduce the negative impact of income inequality on health. The multiple regression models in this study showed that the better the primary care structure and continuity of a country, the higher its population's life expectancy, mental well-being, and infant mortality. These results seem to further support the assumption that strong primary care systems may reduce the ill effects of

income inequality on health (Dabla-Norris et al., 2015; Kringos, 2012; Shi et al., 2003; Starfield, 1994, 2001; WHO, 2008).

Based on the research of Starfield, we hypothesised a positive association between primary care strength and inequity in health. However, according to the analyses, this association seemed less straightforward as theoretically expected. For example, comprehensiveness has an aggravating effect on the negative (positive for infant mortality) association between income inequality and all included health outcomes. This intriguing result, however, makes us wonder which came first—the chicken or the egg? For example, it is unclear whether countries provide a broad scope of care services, and whether the high-end services are only accessible for the wealthier patients, and not for the vulnerable groups. Or this may be the other way around, in that countries observe that health is inequitably distributed among their citizens and want to tackle this by increasing the comprehensiveness of their primary care system. However, this can also be questioned for all the other significant associations. Due to the exploratory nature of this study, we cannot provide causal inference. Further research should, therefore, address these exploratory findings.

Lastly, the analyses reveal some mixed results for the access and coordination dimension. Access has a buffering effect on the adverse association between income inequality and self-rated health, life expectancy, and mental well-being, but aggravates the association between income inequality and infant mortality. The coordination dimension has a buffering effect on the inverse association between income inequality and mental well-being, but has an aggravating effect on the association between income inequality and self-rated health, life expectancy, and infant mortality. The latter finding rejects our hypothesis that a strong primary care system is associated with lower inequity in health, however, this finding may be attributable to the cross-sectional nature of this study. The extent to which our society is characterised by social, organisational and technological changes, makes it questionable to assume that differences in attitudes or behaviours are the result of the passage of time, rather than cohort differences. We look forward to longitudinal research that studies these effects.

Furthermore, our findings are in line with the neo-materialist hypothesis, one of the discussed contextual mechanisms that attempt to explain the negative impact of income inequality on health (Lynch and Kaplan, 1997; Smith, 2014). The neo-materialist hypothesis suggests that income inequality might inhibit public expenditures on human

resources such as in health care, which could consequently lead to lower population health (Lynch and Kaplan, 1997; Smith, 2014). Additionally, a substantial body of evidence has demonstrated that primary care, at both the macro and individual levels, has a beneficial impact on health outcomes (Shi, 1992; Starfield, 1994, 2001). Therefore, it can be suggested that policymakers in Europe who aim to reduce income inequality as well as its negative impact on health should focus on strengthening the primary care systems of their countries.

Limitations

Several limitations of the present study should be taken into account. The claimed causal role of inequality by Wilkinson and Picket (2010) has to deal with some disagreement amongst other authors (Beckfield, 2004; Goldthorpe, 2010; Leigh et al., 2009). The opponents argue that the research of Wilkinson and Picket is based on cross-sectional and correlational evidence, and therefore, does not prove causality. Due to the cross-sectional design, as well as the exploratory nature of this study, we cannot infer causality between strength dimensions of primary care, income inequality, and the included health outcomes. Nevertheless, previous research on this topic that consists of longitudinal designs and which used different measures of income inequality, showed a significant direct association between primary care and favourable mortality outcomes (Shi, 1992). Current study is also limited to 24 countries, which is from a statistical point of view not optimal. Additionally, the countries included in this study are not random and cannot be generalised to all of Europe. Moreover, there are some inconsistencies in the literature on the appropriate ecological levels of measurement to study the association between income inequality and health (Ross et al., 2000). Wilkinson and Pickett (2006) argue in their review that an appropriate level is able to reflect differences in social class in a society, which is the case at the country level. Finally, it is suggested that some cross-country differences, for instance political systems and cultural values and norms, confound the association between income inequality and health (Eckersly, 2006; Navarro and Shi, 2001). These potential confounding variables could also play a role in explaining the variance. However, due to the exploratory nature of the study and restriction of the data, these were not taken into account in the current study. We are looking forward to future research that addresses this limitation.

CONCLUSION

The present exploratory study supports the assumption of the existence of a negative association between income inequality and health in Europe. A strong primary care system may be able to buffer this. Therefore, European policymakers should focus on strengthening the primary care systems in their countries to reduce the adverse impact of income inequality on health. However, further longitudinal research is required to investigate these findings in depth and to claim causal inference.

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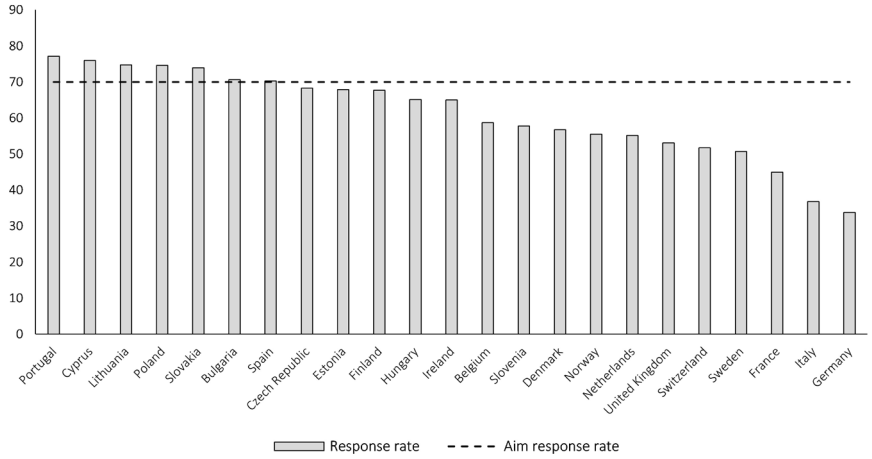
APPENDIX

Appendix 1 Response rates in each country, ineligibles excluded, ESS (round six)



Appendix 2 Overview of the included variables and operationalisation

		Database		Data operationalisation	
		ESS (sixth round)	PHAMEU	Continue variable?	Logarithmic transformation
HEALTH	Income inequality	x		x	x
	Self-rated health (SRH)	x		Dichotomous	
	Life expectancy (LE)	x		x	x
	Mental wellbeing (MW)	x		x	x
	Infant mortality (IM)	x		x	x
PC STRENGTH	Structure		x	x	
	Access		x	x	
	Continuity		x	x	
	Coordination		x	x	
	Comprehensiveness		x	x	

Appendix 3 Descriptive statistics of the dependent and independent variables per country

	Health outcomes					Gini coef-ficient	Primary care strength [3]				
	Self-rated health [1]		Life expectancy [2] (2011, both sexes)	Mental wellbeing [2]	Infant mortality [2] (2012)	(2012)	Structure	Access	Continuity	Coordination	Comprehensi-veness
	(Very) good	Fair and (very) bad									
Belgium	74.9 %	25.1 %	80	7.69	483	26.50	Medium	Weak	Strong	Medium	Medium
Bulgaria	55.2 %	44.8 %	74	5.27	536	33.60	Weak	Weak	Medium	Weak	Strong
Cyprus	76.2 %	23.8 %	81	7.20	36	31.00	Weak	Weak	Medium	Weak	Weak
Czech Republic	65.3 %	34.7 %	78	6.64	285	24.90	Weak	Strong	Strong	Medium	Weak
Denmark	75.6 %	24.4 %	79	8.38	197	28.10	Strong	Strong	Strong	Strong	Medium
Estonia	47.1 %	52.9 %	76	6.82	50	32.50	Medium	Medium	Strong	Medium	Medium
Finland	67.6 %	32.4 %	81	8.09	141	25.90	Medium	Medium	Weak	Medium	Strong
France	61.1 %	38.9 %	82	7.17	2917	30.50	Medium	Weak	Medium	Medium	Medium
Germany	59.8 %	40.2 %	81	7.63	2202	28.30	Medium	Medium	Strong	Weak	Medium
Hungary	58.7%	41.3 %	75	6.10	438	27.20	Weak	Strong	Medium	Weak	Medium
Iceland	79.7 %	20.3 %	82	8.21	5	24.00	Weak	Medium	Strong	Medium	Medium
Ireland	81.0 %	19.0 %	81	7.06	250	29.90	Medium	Weak	Strong	Weak	Weak
Italy	63.1 %	36.9 %	82	7.09	1707	32.40	Strong	Medium	Medium	Medium	Weak
Lithuania	52.3 %	47.7 %	74	6.38	118	32.00	Medium	Strong	Weak	Strong	Strong
Netherlands	70.8 %	29.2 %	81	7.81	649	25.40	Strong	Strong	Weak	Strong	Weak
Norway	77.5 %	22.5 %	81	8.16	150	22.50	Medium	Medium	Medium	Weak	Strong
Poland	62.2 %	37.8 %	76	7.32	1791	30.90	Weak	Strong	Medium	Strong	Weak
Portugal	55.5 %	44.5 %	80	6.44	303	34.50	Strong	Strong	Medium	Medium	Strong
Spain	59.4 %	40.6%	82	7.57	1417	34.20	Strong	Strong	Strong	Strong	Strong
Slovakia	59.8 %	40.2 %	76	6.65	321	25.30	Weak	Medium	Strong	Weak	Weak
Slovenia	59.9 %	40.1 %	80	7.26	36	23.70	Strong	Strong	Weak	Strong	Weak
Sweden	79.0 %	21.0 %	80	7.26	36	23.70	Medium	Medium	Weak	Strong	Strong
Switzerland	82.8 %	17.2 %	83	8.08	296	28.2	Weak	Medium	Medium	Medium	Strong
United Kingdom	69.2 %	30.8%	80	7.50	3347	31.30	Strong	Strong	Medium	Strong	Strong

[1] Valid percentages presented; [2] mean per country presented; [3] * Based on the indicators and features in the Primary Health Care Activity Monitor for Europe a score per dimension is calculated, using two-level hierarchical regression models. In order to facilitate interpretation, the scores for all countries on these dimensions are presented as percentiles (≤ 33% is defined as 'weak', 34%-65% as 'medium', ≥ 66% as 'strong')

Appendix 4 Pearson correlation matrix between all dependent variables and all independent variables

			DEPENDENT VARIABLES				
			Self-rated health [1]	Life expectancy	Mental health	Infant mortality	HDI
INDEPENDENT VARIABLES		**Gini**	**- 0.110 *** **	**- 0.245 *** **	**- 0.157 *** **	**0.288 *** **	**- 0.482 *** **
	PC strength	**Structure**	**- 0.024 *** **	**0.200 *** **	**0.078 *** **	**0.282 *** **	**0.250 *** **
		Access	**- 0.054 *** **	**- 0.160 *** **	**0.027 *** **	**0.091 *** **	**- 0.058 *** **
		Continuity	- 0.002	**- 0.031 *** **	0.009	- 0.002	**0.118 *** **
		Coordination	**0.018 *** **	**0.141 *** **	**0.123 *** **	**- 0.039 *** **	**0.249 *** **
		Comprehensi-veness	**- 0.021 *** **	**- 0.018 *** **	0.007	**0.036 *** **	**- 0.028 *** **

All significant results are indicated in bold

* p ≤ 0.05; ** p < 0.01; *** p < 0.001

Appendix 5 Multiple logistic regression model for the effect of PC strength indicators on the association between Gini coefficient for income inequality and self-rated health

	Model 2.1	**Model 2.2**	**Model 2.3**	**Model 2.4**	**Model 2.5**	**Model 2.6**
	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)
Gini	**- 4.189 (0.193) *** **	**- 4.097 (0.197) *** **	**- 4.644 (0.201) *** **	**- 4.800 (0.207) *** **	**- 4.501 (0.207) *** **	**- 4.452 (0.211) *** **
Structure	-	**- 0.158 (0.071) *** **	**0.483 (0.082) *** **	**0.522 (0.083) *** **	- 0.150 (0.095)	- 0.115 (0.100)
Access	-	-	**- 1.281 (0.083) *** **	**- 1.317 (0.087) *** **	**- 1.537 (0.089) *** **	**-1.563 (0.092) *** **
Continuity	-	-	-	**0.802 (0.257) ** **	**2.830 (0.295) *** **	**2.840 (0.295) *** **
Coordination	-	-	-	-	**0.885 (0.061) *** **	**0.894 (0.062) *** **
Comprehen-siveness	-	-	-	-	-	- 0.094 (0.085)
Intercept	**6752 (0.282) *** **	**6.793 (0.299) *** **	**9.212 (0.334) *** **	**- 7.533 (0.632) *** **	**2.767 (0.720) *** **	**2.861 (0.725) *** **
R^2	0.015	0.015	0.022	0.022	0.028	0.028

All significant results are indicated in bold

* p ≤ 0.05; ** p < 0.01; *** p < 0.001

Appendix 6 Multiple linear regression model for the effect of PC strength indicators on the association between Gini coefficient for income inequality and life expectancy

	Model 3.1	Model 3.2	Model 3.3	Model 3.4	Model 3.5	Model 3.6
	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)
Gini	**- 0.072 (0.001) *****	**- 0.086 (0.001) *****	**- 0.106 (0.001) *****	**- 1.114 (0.001) *****	**- 0.112 (0.001) *****	**- 0.105 (0.001) *****
Structure	-	**0.027 (0.001) *****	**0.050 (0.001) *****	**0.052 (0.001) *****	**0.048 (0.001) *****	**0.054 (0.001) *****
Access	-	-	**- 0.046 (0.001) *****	**- 0.048 (0.001) *****	**- 0.049 (0.001) *****	**- 0.054 (0.001) *****
Continuity	-	-	-	**0.039 (0.001) *****	**0.051 (0.001) *****	**0.054 (0.001) *****
Coordination	-	-	-	-	**0.005 (0.001) *****	**0.007 (0.001) *****
Comprehensive-ness	-	-	-	-	-	**- 0.018 (0.001) *****
Intercept	**2.003 (0.002) *****	**1.963 (0.002) *****	**2.045 (0.002) *****	**1.963 (0.002) *****	**1.943 (0.002) *****	**1.953 (0.002) *****
R^2	0.060	0.123	0.247	0.257	0.260	0.279

All significant results are indicated in bold

* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix 7 Multiple linear regression model for the effect of PC strength indicators on the association between Gini coefficient for income inequality and mental well-being

	Model 4.1	Model 4.2	Model 4.3	Model 4.4	Model 4.5	Model 4.6
	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)
Gini	**- 6.669 (0.180) *****	**- 7.640 (0.182) *****	**- 7.907 (0.185) *****	**- 8.689 (0.191) *****	**- 8.202 (0.191) *****	**- 8.160 (0.193) *****
Structure	-	**1.745 (0.066) *****	**2.049 (0.076) *****	**2.263 (0.077) *****	**1.202 (0.087) *****	**1.237 (0.092) *****
Access	-	-	**- 0.624 (0.079) *****	**- 0.788 (0.080) *****	**- 1.707 (0.080) *****	**- 1.134 (0.083) *****
Continuity	-	-	-	**3.815 (0.077) *****	**7.228 (0.272) *****	**7.243 (0.273) *****
Coordination	-	-	-	-	**1.410 (0.056) *****	**1.420 (0.056) *****
Comprehen-siveness	-	-	-	-	-	- 0.099 (0.078)
Intercept	**16. 970 (0.263) *****	**14.425 (0.278) *****	**15.534 (0.311) *****	**7.516 (0.589) *****	- 0.619 (0.667)	- 0.513 (0.673)
R^2	0.045	0.037	0.046	0.052	0.065	0.065

All significant results are indicated in bold

* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

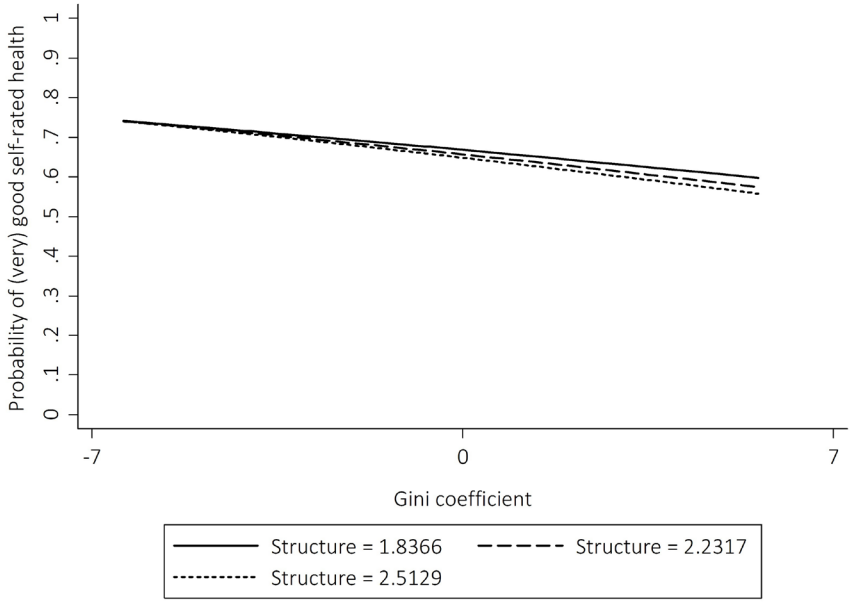
Appendix 8 Multiple linear regression model for the effect of PC strength indicators on the association between Gini coefficient for income inequality and infant mortality

	Model 5.1	**Model 5.2**	**Model 5.3**	**Model 5.4**	**Model 5.5**	**Model 5.6**
	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)	B (S.E)
Gini	**3.264 (0.051) *****	**2.744 (0.051) *****	**2.729 (0.052) *****	**2.836 (0.053) *****	**2.557 (0.052) *****	**2.769 (0.052) *****
Structure		**0.961 (0.018) *****	**0.979 (0.021) *****	**0.949 (0.022) *****	**1.561 (0.024) *****	**1.737 (0.025) *****
Access			- 0.035 (0.022)	- 0.013 (0.022)	**0.174 (0.022) *****	0.039 (0.023)
Continuity				**- 0.532 0.067) *****	**- 2.505 (0.074) *****	**- 2.435 (0.074) *****
Coordination					**- 0.815 (0.015) *****	**- 0.765 (0.015) *****
Comprehensive-ness						**- 0.492 (0.021) *****
Intercept	**- 2.186 (0.075) *****	**- 3.587 (0.077) *****	**- 3.524 (0.087) *****	**- 2.404 (0.165) *****	**2.295 (0.182) *****	**2.827 (0.183) *****
R^2	0.083	0.135	0.136	0.137	0.188	0.198

All significant results are indicated in bold

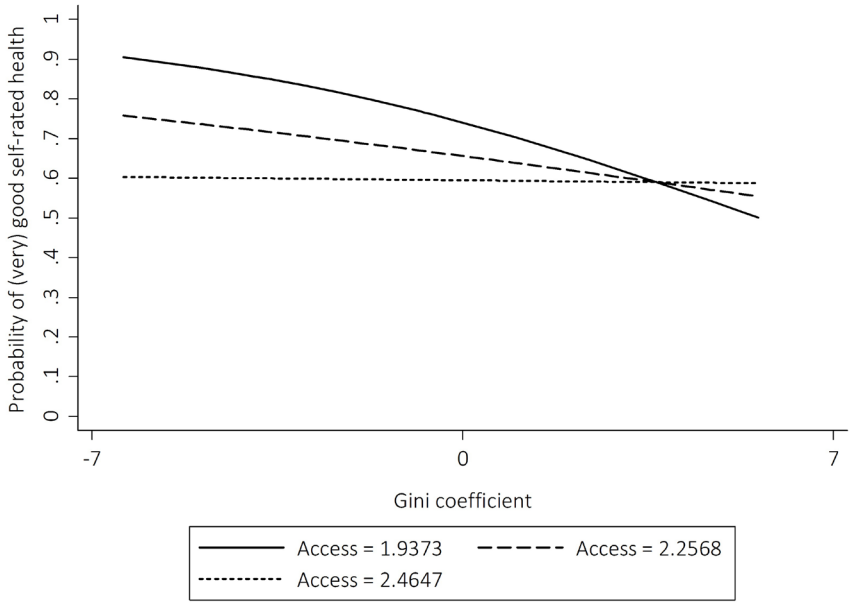
* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

Appendix 9 Interaction plot visualising the association of the structure dimension of primary care strength on the association between income inequality and self-rated health



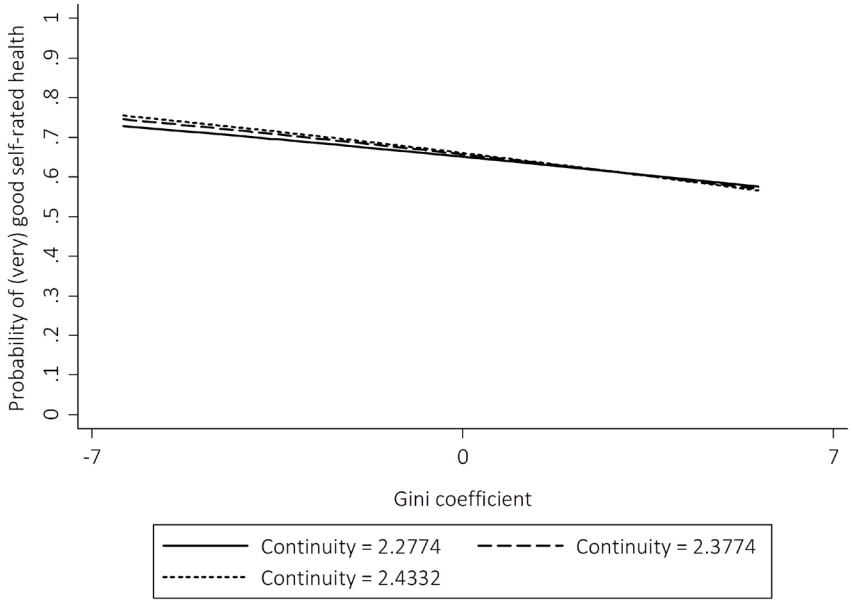
Note No significant association

Appendix 10 Interaction plot visualising the association of the access dimension of primary care strength on the association between income inequality and self-rated health



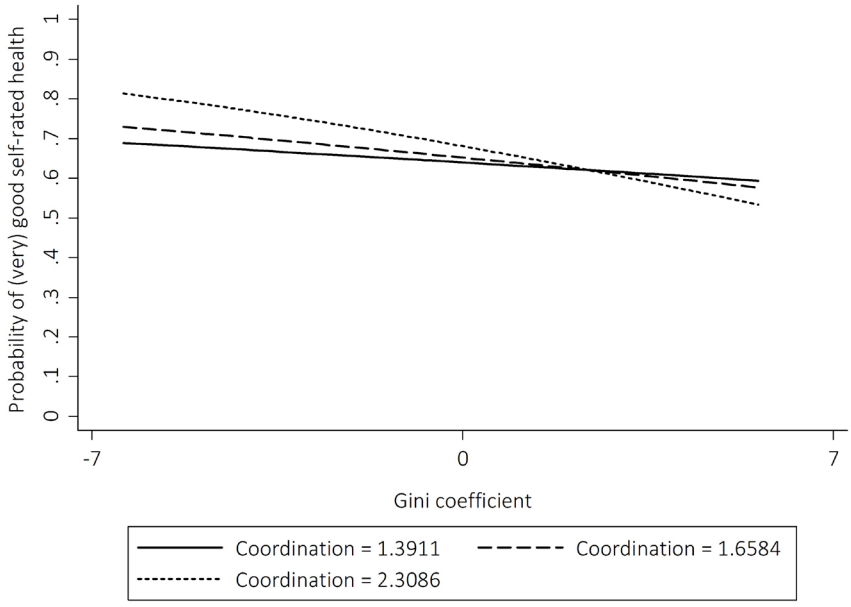
Note Buffering association

Appendix 11 Interaction plot visualising the association of the continuity dimension of primary care strength on the association between income inequality and self-rated health



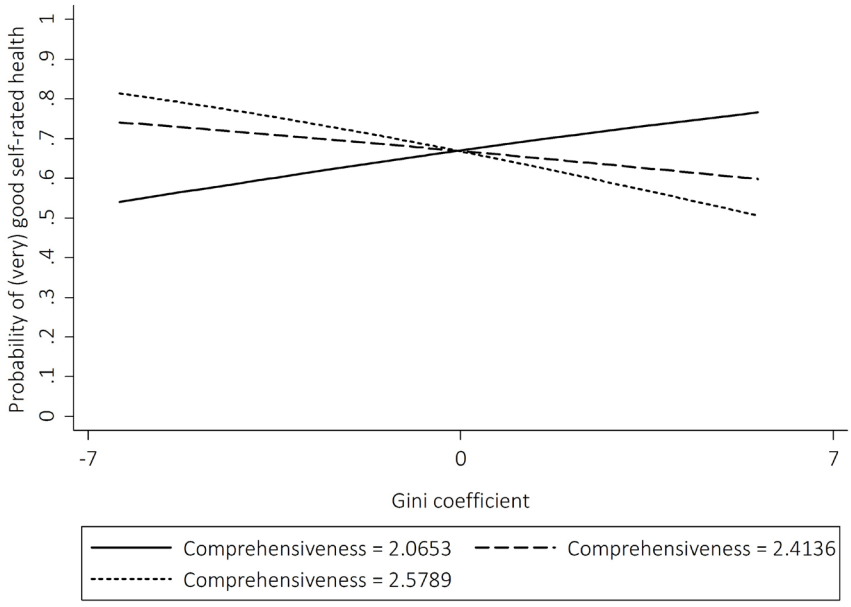
Note No significant association

Appendix 12 Interaction plot visualising the association of the coordination dimension of primary care strength on the association between income inequality and self-rated health



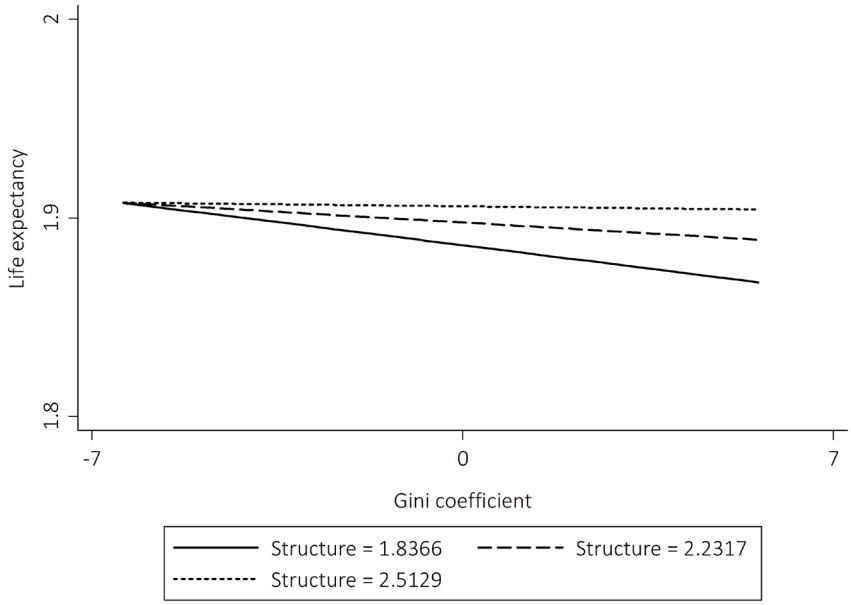
Note Aggravating association

Appendix 13 Interaction plot visualising the association of the comprehensiveness dimension of primary care strength on the association between income inequality and self-rated health



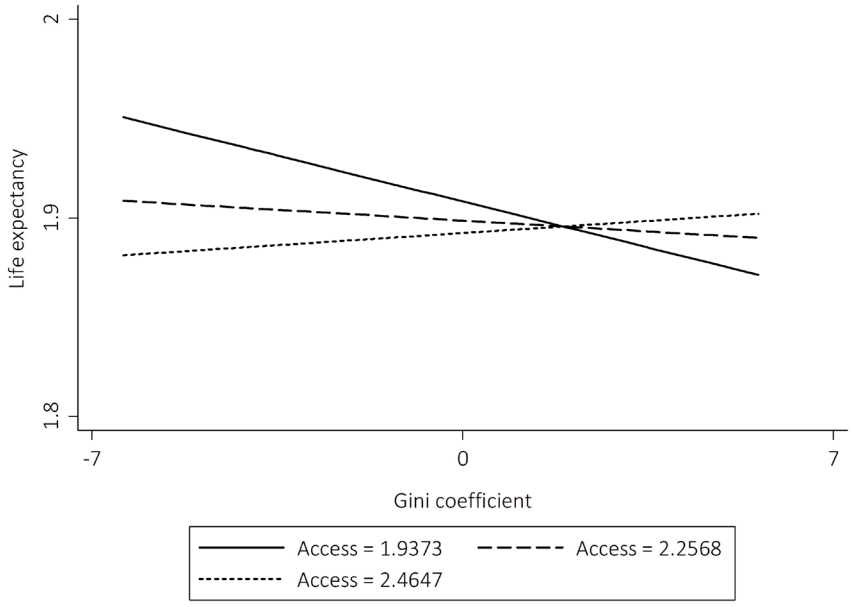
Note Aggravating association

Appendix 14 Interaction plot visualising the association of the structure dimension of primary care strength on the association between income inequality and life expectancy



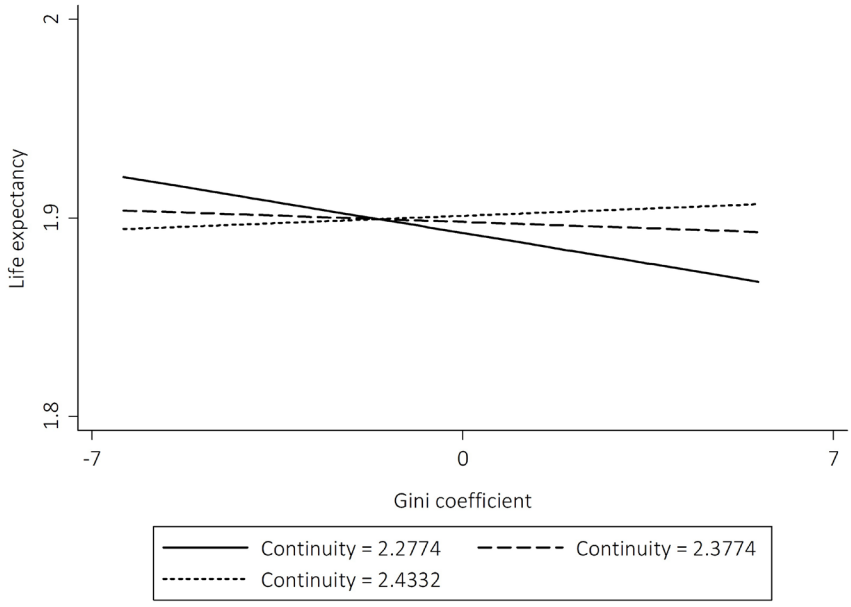
Note Buffering association

Appendix 15 Interaction plot visualising the association of the access dimension of primary care strength on the association between income inequality and life expectancy



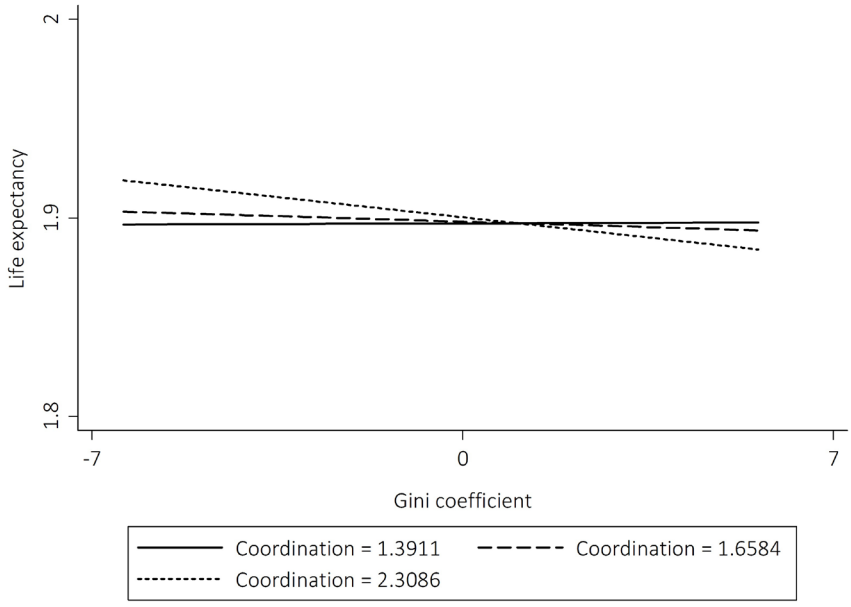
Note Buffering association

Appendix 16 Interaction plot visualising the association of the continuity dimension of primary care strength on the association between income inequality and life expectancy



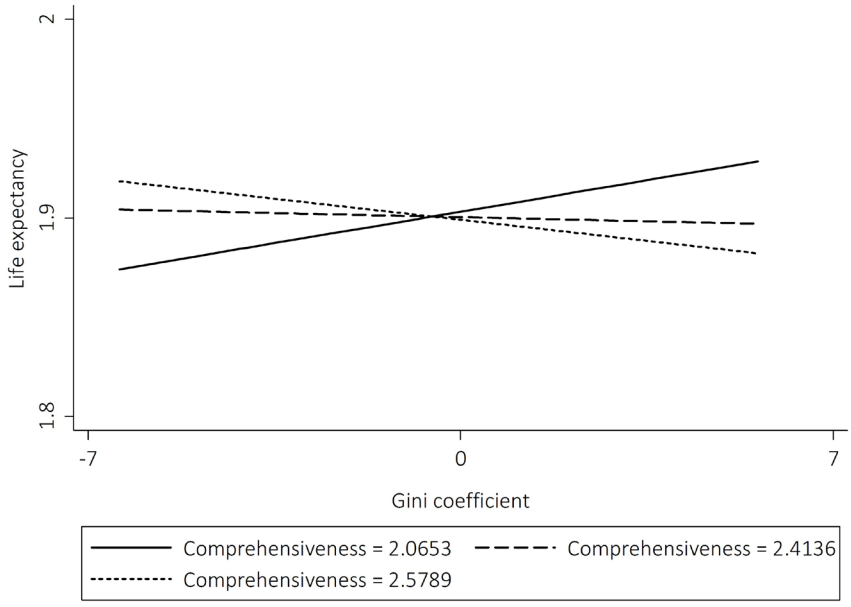
Note Buffering association

Appendix 17 Interaction plot visualising the association of the coordination dimension of primary care strength on the association between income inequality and life expectancy



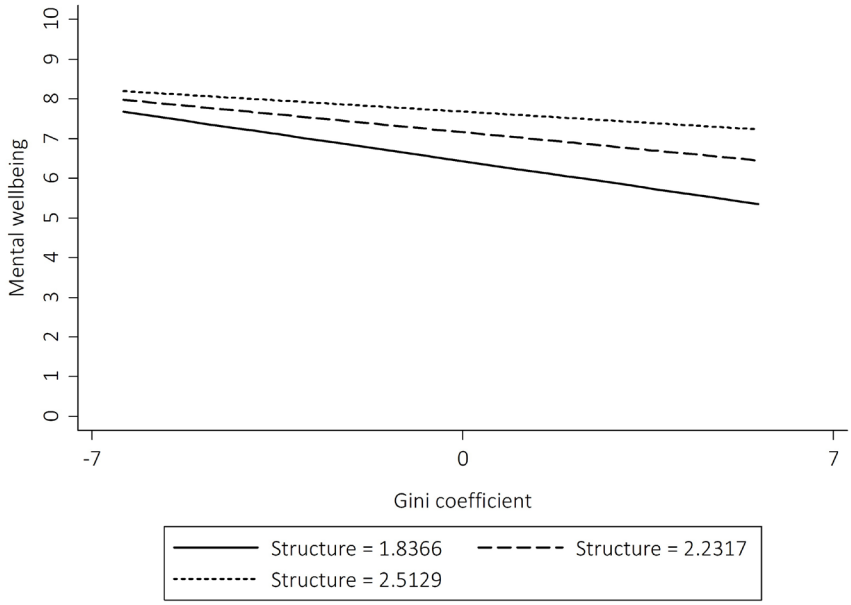
Note Aggravating association

Appendix 18 Interaction plot visualising the association of the comprehensiveness dimension of primary care strength on the association between income inequality and life expectancy



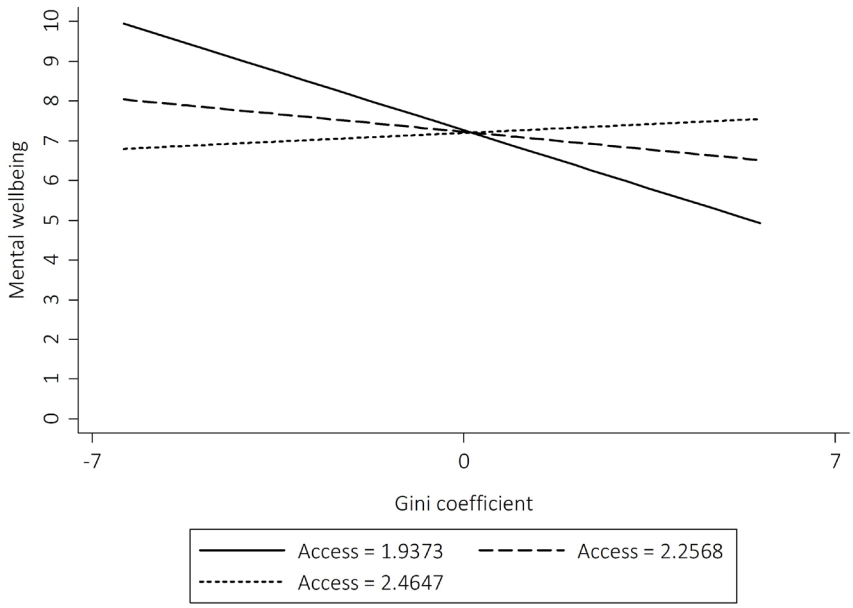
Note Aggravating association

Appendix 19 Interaction plot visualising the association of the structure dimension of primary care strength on the association between income inequality and mental wellbeing



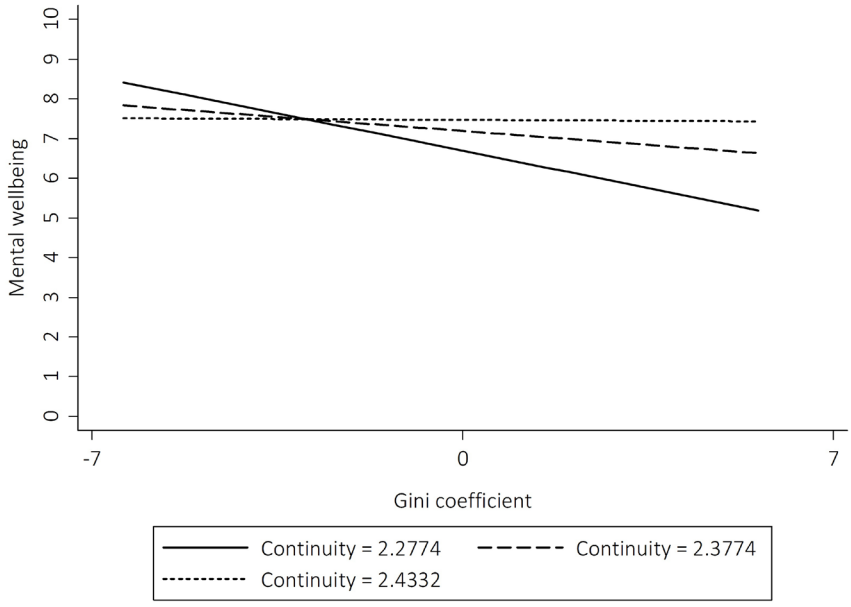
Note Buffering association

Appendix 20 Interaction plot visualising the association of the access dimension of primary care strength on the association between income inequality and mental wellbeing



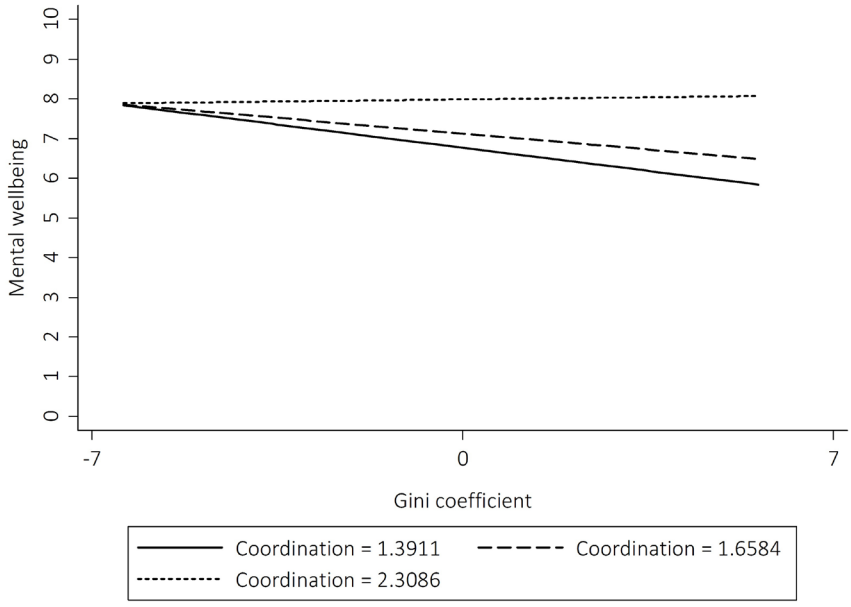
Note Buffering association

Appendix 21 Interaction plot visualising the association of the continuity dimension of primary care strength on the association between income inequality and mental wellbeing



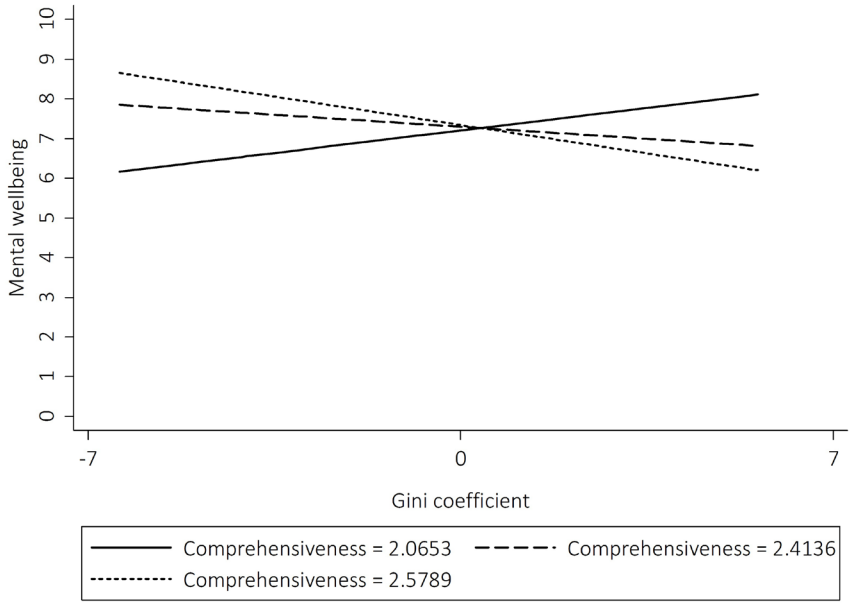
Note Buffering association

Appendix 22 Interaction plot visualising the association of the coordination dimension of primary care strength on the association between income inequality and mental wellbeing



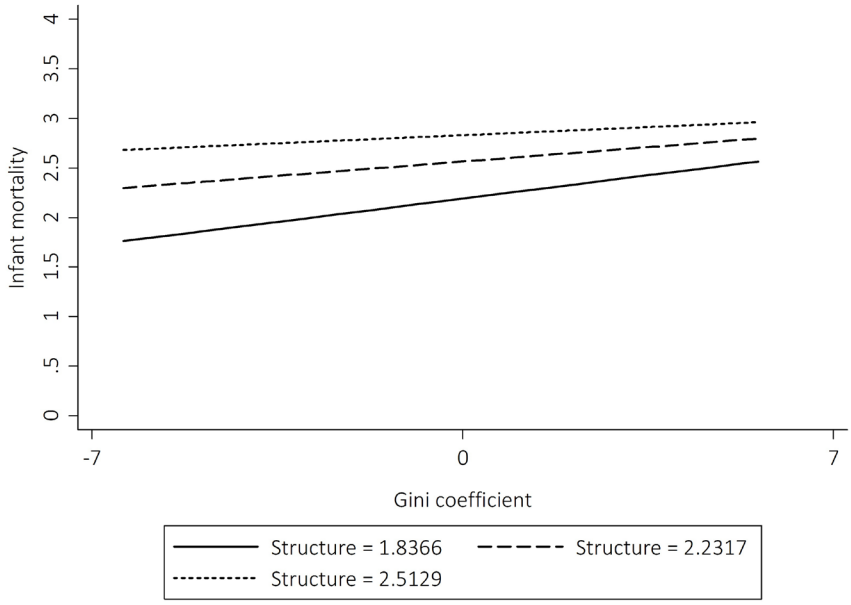
Note Buffering association

Appendix 23 Interaction plot visualising the association of the comprehensiveness dimension of primary care strength on the association between income inequality and mental wellbeing



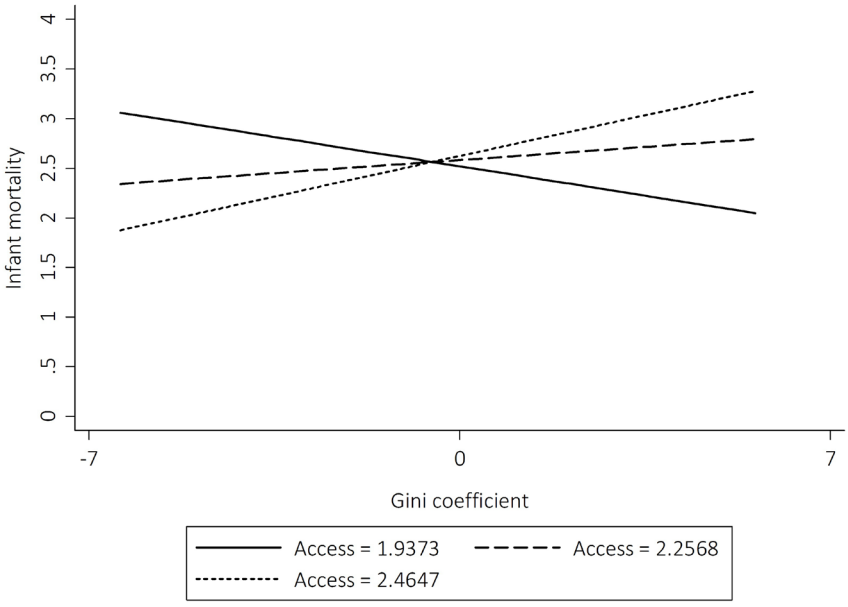
Note Aggravating association

Appendix 24 Interaction plot visualising the association of the structure dimension of primary care strength on the association between income inequality and infant mortality



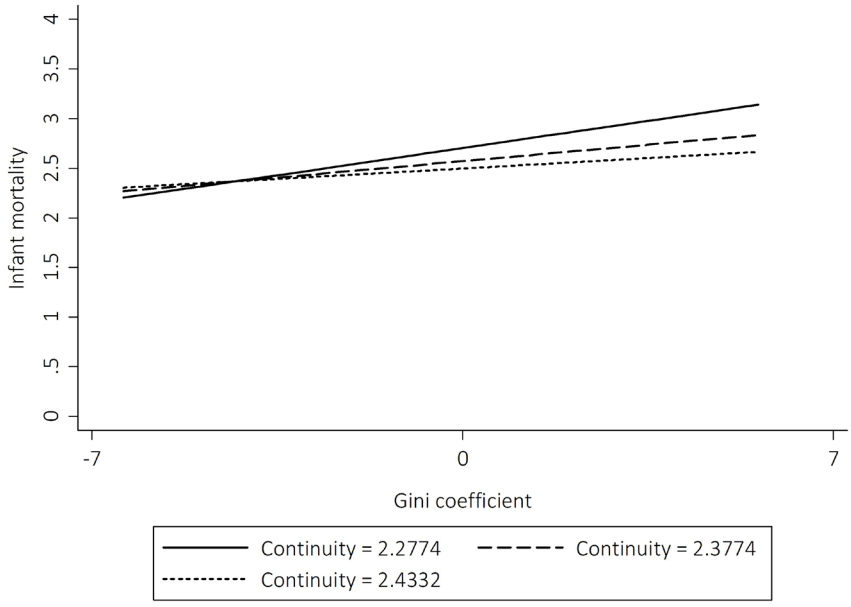
Note Buffering association

Appendix 25 Interaction plot visualising the association of the access dimension of primary care strength on the association between income inequality and infant mortality



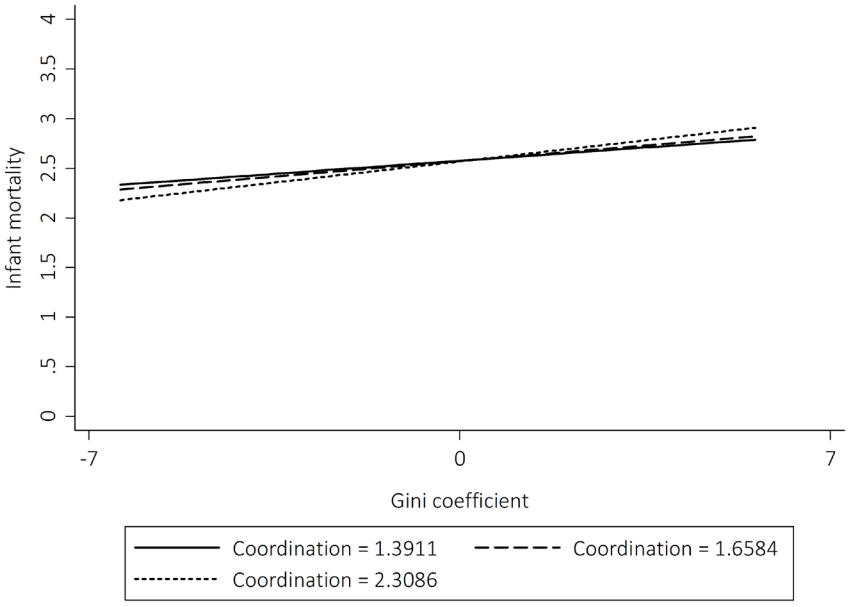
Note Aggravating association

Appendix 26 Interaction plot visualising the association of the continuity dimension of primary care strength on the association between income inequality and infant mortality



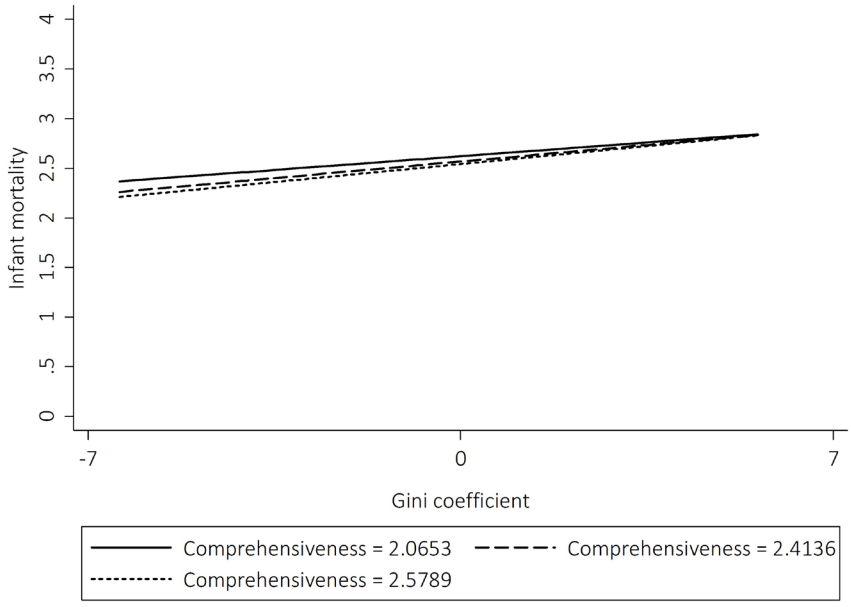
Note Buffering association

Appendix 27 Interaction plot visualising the association of the coordination dimension of primary care strength on the association between income inequality and infant mortality



Note Aggravating association

Appendix 28 Interaction plot visualising the association of the comprehensiveness dimension of primary care strength on the association between income inequality and infant mortality



Note Aggravating association

(Footnotes)

1 Given the uneven distribution of the variable 'self-rated health', the correlation between this variable and the other independent variables is calculated using the Spearman correlation equation.

4.2

Postponing a general practitioner visit: describing social differences in thirty-one European countries

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ABSTRACT

Objective. To describe social differences in postponing a general practitioner visit in 31 European countries and to explore whether primary care strength is associated with postponement rates.

Data Sources. Between October 2011 and December 2013, the multi-country QUALICOPC study collected data on 61,931 patients and 7,183 general practitioners throughout Europe.

Study Design. Access to primary care was measured by asking the patients whether they postponed a general practitioner visit in the past year. Social differences were described according to patients' self-rated household income, education, ethnicity, and gender.

Data Collection/Extraction Methods. Data were analysed using multivariable and multilevel binomial logistic regression analyses.

Principal Findings. According to the variance–decomposition in the multilevel analysis, most of the variance can be explained by patient characteristics. Postponement of general practitioner care is higher for patients with a low self-rated household income, a low education level, and a migration background. In addition, although the point estimates are consistent with a substantial effect, no statistically significant association between primary care strength and postponement in the 31 countries is determined.

Conclusions. Despite the universal and egalitarian goals of health care systems, access to general practitioner care in Europe is still determined by patients' socioeconomic status (self-rated household income and education) and migration background.

Keywords: Europe, postponement, primary health care, equity, access

INTRODUCTION

Health inequities seem to be constant or even to increase for some diseases and/or social groups despite marked improvements in the health of the general population (Hart, 1971; Mackenbach et al., 2008; Strand et al., 2010; Whitehead & Dahlgren, 2006). Different mechanisms between social groups lie at the base of these persisting disparities in health: (1) different levels of power and resources to live a healthy life, (2) different levels of exposure to health hazards, (3) same level of exposure leads to differential impacts, (4) lifecourse effects considering the cumulative outcome of all of the pathways mentioned above, and (5) different social and economic effects of being sick (Dahlgren & Whitehead, 2006).

Strong primary care (PC) systems have the potential to improve the performance of health care systems, boost population health, and last but not least, lower socioeconomic inequality (Kringos et al., 2013a; Kringos et al., 2013b; Macinko, Starfield, & Shi, 2003; Starfield, 2006; Starfield, 2009). According to Kringos et al. (2013a), the key features of a strong PC system can be clustered in three levels: the structure, process, and outcome level of the system. Indicators on the structure level are governance, economic conditions, and workforce development. The process level includes four indicators: access, continuity, comprehensiveness, and coordination. At the outcome level, indicators consist of quality, efficiency, and equity. Countries with a relatively overall strong PC system are Denmark, Finland, Lithuania, Slovenia, Portugal, Spain, the United Kingdom, the Netherlands, Estonia, and Belgium. The PC system of these countries has broad policy and regulations that focus on PC, combined with a good financial coverage, and qualitative PC workforce conditions (Kringos et al., 2013a).

According to the European Primary Care Monitor, wealthier countries are associated with a weak PC structure and lower PC accessibility. Also, countries ruled by a left-wing governments have stronger PC structure, accessibility, and coordination of PC (Kringos et al., 2013c). A more detailed overview of every country's score on the specific indicators can be consulted in the Appendix of this article.

Equity in access to health care is an important objective for many health care systems (Adamson et al., 2003; Goddard & Smith, 2001). The main focus of equitable access to care is that the likelihood of access is affected by a patient's need for medical care and not by his or her social status, age, gender, income, or ethnic background (Aday &

Andersen, 1984). However, some social groups are still more likely to encounter barriers in accessing PC compared to others. The literature indicates that lower socioeconomic groups (Himmelstein & Woolhandler, 1995; Murray, 2000; Reilly, Schiff, & Conway, 1998), women (Diamant et al., 2004; Xu & Borders, 2003), and ethnic minorities (Dias, Severo, & Barros, 2008; Dias et al., 2011; Kontopantelis, Roland, & Reeves, 2010) may encounter several barriers to health care, such as financial, cultural, or geographical barriers, that can decrease their access to care and therefore perpetuate or increase existing social disparities in health. Postponing health care can lead to more serious health problems that could be prevented at an earlier stage; however, by postponing health care, health problems require hospitalization and/or specialist care (Verlinde et al., 2013).

The existence of barriers in access to health care can be demonstrated by relatively high rates of care postponement for different social groups (Aday & Andersen, 1984; Burstrom, 2002; Whitehead & Hanretty, 2004). This finding has been observed in several countries. For example, Vilhjalmsson et al. (2005) showed that economically troubled people in Iceland are more likely to postpone or cancel a general practitioner (GP) visit than others, although they needed care. In Belgium, 19 percent of low-educated households in a Health Interview Survey (Demarest, 2013) indicated that they had delayed GP care in comparison with 9 percent of households with high educational attainment (Drieskens et al., 2010). When looking more internationally, the studies supported by the Commonwealth Fund revealed that low-income Americans are more likely than their low-income counterparts in other countries to indicate that they postponed care in the last year (Davis & Ballreich, 2014; Schoen et al., 2013, Schoen et al., 2014). Compared to the United States, the United Kingdom, Germany, France, Sweden, Norway, and Switzerland report significantly better accessibility to health care. Concerning gender, 4.5 percent more women than men reported unmet needs for a medical examination in Romania (Eurostat, 2011). Postponement of seeking care may have severe health consequences, such as a decline in health status, increased rates of complications, or longer hospital stays (Adler et al., 1993; Epstein, Stern, & Weissman, 1990; Himmelstein & Woolhandler, 1995). These implications matter especially for people with a lower socioeconomic status, whose average health is generally poorer than for other social classes (Droomers & Westert, 2004; Mackenbach et al., 2008).

Besides the fact that prior research, as described above, did not yet address the link between strength of PC and postponement of care, these aforementioned studies comprise some limitations. First, these previous studies frequently focused on one

country (Burstrom, 2002; Verlinde et al., 2013; Vilhjalmsson, 2005) or a selection of European countries (Davis and Ballreich, 2014; Devaux & de Looper, 2012; Schoen et al., 2013; Schoen et al., 2014), and they often focused on only relatively wealthy countries (van Doorslaer, Koolman, & Puffer, 2002; van Doorslaer, Masseria, & Koolman, 2006). International comparative European research on the postponement of seeking PC is lacking. Nevertheless, this type of research could help identify opportunities to reduce inequities (Mackenbach et al., 2008). It could also give insight into the existence of social gradients in postponement of PC in countries for which there is no (recent) knowledge concerning this topic. In addition, the available literature often focuses on specific patient groups, such as age cohorts (e.g., Crespo-Cebada & Urbanos-Garrido, 2012; Flores et al., 1999) or patients with particular pathologies (e.g., Bebbington et al., 2000; Rahimi et al., 2007), and not on a representative sample of the population, which imposes a major limitation in generalizing these findings.

In this study, we contribute to the literature—and address the aforementioned limitations of previous research—in two important ways. The first aim of this study is to provide an overview of the frequency of and the social gradient in the postponement of GP care in Europe. More concretely, we investigate social differences in the postponement of GP care according to patients' self-rated household income level, education, ethnicity, and gender in 31 European countries. Secondly, we study whether the strength of the PC systems influences postponement of GP care.

DATA AND METHODS

Data Collection

Within the framework of the Quality and Costs of Primary Care in Europe (QUALICOPC) project, a cross-sectional multi-country study, surveys were held in 31 European countries (the EU-27 [except for France], FYR Macedonia,

Iceland, Norway, Switzerland, and Turkey). Random sampling was used to select GPs in countries having national registers of GPs. When countries only provided regional registers, random samples were drawn from regions that represent the national setting. If only lists of facilities (and not individual GPs) in the country existed, a random selection of these lists was made. In each country, an average of 220 GP practices was selected. In Turkey, Spain, and Belgium, larger samples were conducted to allow comparisons between regions. The British sample was collected in England and not in the other parts of the United Kingdom. Lastly, the QUALICOPC database does not provide information for France. The data collection for this country could not be successfully completed within the time frame of the project.

Between October 2011 and December 2013, fieldworkers visited the selected GP practices and invited patients (aged 18 years or older) who had just had a face-to-face consultation with the GP to fill in the questionnaire until responses from 10 patients were collected. The survey among the patients consisted of two questionnaires: one about the patient's experiences and one about the patient's values. The first nine patients who were willing to participate completed the questionnaire about their experiences during the consultation and the PC system in general. The tenth patient completed the questionnaire that probed the patient about his or her PC values. In addition, one GP per practice also completed a questionnaire. Finally, each trained fieldworker filled in a short questionnaire about the practice facility. A unique practice identification number linked the GP response to the responses of their 10 patients and the fieldworker survey, allowing multilevel analysis of the data. In total, 7,183 GPs and 61,931 patients participated in the study, and the average response rate was 74.1 percent (range: 54.5–87.6 percent).

Ethical approval was acquired in accordance with the legal requirements in each country.

Outcome measures

Access to PC was measured by asking the patients whether they postponed a GP visit in the past year (yes/no).

Four patient characteristics were used to identify social groups: self-rated household income, education, ethnicity, and gender. Concerning self-rated income, patients could answer the following question 'Compared to the average in your country, would you say your household income is ...' by choosing one of these three categories: 'below average,' 'around average', or 'above average'. Based on thorough discussion with the other QUALICOPC partners, the answer 'below average' was recoded as 'low self-rated income', 'around average' as 'middle self-rated income', and 'above average' as 'high self-rated income'. The question that probed the education of the participant was based on the categories as proposed by ISCED (International Standard Classification of Education). These categories are the following: 'preprimary education', 'primary education', 'lower secondary education', '(upper) secondary education', 'postsecondary nontertiary education', 'first stage of tertiary education', and 'second stage of tertiary education'. The QUALICOPC consortium decided to recode these into the three categories: 'low' (no education, (pre)primary or lower secondary education), 'middle' (upper secondary education), and 'high' (postsecondary or higher education) groups. Following the framework of Rumbaut (2006), ethnicity was determined by the birthplace of the respondent and his or her mother; when both were born in the country of residence or when only the mother was born in the country of residence, the patient was considered 'native'. When both the patient and mother were born elsewhere, the patient was considered to be a 'first-generation migrant'. When the patient was born in the country of residence and the mother was born in a foreign one, the patient was considered to be a 'second generation migrant'. Finally, gender was categorized in 'men' and 'women', following the answer of the participant. All analyses were controlled for age differences. Age was added to the model as a continuous variable.

Statistical analyses

Social differences were evaluated in multivariable models using binomial logistic regression analyses. First, a separate model for each country was calculated. The standard errors of all logistic regression models were adjusted using the standard Huber–White correction to account for the heteroscedasticity introduced by the clustering of patients

in GP practices. Initially, the variables were checked for multicollinearity test using variance inflation factors. Although there were no hard and fast rules about what value of the variance inflation factor should cause concern, Myers (1990) and O'Brien (2007) suggested that a value of 10 is the cutoff point from which collinearity appears. For each variable, we report the odds ratios and their 95 percent confidence interval (CI). These tests were conducted in SPSS (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). As a pretest, we conducted a multivariable logistic regression of postponement on the individual patient characteristics in interaction with country dummies pooling all European observations. For each patient characteristic, we could then perform a Wald test for the equality of the 31 interactions between this characteristic and the country dummies. Equality of the country-individual predictor-interactions was rejected at the 10 percent significance level for high (versus low) income and at the 5 percent significance level for all other individual characteristics.

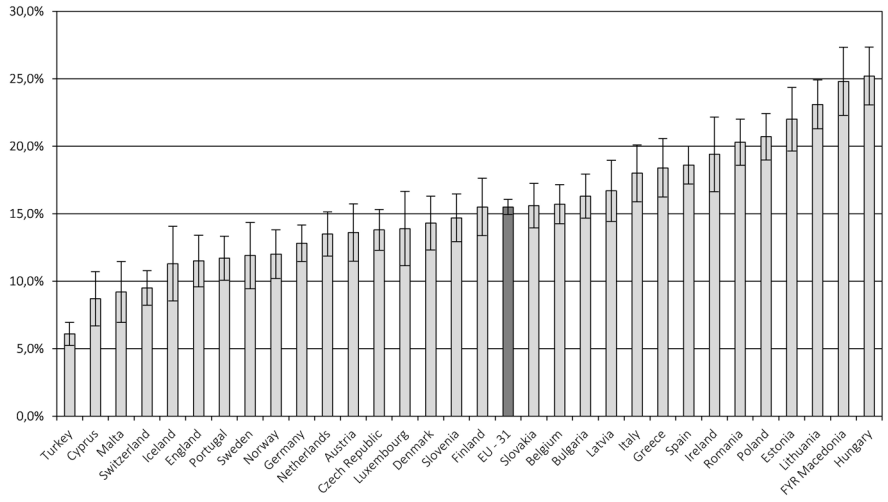
Second, given the hierarchical structure of the data, a logistic multilevel regression model was fitted to the data for all 31 European countries together. The null model was used to evaluate the importance of each level (i.e., patient level, GP practice level, and country level) independently in explaining the prevalence of postponement of care. In Model 1, the influence of individual patient characteristics (i.e., self-rated household income, education, ethnicity, and gender; controlled for age) on the prevalence of postponement was examined.

Subsequently, indicators of the strength of the PC systemwere gradually added. PC strength was, as mentioned in the Introduction, operationalized by the European Primary Care Monitor of Kringos (2012). The structure variable (added from Model 2 on) was added as a continuous variable, following the operationalization of Kringos et al. (2013b), because the different structure indicators (governance, economic conditions, and workforce development) were positively associated with each other. Also following the operationalization of (Kringos et al., 2013b), the process indicators (access, continuity, coordination, and comprehensiveness) were added separately because they were not associated with each other, in Models 3, Model 4, Model 5, and Model 6, respectively. All multilevel analyses were conducted inMLwiN (University of Bristol, United Kingdom, version 2.31), first-order PQL was used as the nonlinear estimation procedure. The level of statistical significance was set at $p \leq 0.05$.

RESULTS

On average, 15.6 percent of the European respondents postponed at least one visit to a GP in the last year (Figure 1). Countries that are located in the upper quartile concerning the postponement rates are as follows: Hungary (25.2 percent), FYR Macedonia (24.8 percent), Lithuania (23.1 percent), Estonia (22.0 percent), Poland (20.7 percent), Romania (20.3 percent), and Ireland (19.4 percent). Countries situated in the lower quartile are as follows: Portugal (11.7 percent), England (11.5 percent), Iceland (11.3 percent), Switzerland (9.5 percent), Malta (9.2 percent), Cyprus (8.7 percent), and Turkey (6.1 percent).

Figure 1 National distributions of patients that postponed a GP visit in the last year (valid %) and their binomial confidence intervals

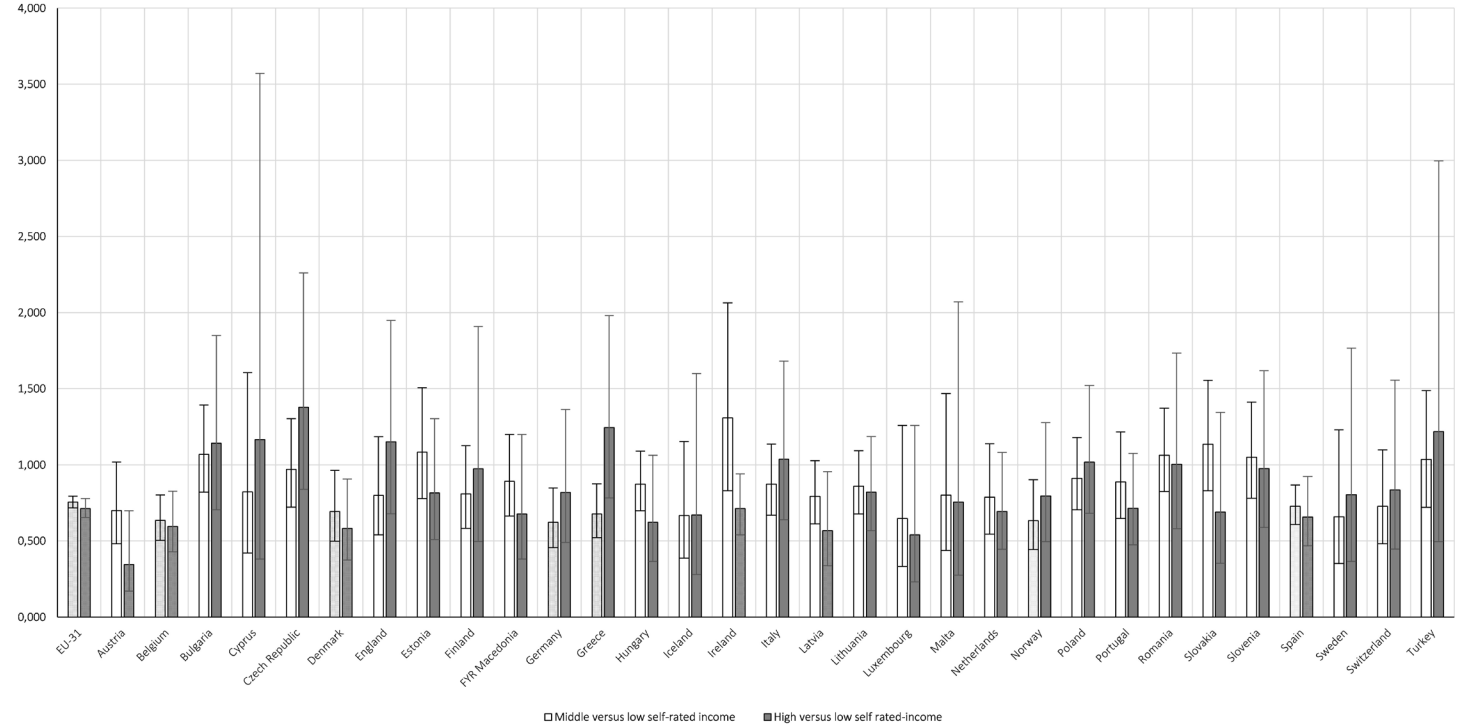


Note Missings range from 0.0% (Turkey) to 6.6% (Iceland)

The results for the multivariable logistic regressions of postponement on the predictors at the individual level by country are summarized in Figure 2 (income as a predictor of postponement), Figure 3 (education as predictor), Figure 4 (ethnicity as predictor), and Figure 5 (gender as predictor). The related coefficients can be found in Appendix 2. Figure 2 shows that in Europe, the chance to postpone care is higher for lower income groups compared to middle- (OR: 0.755, CI: 0.717–0.794) and high-income groups (OR: 0.713, CI: 0.655–0.777). Furthermore, we observe a significant difference between middle- and low-income groups in Belgium, Denmark, Germany, Greece, Norway, and

Spain. In all of these countries, patients with a middle income are less likely to postpone care compared to their counterparts with a low income. At last, the logistic regression models per country show that high-income groups postpone care less frequently than low-income groups in Austria, Belgium, Denmark, Ireland, Latvia, and Spain.

Figure 2 Binomial logistic regression of postponement on self-rated household income (odds ratios and 95% CI given)

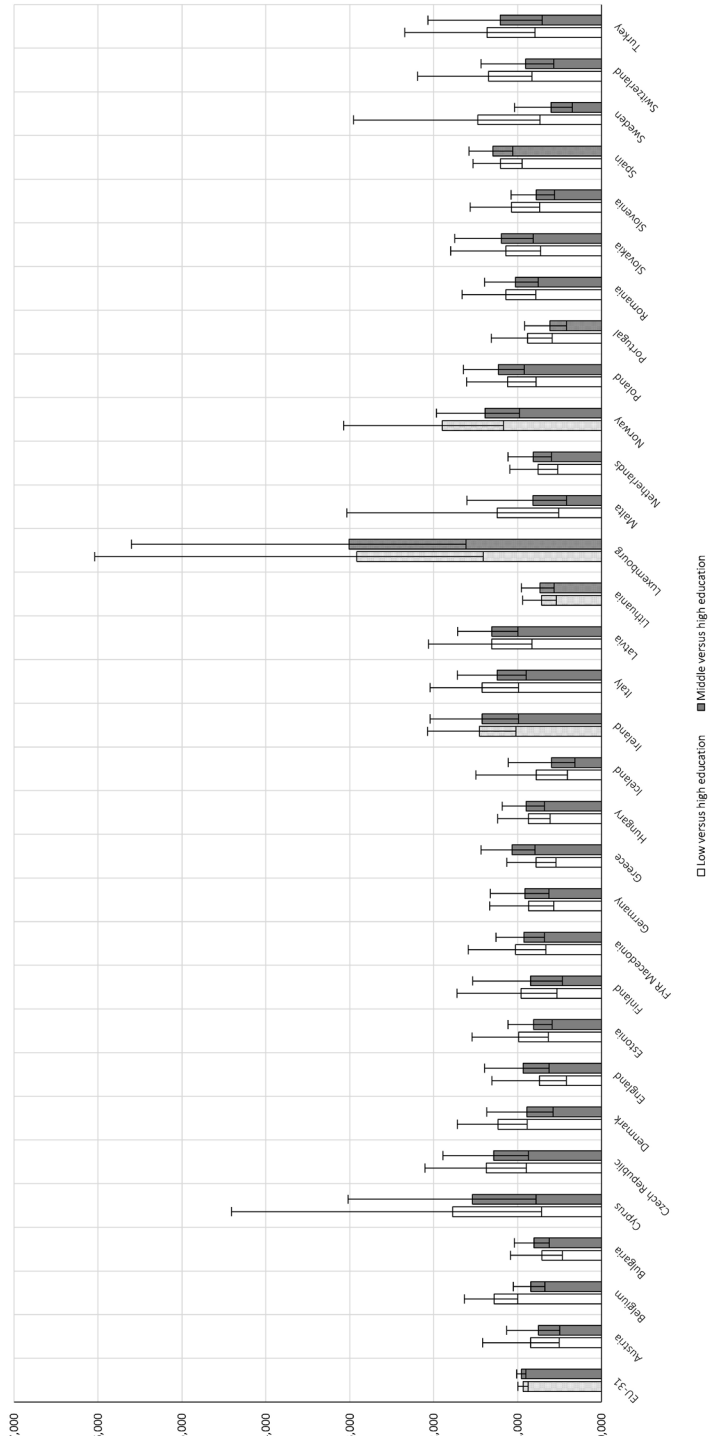


All regression analyses controlled for patient's age, educational attainment, ethnic background, and gender

95% CIs are based on the Huber-White corrected standard errors

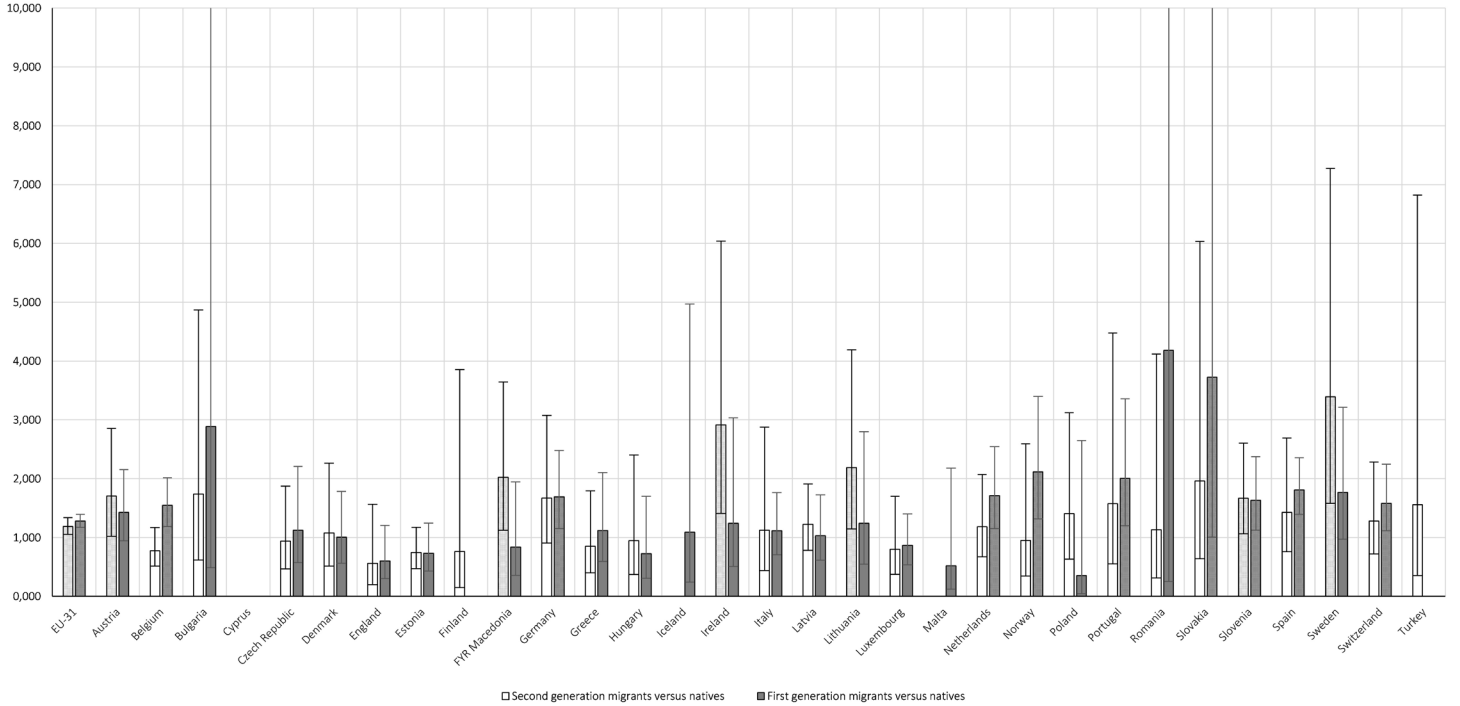
All significant results are marked with dots; Reference category: low self-rated income

Figure 3 Binomial logistic regression of postponement on educational attainment (odds ratios and 95% CI given)



All regression analyses controlled for patient's age, self-rated household income, ethnic background, and gender
95% CIs are based on the Huber-White corrected standard errors
All significant results are marked with dots ; Reference category: high education

Figure 4 Binomial logistic regression of postponement on ethnic background (odds ratios and 95% CI given)



All regression analyses controlled for patient's age, self-rated household income, educational attainment, and gender

95% CIs are based on the Huber-White corrected standard errors

All significant results are marked with dots; Reference category: natives

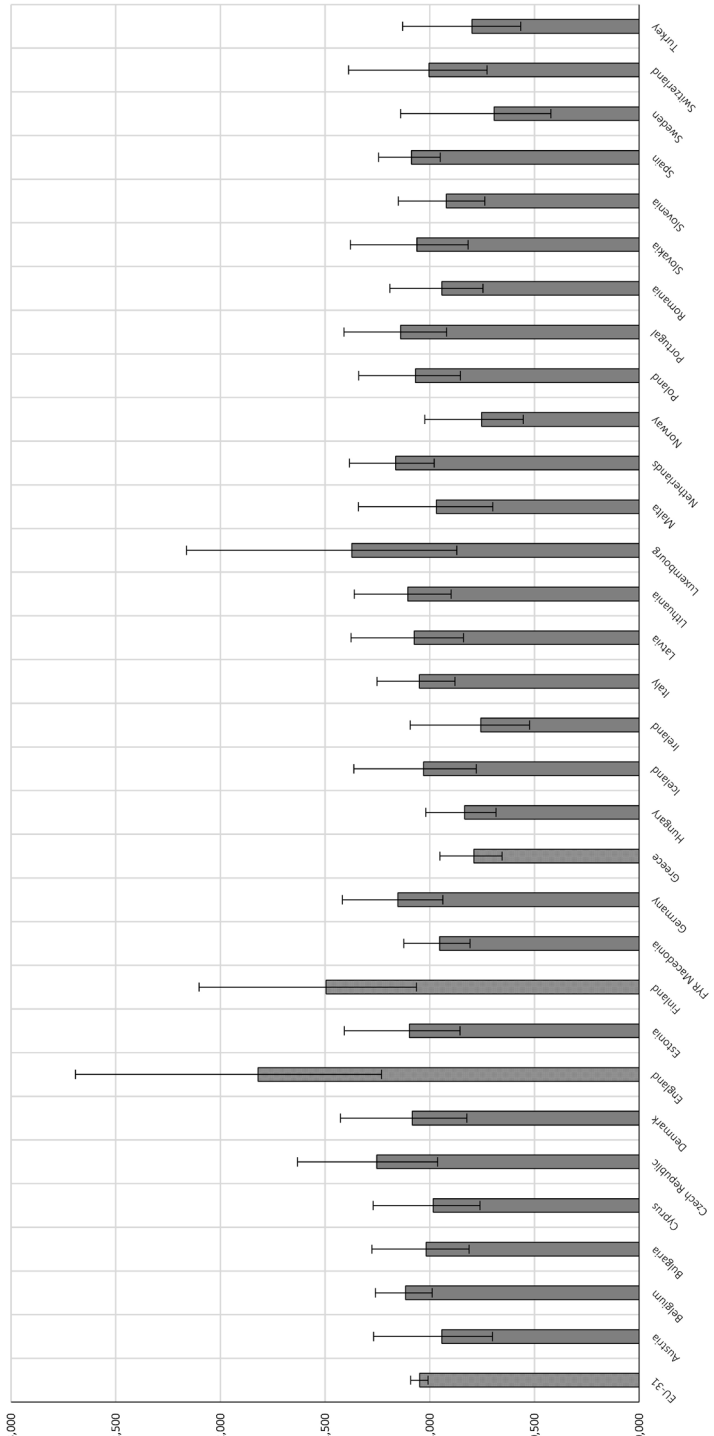


Figure 5 Binomial logistic regression of postponement on gender (odds ratios and 95% CI given)

All regression analyses controlled for patient's age, self-rated household income, educational attainment, and ethnic background
95% CIs are based on the Huber-White corrected standard errors
All significant results are marked with dots ; Reference category: men

The independent impact of education on postponement of care can be consulted in Figure 3. The results of these multivariable logistic regression models are, however, mixed. In the European model, low-educated patients tend to postpone care less frequently compared to high-educated patients (OR: 0.934, CI: 0.875–0.997). This trend can also be observed in Lithuania. The opposite trend is found in Ireland, Luxembourg, and Norway, where high-educated patients postpone care less frequently compared to their loweducated counterparts. Furthermore, compared to high-educated patients, middle-educated patients postpone more care in Luxembourg and Spain. While in Lithuania and Portugal, middle-educated patient groups postpone less compared to higher educated patient groups.

Subsequently, Figure 4 presents the results of the association between ethnicity and postponement of care. In the overall European regression model, both second- (OR: 1.187, CI: 1.052–1.340) and first-generation migrants (OR: 1.281, CI: 1.175–1.396) are more likely to postpone care compared to the native population. The same trend between second-generation migrants and natives can be observed in the subsamples for Austria, FYR Macedonia, Ireland, Lithuania, Slovenia, and Sweden. First-generation migrants are more likely to postpone GP care compared to the native population in Belgium, Germany, Netherlands, Norway, Portugal, Slovakia, Slovenia, Spain, and Switzerland.

Furthermore, women are more likely to postpone GP care in the pooled European data (OR: 1.049, CI: 1.009–1.091), where the effect size is not substantial, and in the subsample for England, and Finland (Figure 5). The opposite is found in Greece, where men are more likely to postpone GP care compared to women.

The discussion in the former paragraphs of the individual predictors of postponement by the European countries is based on 217 coefficients (seven for each of the 31 countries). As a consequence, one might argue that some kind of adjustment for multiple comparisons is warranted. The Bonferroni corrected significance level (for our a priori significance level of 0.05) in our case is 0.005, that is (1 – [1 – 0.05]217)/217. When applying this correction, as can be deduced from Appendix 2, significant differences in postponement are only found between middle- and low (high and low)-income groups in Belgium, Germany, Greece, and Spain (Austria and Belgium), between patients of different education levels in Luxembourg, between second (first)-generation migrants

and natives in Ireland and Sweden (Belgium, Norway, and Spain) and between women and men in England.

Table 1 presents the results of our multilevel analyses. The null model reveals that the variances at the country and GP practice levels were, respectively, 0.123 (0.034) and 0.414 (0.024). The residual variance at the patient level was estimated to be 3.290 (=p2/3) using the latent variable method (Snijders & Bosker, 1999) because in logistic multilevel analysis, the individual-level residual variance is expressed on a different scale (probability) than the higher level residual variances (logistic scale; Merlo et al., 2006). When this estimation was used to calculate the intraclass correlation (ICC) of each level, the authors found that 3.20 percent of the variance of postponement of a GP visit can be situated at the country level and 10.80 percent at the GP practice level. Model 1 mainly confirms the findings of the aforementioned single-level regression models. Patients with a middle and high self-rated income are less likely to postpone GP care, compared to their counterparts with a lower income. Also, the native population, compared to first- and second-generation migrants, is less likely to postpone care.

Education and gender have no significant influence on the prevalence of postponement of care in Europe. Additionally, as shown by the results for Model 2 to 6, we observe no significant association between the different strength indicators and postponement of care.

Table 1 Multilevel regression of individual patient characteristics and primary care characteristics on postponement of care (log odds and their standard error)

		Null model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Self-rated household income (reference: low income)								
	Middle income		**- 0.203 (0.030) *****	**- 0.203 (0.030) *****	**- 0.203 (0.030) *****	**- 0.202 (0.030) *****	**- 0.202 (0.030) *****	**- 0.203 (0.030) *****
	High income		**- 0.207 (0.049) *****	**- 0.207 (0.049) *****	**- 0.207 (0.049) *****	**- 0.206 (0.049) *****	**- 0.206 (0.049) *****	**- 0.207 (0.049) *****
Education (reference: high education)								
	Low education		- 0.001 (0.039)	- 0.001 (0.039)	- 0.001 (0.039)	- 0.001 (0.039)	- 0.001 (0.039)	- 0.001 (0.039)
	Middle education		- 0.057 (0.033)	- 0.056 (0.033)	- 0.056 (0.033)	- 0.056 (0.033)	- 0.056 (0.033)	- 0.056 (0.033)
Ethnicity (reference: natives)								
	First generation migrants		**0.191 (0.054) *****	**0.191 (0.054) *****	**0.192 (0.054) *****	**0.192 (0.054) *****	**0.192 (0.054) *****	**0.193 (0.054) *****
	Second generation migrants		**0.197 (0.068) *****	**0.198 (0.068) *****	**0.197 (0.068) *****	**0.198 (0.068) *****	**0.198 (0.068) *****	**0.198 (0.068) *****
Gender (reference: men)								
	Women		0.036 (0.027)	0.036 (0.027)	0.035 (0.027)	0.035 (0.027)	0.035 (0.027)	0.035 (0.027)
Structure				0.168 (0.437)	- 0.084 (0.484)	- 0.012 (0.495)	0.003 (0.522)	0.188 (0.517)
Process	Access				0.636 (0.566)	0.542 (0.587)	0.543 (0.589)	0.264 (0.593)
	Continuity					1.320 (1.190)	1.294 (1.219)	1.903 (1.213)
	Coordination						- 0.026 (0.322)	0.109 (0.317)
	Comprehensiveness							- 0.701 (0.425)
Intercept		**- 1.705 (0.066) *****	**- 0.991 (0.084) *****	- 1.365 (0.972)	- 2.222 (1.223)	- 5.278 (2.950)	- 5.208 (3.030)	- 5.001 (2.915)
Variance country		**0.123 (0.034) *****	**0.120 (0.033) *****	**0.120 (0.033) *****	**0.115 (0.032) *****	**0.115 (0.032) *****	**0.115 (0.032) *****	**0.105 (0.029) *****
Variance GP		**0.414 (0.024) *****	**0.416 (0.025) *****	**0.414 (0.025) *****	**0.418 (0.025) *****	**0.420 (0.025) *****	**0.420 (0.025) *****	**0.418 (0.025) *****

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

DISCUSSION

A strong PC system, as described by Kringos (2012), has the potential to contribute to a country's health system performance and population health (Kringos et al., 2013b; Macinko, Starfield, & Shi, 2003; Starfield, 2006; Starfield, 2009). It is also expected to be an effective response to the effects of the current economic crisis on health and health care (WHO, 2009). Thus, equity of access to PC is an important aim for many health care systems (Adamson et al., 2003; Goddard & Smith, 2001; Judge & Britain, 2005). However, some social groups are still more at risk of postponing a needed PC visit in several European countries (Anderson et al., 2003; Baert & de Norre, 2009; Devaux & de Looper, 2012; Goddard & Smith, 2001;). Unfortunately, it is difficult to compare postponement rates across Europe because most studies are limited to one or a few (relatively wealthy) European countries (Davis & Ballreich, 2014; Schoen et al., 2013; Schoen et al., 2014). Furthermore, studies targeting social differences in access to care generally focus on income and education, but characteristics such as gender and ethnicity are often left out of the multivariable analysis. Nevertheless, the literature stresses the importance of these characteristics in research of equity in access to care (Goddard & Smith, 2001; Jatrana & Crampton, 2012; Schulman et al., 1995). The postponement rates in Hungary, FYR Macedonia, Lithuania, Estonia, Poland, Romania, and Ireland are the highest compared to other countries. Almost no postponement is reported in Portugal, England, Iceland, Switzerland, Malta, Cyprus, and Turkey. The high postponement rates are not surprising because these health care systems depend more on private funding (e.g., out-of-pocket payments and private social insurances; Eurostat, 2008). Previous studies found a relationship between the share of public health spending in total health expenditure and lower inequity in doctor consultations (Or, Jusot, & Yilmaz, 2008). Conversely, private funding is often regressive and has negative impacts on the use of needed care, in particular, for vulnerable people (Hanratty, Zhang, & Whitehead, 2007; Huber et al., 2008). To the best of our knowledge, our study is the first to study the association between postponement of GP care and PC strength, as captured by the strength indicators of Kringos (2012). These analyses reveal, however, that most of the differences in postponement rates can rather be explained by individual patient characteristics, instead of country or GP practice features. This finding, however, but must be viewed in the context of the large standard errors of the coefficients for the PC strength measures. Because these are country-level measures, the number of observations based on which they are identified is only the number of

countries, that is, 31, as compared to 7,183 and 61,931 observations for the GP and individual patient effects, respectively. It is thereby not surprising that although the point estimates and confidence intervals are consistent with a substantial effect, it is impossible to determine a systematic association between the PC strength indicators and postponement of care.

The next question is whether there are social differences in the postponement of care. Significant effects on postponement are found for every patient characteristic that was considered. Most of the social differences are according to self-rated household income. This finding complements earlier international studies that acknowledge the importance of income in experiencing barriers to access health care (Davis & Ballreich, 2014; Schoen et al., 2013; Schoen et al., 2014). Notwithstanding the mixed results concerning education, in most countries low-educated patients tend to postpone care more frequently compared to their higher educated counterparts. The literature states that the education of patients has a more limited effect on the utilization of specialist and preventive care (Dunlop, Coyte, & McIsaac, 2000; Vilhjalmsson et al., 2001).

In other words, despite the fact that most of these countries have health care systems with the same goals of reducing financial costs for the patient, access to care is still dependent on patients' socioeconomic position, where patients with a higher social status perceive better access (Devaux & de Looper 2012; Mossialos & Thomson, 2003; Vilhjalmsson, 2005; van Doorslaer, Masseria, & Koolman, 2006). Even with insurance coverage, deductibles and co-payments are the patient's responsibility and lower socioeconomic groups often defer seeking medical attention even when they have insurance coverage, fearing the inability to pay (Friedman, 1994). In addition, it is possible that low socioeconomic groups are hindered by barriers that are not directly linked to the cost of the consultation (Verlinde et al., 2013), such as travel, child care, or opportunity costs, including time lost from work (Ahmed et al., 2001; Hanratty, Zhang, & Whitehead, 2007), but there is relatively little evidence on the extent to which these factors deter poorer groups from seeking care. More research in this area is necessary to determine which mechanisms are at work and how they can be buffered. However, it is clear that a universal approach in the organization of health care systems is not enough. Furthermore, the current analyses indicate that socioeconomically disadvantaged patients not only have to cope with financial barriers but also have to encounter significant organizational/structural and possible geographical barriers in obtaining care (Ahmed et al., 2001; Friedman, 1994; Verlinde et al., 2013; Whitehead & Hanretty, 2004; Willems, 2005).

Many studies focusing on the health-seeking behaviour of ethnic minorities suggest that psychological and cultural characteristics (Anderson et al., 2003; Weinick, Zuvekas, & Cohen, 2000) or socioeconomic status (Dunlop, Coyte, & McIsaac, 2000; Uiters et al., 2009; Zuvekas & Taliaferro, 2003;) explain the differences in use of care more than health system-related characteristics. Additionally, the way patients view PC influences their propensity to seek care. van Loenen et al. (2015) argue that patients who experience better access, continuity, and communication with the GP show a higher propensity to seek care. Our results show that ethnic minorities (first- and second-generation migrants) postpone GP care more frequently compared to the native population, even after controlling for household income, education, gender, and age. This finding is in line with previous research that explains this difference as a result of a lack of knowledge regarding where to seek care and transportation problems (Cots et al., 2007; Scheppers et al., 2006; Szczepura, 2005).

These barriers to care are determined by the organization of the PC system (Devaux & de Looper, 2012; Jatrana & Crampton, 2009; Vilhjalmsson, 2005). Therefore, our results indicate, on the one hand, the importance of paying attention to health system characteristics in explaining differences in PC use and, on the other hand, strong PC systems possibly contribute positively to equity in access for (potentially) vulnerable groups (Uiters et al., 2009).

Lastly, regarding gender, women are more likely to postpone care in Europe, England, and Finland. Only in Greece, men tend to postpone more frequently. Previous studies show that women are more likely to seek and use health care for a number of reasons, including higher rates of chronic illness, longer life spans, and reproductive health needs (Green & Pope, 1999; Parslow et al., 2004; Verbrugge, 1985). Furthermore, women are more likely to postpone PC because they have fewer resources than men to pay out-of-pocket costs and other costs related to receiving medical care (Diamant et al., 2004; Jatrana & Crampton, 2012; Nelson et al., 1999). The present study suggests that the mechanisms behind gender and (non)use of PC are not as straightforward as indicated. Future studies, possibly including interaction effects, may allow an adequate understanding of how men and women differ in barriers to health care because gender interacts with other predictors of health care use and postponement (Jatrana & Crampton, 2012).

Previous international research on access to GP care uses utilization rates to indicate whether access to GP care is more or less equitable in Europe, especially in comparison with specialist care (Couffinhal et al., 2000; Hanratty, Zhang, & Whitehead, 2007; van Doorslaer, Koolman, & Jones, 2004; van Doorslaer, Masseria, & Koolman, 2006). The results in the present study show, however, that many European countries report high postponement rates. More important, several social groups are frequently more at risk of postponing a GP visit compared to others. Therefore, special efforts are needed to remove barriers to GP care to ensure affordable and equitable accessible GP services.

We end by acknowledging five research limitations inherent to our research focus and our available data. First, respondents were recruited from the waiting room of the GP. These patients had already overcome some boundaries by going to their GP at the moment that others may have not. Consequently, our results concerning postponement are probably underreported, with the actual postponement rates being higher. Information about cross-country variation in PC enrolment would be interesting to present in this respect. However, this information is not available in our data. Second, our data do not provide information on the duration of the postponement or other dimensions of access of health care. As a consequence, we cannot translate our research results into divergences in actual access let alone divergences in health outcomes due to postponement. Third, it is possible that self-rated household income does not affect the likelihood to delay care per se but rather that the ability to make ends meet may affect the likelihood to delay care. In this respect, a study on postponement of care in Iceland found no significant influence of income after controlling for economic difficulties (Vilhjalmsson, 2005). Fourth, the present study focuses on GP care, which is only one aspect of PC; future research should not discount dental care, home care, and other types of PC (Schoen & Doty, 2004). Finally, readers should keep in mind that the pooled model for Europe could oversimplify the reality by ignoring interactions between patient and country characteristics. However, notwithstanding these limitations, the current study presents the largest and most comparable analysis of between-country and social (within-country) differences in the postponement of seeking GP care in Europe to date.

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APPENDIX

Appendix 1 Summary of structure and process strength dimensions of primary care in Europe *

	Structure	Process			
		Access	Continuity	Coordination	Comprehensive-ness
Austria	Medium	Medium	Weak	Weak	Medium
Belgium	Medium	Weak	Strong	Medium	Medium
Bulgaria	Weak	Weak	Medium	Weak	Strong
Cyprus	Weak	Weak	Medium	Weak	Weak
Czech Republic	Weak	Strong	Strong	Medium	Weak
Denmark	Strong	Strong	Strong	Strong	Medium
England	Strong	Strong	Medium	Strong	Strong
Estonia	Medium	Medium	Strong	Medium	Medium
Finland	Medium	Medium	Weak	Medium	Strong
FYR Macedonia	Medium	Strong	Weak	Weak	Weak
Germany	Medium	Medium	Strong	Weak	Medium
Greece	Weak	Weak	Weak	Strong	Weak
Hungary	Weak	Strong	Medium	Weak	Medium
Iceland	Weak	Medium	Strong	Medium	Medium
Ireland	Medium	Weak	Strong	Weak	Weak
Italy	Strong	Medium	Medium	Medium	Weak
Latvia	Medium	Weak	Medium	Medium	Medium
Lithuania	Medium	Strong	Weak	Strong	Strong
Luxembourg	Weak	Weak	Weak	Medium	Medium
Malta	Weak	Medium	Weak	Strong	Strong
Netherlands	Strong	Strong	Weak	Strong	Weak
Norway	Medium	Medium	Medium	Weak	Strong
Poland	Weak	Strong	Medium	Strong	Weak
Portugal	Strong	Strong	Medium	Medium	Strong
Romania	Strong	Medium	Medium	Weak	Weak
Slovakia	Weak	Medium	Strong	Weak	Weak
Slovenia	Strong	Strong	Weak	Strong	Weak
Spain	Strong	Strong	Strong	Strong	Strong
Sweden	Medium	Medium	Weak	Strong	Strong
Switzerland	Weak	Medium	Medium	Medium	Strong
Turkey	Medium	Weak	Weak	Weak	Medium

* Based on the indicators and features in the Primary Health Care Activity Monitor for Europe a score per dimension is calculated, using two-level hierarchical regression models. In order to facilitate interpretation, the scores for all countries on these dimensions are presented as percentiles (≤ 33% is defined as 'weak', 34%-65% as 'medium', ≥ 66% as 'strong')

Source: authors' own calculations based on PHAMEU database (2010)

Appendix 2 Results of the logistic regression of postponement of care (odds ratios and 95% confidence intervals given)

	Low versus high education (ref.)		Middle versus high education (ref.)		Middle versus low income (ref.)		High versus low income (ref.)		Second generation migrants versus natives (ref.)		First generation migrants versus natives (ref.)		Women versus men (ref.)	
	OR	95% C.I.	OR	95% C.I.	OR	95% C.I.	OR	95% C.I.	OR	95% C.I.	OR	95% C.I.	OR	95% C.I.
EU-31	**0.934**	**[0.875-0.997]**	0.956	[0.903-1.011]	**0.755**	**[0.717-0.794]**	**0.713**	**[0.655-0.777]**	**1.187**	**[1.052-1.340]**	**1.281**	**[1.175-1.396]**	**1.049**	**[1.009-1.091]**
Austria	0.847	[0.506-1.419]	0.751	[0.499-1.131]	0.699	[0.481-1.017]	**0.345**	**[0.171-0.699]**	**1.705**	**[1.018-2.854]**	1.428	[0.946-2.157]	0.943	[0.701-1.268]
Belgium	1.278	[0.999-1.636]	0.843	[0.675-1.054]	**0.636**	**[0.505-0.802]**	**0.596**	**[0.430-0.826]**	0.776	[0.515-1.169]	**1.548**	**[1.189-2.015]**	1.116	[0.989-1.260]
Bulgaria	0.712	[0.467-1.085]	0.804	[0.622-1.040]	1.069	[0.820-1.392]	1.141	[0.704-1.850]	1.740	[0.622-4.868]	2.888	[0.489-17.04]	1.018	[0.812-1.277]
Cyprus	1.773	[0.713-4.409]	1.537	[0.782-3.021]	0.822	[0.421-1.605]	1.167	[0.381-3.571]					0.983	[0.760-1.271]
Czech Republic	1.375	[0.898-2.105]	1.287	[0.874-1.893]	0.970	[0.723-1.303]	1.379	[0.841-2.261]	0.939	[0.471-1.872]	1.126	[0.574-2.209]	1.253	[0.962-1.633]
Denmark	1.236	[0.888-1.719]	0.890	[0.579-1.367]	**0.694**	**[0.500-0.963]**	**0.583**	**[0.375-0.907]**	1.078	[0.513-2.266]	1.006	[0.567-1.784]	1.084	[0.823-1.427]
England	0.740	[0.420-1.306]	0.935	[0.626-1.396]	0.800	[0.540-1.185]	1.151	[0.679-1.950]	0.561	[0.201-1.565]	0.605	[0.303-1.206]	**1.821**	**[1.231-2.693]**
Estonia	0.989	[0.633-1.546]	0.810	[0.589-1.115]	1.083	[0.778-1.508]	0.815	[0.510-1.303]	0.745	[0.472-1.175]	0.732	[0.430-1.247]	1.097	[0.855-1.408]
Finland	0.957	[0.531-1.724]	0.847	[0.467-1.535]	0.810	[0.582-1.125]	0.975	[0.498-1.909]	0.761	[0.150-3.854]			**1.496**	**[1.064-2.101]**
FYR Macedonia	1.027	[0.664-1.587]	0.925	[0.681-1.258]	0.893	[0.665-1.199]	0.677	[0.382-1.199]	**2.026**	**[1.126-3.647]**	0.837	[0.360-1.946]	0.952	[0.807-1.124]
Germany	0.871	[0.569-1.332]	0.913	[0.628-1.327]	**0.623**	**[0.457-0.848]**	0.818	[0.491-1.364]	1.671	[0.908-3.077]	**1.691**	**[1.154-2.479]**	1.152	[0.937-1.417]
Greece	0.783	[0.543-1.129]	1.067	[0.793-1.437]	**0.677**	**[0.522-0.877]**	1.245	[0.782-1.980]	0.850	[0.403-1.795]	1.120	[0.596-2.105]	**0.790**	**[0.655-0.952]**
Hungary	0.872	[0.614-1.237]	0.899	[0.683-1.185]	0.872	[0.698-1.090]	0.624	[0.366-1.063]	0.947	[0.373-2.405]	0.725	[0.308-1.703]	0.834	[0.683-1.018]
Iceland	0.780	[0.407-1.497]	0.596	[0.319-1.113]	0.668	[0.387-1.153]	0.670	[0.281-1.600]			1.093	[0.240-4.696]	1.030	[0.778-1.363]
Ireland	**1.455**	**[1.021-2.073]**	1.423	[0.991-2.043]	1.308	[0.830-2.064]	**0.712**	**[0.539-0.941]**	**2.917**	**[1.409-6.039]**	1.243	[0.509-3.035]	0.757	[0.524-1.094]
Italy	1.423	[0.991-2.043]	1.243	[0.899-1.719]	0.872	[0.668-1.137]	1.037	[0.639-1.682]	1.126	[0.441-2.878]	1.117	[0.707-1.764]	1.049	[0.879-1.252]
Latvia	1.308	[0.830-2.064]	1.308	[0.997-1.715]	0.792	[0.611-1.028]	**0.568**	**[0.337-0.955]**	1.226	[0.786-1.913]	1.032	[0.617-1.728]	1.075	[0.840-1.376]
Lithuania	**0.712**	**[0.539-0.941]**	**0.735**	**[0.565-0.957]**	0.860	[0.677-1.093]	0.821	[0.568-1.186]	**2.190**	**[1.144-4.191]**	1.242	[0.551-2.801]	1.106	[0.899-1.360]
Luxembourg	**2.917**	**[1.409-6.039]**	**3.007**	**[1.614-5.602]**	0.648	[0.333-1.260]	0.540	[0.231-1.259]	0.800	[0.376-1.700]	0.867	[0.536-1.402]	1.373	[0.872-2.162]
Malta	1.243	[0.509-3.035]	0.818	[0.417-1.603]	0.801	[0.437-1.469]	0.756	[0.276-2.069]			0.520	[0.124-2.182]	0.968	[0.699-1.341]
Netherlands	0.757	[0.524-1.094]	0.814	[0.595-1.114]	0.788	[0.545-1.139]	0.694	[0.445-1.081]	1.183	[0.676-2.071]	**1.715**	**[1.154-2.548]**	1.164	[0.979-1.384]

Norway	**1.897**	**[1.171-3.074]**	1.389	[0.979-1.969]	**0.632**	**[0.443-0.903]**	0.796	[0.496-1.278]	0.950	[0.348-2.593]	**2.116**	**[1.317-3.401]**	0.753	[0.553-1.024]
Poland	1.121	[0.781-1.611]	1.230	[0.919-1.646]	0.912	[0.704-1.180]	1.018	[0.681-1.521]	1.408	[0.634-3.124]	0.356	[0.048-2.648]	1.069	[0.853-1.339]
Portugal	0.882	[0.591-1.316]	**0.617**	**[0.415-0.917]**	0.888	[0.648-1.216]	0.714	[0.475-1.075]	1.574	[0.553-4.478]	**2.010**	**[1.202-3.361]**	1.139	[0.920-1.411]
Romania	1.142	[0.784-1.662]	1.026	[0.755-1.394]	1.064	[0.825-1.372]	1.004	[0.581-1.734]	1.132	[0.311-4.122]	4.185	[0.255-68.79]	0.942	[0.746-1.190]
Slovakia	1.142	[0.726-1.796]	1.193	[0.813-1.751]	1.136	[0.830-1.555]	0.690	[0.354-1.344]	1.964	[0.639-6.033]	**3.724**	**[1.005-13.79]**	1.061	[0.816-1.379]
Slovenia	1.074	[0.738-1.565]	0.779	[0.562-1.080]	1.050	[0.781-1.412]	0.976	[0.588-1.618]	**1.668**	**[1.068-2.605]**	**1.635**	**[1.125-2.375]**	0.921	[0.738-1.150]
Spain	1.205	[0.947-1.532]	**1.293**	**[1.058-1.579]**	**0.727**	**[0.608-0.868]**	**0.658**	**[0.469-0.923]**	1.430	[0.758-2.695]	**1.812**	**[1.394-2.356]**	1.088	[0.950-1.245]
Sweden	1.473	[0.734-2.956]	0.603	[0.350-1.039]	0.658	[0.352-1.230]	0.804	[0.365-1.767]	**3.393**	**[1.583-7.274]**	1.768	[0.972-3.216]	0.693	[0.422-1.139]
Switzerland	1.348	[0.829-2.193]	0.905	[0.570-1.436]	0.727	[0.481-1.098]	0.834	[0.448-1.556]	1.283	[0.720-2.284]	**1.583**	**[1.115-2.247]**	1.004	[0.726-1.388]
Turkey	1.365	[0.795-2.346]	1.210	[0.708-2.067]	1.036	[0.721-1.488]	1.219	[0.496-2.992]	1.558	[0.356-6.822]			0.800	[0.566-1.130]

All significant results are indicated in bold

Appendix 3 Multilevel regression of individual patient characteristics and primary care characteristics on postponement of care (log odds and their standard error) [1]

		Null model	Model 2	Model 3	Model 4	Model 5	Model 6
Self-rated household income (reference: low income)							
	Middle income		**- 0.203 (0.030) *****	**- 0.209 (0.031) *****	**- 0.209 (0.031) *****	**- 0.209 (0.031) *****	**- 0.210 (0.031) *****
	High income		**- 0.207 (0.049) *****	**- 0.213 (0.050) *****	**- 0.213 (0.050) *****	**- 0.213 (0.050) *****	**- 0.213 (0.050) *****
Education (reference: high education)							
	Low education		- 0.001 (0.039)	- 0.002 (0.039)	- 0.001 (0.039)	- 0.002 (0.039)	- 0.002 (0.039)
	Middle education		- 0.056 (0.033)	- 0.059 (0.034)	- 0.058 (0.034)	- 0.059 (0.034)	- 0.059 (0.034)
Ethnicity (reference: natives)							
	First generation migrants		**0.191 (0.054) *****	**0.198 (0.055) *****	**0.196 (0.055) *****	**0.196 (0.055) *****	**0.197 (0.055) *****
	Second generation migrants		**0.198 (0.068) *****	**0.204 (0.069) *****	**0.203 (0.069) *****	**0.203 (0.069) *****	**0.204 (0.069) *****
Gender (reference: men)							
	Women		0.036 (0.027)	0.038 (0.027)	0.038 (0.027)	0.038 (0.027)	0.038 (0.027)
Structure			0.168 (0.437)				
Process	Access			0.710 (0.522)			
	Continuity				1.896 (1.178)		
	Coordination					- 0.009 (0.307)	
	Comprehensiveness						- 0.574 (0.416)
Intercept		**- 1.705 (0.066) *****	- 1.365 (0.972)	**- 2.627 (1.167) ****	- 5.497 (2.768)	- 1.030 (0.532)	0.310 (0.987)
Variance country		**0.123 (0.034) *****	**0.120 (0.033) *****	**0.125 (0.035) *****	**0.122 (0.034) *****	**0.133 (0.037) *****	**0.124 (0.034) *****
Variance GP		**0.414 (0.024) *****	**0.414 (0.025) *****	**0.366 (0.024) *****	**0.366 (0.024) *****	**0.366 (0.024) *****	**0.366 (0.024) *****

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

1 Considering that only 33 countries are included in the analyses (i.e. 33 different observations on level 3), the multilevel regression, reported in Chapter 4.2, may be overdetermined when including multiple independent explanatory variables. However, when adding strength-dimensions of primary care one-by-one to the statistical model, the results are comparable to those reported in Chapter 4.2.

4.3

Patients' financially driven delay of GP visits: is it less likely to occur in stronger primary care systems?

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ABSTRACT

Available evidence has suggested that strong primary care (PC) systems are associated with better outcomes. This study aims to investigate whether PC strength is specifically related to the prevalence of patients' financially driven postponement of general practitioner (GP) care. Therefore, data from a cross-sectional multicountry study in 33 countries among GPs and their patients were analyzed using multilevel logistic regression modelling. According to the results, the variation between countries in the levels of patients' postponement of seeking GP care for financial reasons was large. More than one third of these cross-country differences could be explained by characteristics of the health care system and the GP practices. In particular, PC systems with good accessibility and those systems that offer comprehensive care were associated with lower levels of financially driven delay. Consequently, we can conclude that well-organized PC systems can compensate for the negative influence of individual characteristics (socioeconomic position) on the care-seeking behaviors of patients.

Keywords: access, postponement, financial, Europe, primary health care, strength

INTRODUCTION

Current societal developments, such as the ageing of populations, increasing health inequities, and increasing health care expenditures, challenge the development of health care systems and drive them toward the needs of greater costeffectiveness, responsiveness to health needs and coordinated care (Kringos, Boerma, Hutchinson, van der Zee, & Groenewegen, 2010; Mackenbach, Meerding, & Kunst, 2011; Van Lerberghe, 2008). Among the possible strategies to cope with these challenges, decision makers can opt for strengthening primary health care systems. A range of studies since the 1990s have provided evidence for the added value of strong primary care (PC) systems, including better health outcomes, less avoidable hospitalizations and unnecessary use of specialist services and reduced inequity in health (Andersen, 1995; Blumenthal, Mort, & Edwards, 1995; Burström, 2002; Goddard & Smith, 2001; Kringos et al., 2013; Whitehead & Hanratty, 2004).

The positive influence of strong PC on the functioning of health care systems is ascribed to the core features of PC, including good access and the role of PC as the first contact for the majority of the population's curative and preventive health needs; continuity of care in settings near people's homes (Kringos et al., 2013). Accordingly, the goal of PC systems is to provide universal and accessible care that is determined by the need for medical care rather than the patient's ability to pay (Goddard & Smith, 2001). Barriers to health care access, for instance, in terms of postponement of care seeking, occur more often among financial and social vulnerable groups (Burström, 2002; Whitehead & Hanratty, 2004). There are several factors that lay at the heart of care postponement by patients in need, such as language barriers, the availability of medical care in the neighborhood, health beliefs, cultural habits, and financial concerns (Andersen, 1995; Blumenthal et al., 1995; Himmelstein & Woolhandler, 1995; Nelson, Thompson, Bland, & Rubinson, 1999). European research has shown that financial reasons are the main reason why patients postpone medical care (Baert & de Norre, 2009). Nonetheless, the results of this European research are dated from before the economic crisis. One could expect that the relative importance of this reason for postponement has become even more prominent as under the influence of the economic crisis, health care spending has decreased and costs of treatment have increased, posing more financial barriers for vulnerable groups. For example, as a consequence of the economic crisis in 2008, the Belgian share of households that had to postpone care because they could not af-

ford it increased to 14% (while the share was approximately 9% before the economic crisis; Maresso et al., 2015).

A PC system, however, will provide an overarching approach, especially at a time of economic crisis. Its continuing relevance lies in its values base—stressing the importance of equity, solidarity, and gender and through inclusiveness—and the objective of working toward universal coverage and consequently reducing financial barriers for vulnerable patient groups (World Health Organization [WHO], 2009). Strong PC systems provide accessible, comprehensive care in an ambulatory setting to patients in their own context on a continuous basis and coordinate the care processes of patients across the health care system (Starfield, 1994). The Primary Health Care Activity Monitor for Europe (PHAMEU) project showed that a European country's strength of PC can be measured using indicators at the structural level (i.e., governance, economic conditions, and workforce development) and at the process level (i.e., access, continuity, coordination, and comprehensiveness) in the context of the health care system (Himmelstein & Woolhandler, 1995; Kringos et al., 2013). Governance included information about the existence of PC policies and regulations, for example, information about the equal distribution of PC providers and facilities. The availability of financial resources for PC and the population's coverage for PC services are two examples of items that were included in the economic condition indicator. Information about the health care providers, including age, training, and workload, was summarized in the workforce development indicator. The accessibility indicator contained the national and geographic service supplies and the organization of the access to practices. Conditions related to enduring doctor–patient relationships were measured in the continuity of care indicator. The coordination of care indicator contained, for example, the collaborations within PC and with secondary care, the mix of skills of the professionals, and the existence of a gatekeeping system. Finally, the scope of services offered to patients at the primary level was captured in the comprehensiveness of PC indicator. The importance of a strong PC system is also acknowledged by the WHO. According to this institution, the PC system is the cornerstone of their strategy to strengthen health systems toward 'Health for All' (Van Lerberghe, 2008). As aforementioned, to do so, the PC system should achieve equitable access. Therefore, we hypothesize that countries with relatively stronger PC systems are associated with lower rates of postponement compared with weaker PC systems. Strong PC systems should result in the (timely) treatment of problems before they become more severe and require specialist care or

hospitalization. Moreover, among other factors, accessible PC systems are influenced by limited financial thresholds for consultations and sufficient geographical provision of care (European Commission, 2014).

Keeping the aforementioned issues in mind, we expect to observe reduced financially driven postponement in health care systems with a strong focus on PC systems. The current article aims to test this hypothesis. More concretely, we answer the following research question:

Research Question 1: To what extent are strong PC systems (i.e., health care systems with a major focus on PC use) associated with lower financially driven postponement?

New contributions

We advance the state-of-the-art of health services research by investigating the association between PC strength and financial postponement, using unique data from 31 European countries, and two non-European countries. Our study is original in which it merges two large and recent international databases. First, the PHAMEU database is the largest and most comprehensive overview of the strength of PC systems in Europe. Up to 2011, such information was either not available or outdated and incomparable across nations (Kringos et al., 2015). Second, we merged the PHAMEU database with the recent Quality and Costs of Primary Care in Europe (QUALICOPC) database. Using a multi-actor design, QUALICOPC integrates health information at different PC levels. Surveying GPs and their patients allowed the researchers to align information provided by patients and their GPs, and this was carried out in no less than 34 countries (Schäfer et al., 2011).

METHODS

Data Collection

Within the framework of the QUALICOPC study, a cross-sectional multicountry study, surveys were conducted in 31 European countries (the European Union 27 [with the exception of France], FYR Macedonia, Iceland, Norway, Switzerland, and Turkey) and 3 non-European countries as well as in Australia, Canada, and New Zealand. In each country, an average of 220 general practitioner (GP) practices were selected, except for the very small countries where the average was 80.

Between October 2011 and December 2013, data were collected with patients in the waiting rooms of GP practices, mostly by specially trained fieldworkers and in five countries also by practice staff. Random sampling was used to select GPs in countries that have national GP registers. When a country only has regional registers, regions representing the national context were selected by random sampling (and within these regions GPs were selected in a random way). If a country only has a list of the facilities in that particular country, a random selection of this list was made (Schäfer et al., 2011). Data collection among patients in each country took place during a period of several months. The patients were recruited on different days of the week and during different times of the day. The fieldworkers consecutively invited patients (aged 18 years or older) who had just had face-to-face consultations with GPs to complete a questionnaire until 10 patients had responded. The survey consisted of two questionnaires, one about the patient's experiences and one about the patient's values. The first nine respondents completed the questionnaire about their experiences with the consultation, while the 10th respondent completed the questionnaire probing the patient's values. Additionally, one GP working in the included practice completed a questionnaire. Finally, each fieldworker completed a short questionnaire about the practice facility. A unique practice identification number enabled the linkage of GPs data to patient data and the fieldworker data to allow for multilevel analyses. In total, 7.183 GPs and 61.931 patients participated in the study. Details about the study protocol and questionnaire development are provided elsewhere (Schäfer et al., 2011; Schäfer et al., 2013). The strength of the PC systems was obtained from the PHAMEU database (Kringos, 2012). PHAMEU is a European Union–funded project that was conducted by the Netherlands Institute for Health Services Research (NIVEL) and was cofounded by the European

Commission. The project was intended to produce a database comparing various characterizing aspects of European PC systems. This database shows trends and variations in PC strength across Europe, and details knowledge and expertise relating to policy strategies conducive to strengthening PC. The development of PHAMEU consisted of four sequential steps: (1) an identification of relevant PC dimensions and features by means of a systematic literature review, (2) a selection of adequate indicators within the established PC dimensions, (3) an evaluation of the indicators by European PC experts, and (4) a pilot test of the feasibility of the PHAMEU monitor in 31 European countries. In the following paragraph, we will explain these four steps in greater depth. However, for more specific and detailed information regarding the development of the PHAMEU monitor, see Kringos (2012).

The systematic literature review by the NIVEL research team identified 85 relevant systematic reviews and original research articles on PC classification published between 2003 and 2008. Ten core dimensions that constitute a PC system were derived and related to one of the three levels in the framework created by Donabedian (1980): structure, process, and outcome. The structure level consists of (1) governance, (2) workforce development, and (3) economic conditions. The process level comprised of (1) access, (2) continuity, (3) comprehensiveness, and (4) coordination. The outcome level consists of (1) efficiency of care, (2) quality of care, and (3) equity in health (Kringos, Boerma, Hutchinson et al., 2010). In the second step of the development of PHAMEU, indicators within the 10 aforementioned dimensions were identified. First, measurable indicators were selected from the publications included in the systematic literature review of step 1. Second, additional indicators were collected from a number of international databases (such as Eurostat, the World Bank, OECD Health data, and the WHO 'Health for All' database). When there were no indicators for a dimension available, the NIVEL research team developed measurable indicators. In this second step, 551 indicators for the 10 PC dimensions were identified overall. However, one of the aims of the third step was to shorten this long list of indicators and obtain a feasible set of essential indicators, using expert evaluation. These experts consisted of members of the NIVEL research team and eight other experts from various European countries (such as researchers in family medicine, GPs, and health services researchers). The experts were asked to score each indicator on its suitability for describing and comparing European PC systems on a 4-point Likert-type scale (ranging from not useful for PC system comparison to essential for PC system comparison). In this step, 143 essential indicators used to describe 9 of

the 10 dimensions (i.e., governance, workforce development, economic conditions, access, continuity, comprehensiveness, coordination, efficiency of care, and quality of care) were identified. Indicators that were selected in the 'equity dimension', however, obtained a low score in the expert evaluation. The experts felt that the proposed indicators measuring equity in health were influenced by various other factors (such as social conditions in which people live and work) than just disparities in PC access and use. Therefore, no indicators of the 'equity dimension' were included in the PHAMEU monitor. However, equity was integrated in several other dimensions (e.g., an indicator called 'policy on equality in access' in the governance dimension and an indicator called 'affordability of PC services' in the access dimension; Kringos, Boerma, Bourgueil et al., 2010). Finally, in the fourth step, all retained indicators in the PHAMEU monitor were scored by national coordinators for the 31 European countries. They used the best data available from several relevant sources, such as international databases (WHO or Organization for Economic Co-operation and Development), publications of the European Observatory on Health Systems and Policies, and national statistical databases. All sources used were registered and published in Kringos et al. (2015). Furthermore, in the appendix of the present study, we added a detailed overview of the several PC strength dimensions and explained from which features they are constructed.

Measuring access

Access to PC was measured by asking the patients whether they had postponed a GP visit within the past 12 months (yes or no). If the patients responded yes, they were asked whether the primary reason they had postponed a GP visit was financial (yes or no, Tables 1 and 2).

Calculating PC strength dimensions scores

A score for each PC strength dimension per country was calculated using the scores of the national coordinators (supra) and by means of a two-level hierarchical latent regression model. The dependent variables in this two-level hierarchical regression model were the country's score for the indicators belonging to that dimension. In the fixed part of the model, the differences in the item averages were controlled by estimating the indicator average together with the item effects (using deviation indicator coding). In the random part, at Level 1, the differences in the items' deviations were considered

controlled by modelling the item measurement errors as separate variance terms for each item. At Level 2, the effect of each country on the indicator was modelled and used to calculate the country scores. Reliability coefficients of the constructed dimension scales were acceptable and could be considered reliable (Kringos et al., 2013). Following the methodology developed by Macinko, Starfield, and Shi (2003), the data on all indicators were transformed into scores ranging from 1 (weak) to 3 (strong). The limits between weak–medium and medium–strong were determined by means of the 33% and 67% percentiles, respectively.

Statistical analyses

First, one-way analysis of variance test statistics (with Bonferroni post hoc tests) were used to test the associations between the prevalence of financially driven postponement of GP care and the independent variables. Additionally, due to the hierarchical structure of the data (patients [Level 1] nested in GP practices [Level 2] and these practices nested in countries [Level 3]) logistic multilevel regressions were performed. These logistic multilevel regression models were used to evaluate the importance of each level independently (i.e., patient, practice, and country) in explaining the differences in postponement of GP care (i.e., our dependent variable). In view of answering our research questions, the health care system characteristics mentioned above were added as explanatory variables at the country level.

In the first model, only variables capturing general information about two global measures of the strength of the PC system (one for structure and one for the delivery process) are included. This model, for which the results are presented in Table 3, can be abstracted by means of the following equation:

$$\text{logit}\,(\pi_{ijk}) = \ln(\pi_{ijk}/(1-\pi_{ijk})) = \beta_{0jk} + \beta_1 x_{1k} + \beta_2 x_{2k} + \beta_{income}\,\text{income}_{ijk} + \beta_{GDP}\,\text{GDP}_k$$

$$\beta_{0jk} = \beta_0 + v_{0k} + u_{0jk}$$

This equation, logit (π_{ijk})=ln(π_ijk/(1- π_{ijk})) represents the dependent variable: postponement for financial reasons in the last 12 months by patient 'i' in GP practice 'j' of country 'k'. β_{0jk} is the constant intercept term for all patients in a particular GP practice of a particular country. Furthermore, x_{1k} is the continuous structure variable, which is calculated as the sum of a country's scores with respect to government, economic conditions, and workforce development. is the continuous process variable which was

calculated as the sum of a country's scores for access, continuity, coordination, and comprehensiveness. All analyses were controlled for household income of the patients and GDP per capita. Household income was categorized as 'below average', 'around average (reference category)' or 'above average' based on the respondents' answers to the question: 'Compared to the average in your country, would you say your household income is …'. GDP per capita was added to the multilevel regression model to control for a country's average income and economic status of the included countries. It is the sum of the gross value of purchaser's prices, added by all citizens producers in the economy plus any product taxes and minus any subsidies that are not included in the value of the products (Worldbank, 2016). Data on GDP per capita from 2013 was used, as the outcome variables were also collected in 2013. and represent the coefficients corresponding to the continuous structure and process variable respectively. Lastly, is the error term at the country level and is the error term at the GP practice level.

In a second model (of which the results are presented in Table 4), we more closely examined the independent effects of specific indicators of both the structure and process strengths of PCs by including the seven individual dimension scores. This model can be visualised using the following equation:

$$\text{logit}\,(\pi_{ijk}) = \ln(\pi_{ijk}/(1-\pi_{ijk})) = \beta_{0jk} + \beta_1 x_{1k} + \beta_2 x_{2k} + \beta_3 x_{3k} + \beta_4 x_{4k} + \beta_5 x_{5k} + \beta_6 x_{6k} + \beta_7 x_{7k} + \beta_{\text{income}}\,\text{income}_{ijk} + \beta_{GDP}\,GDP_k$$

$$\beta_{0jk} = \beta_0 + v_{0k} + u_{0jk}$$

In the equation above, logit (π_{ijk})=ln(π_ijk/(1- π_{ijk})) represents the dependent variable and β_{0jk} the constant intercept term of this second model. Moreover, x_{1k} exhibits the governance dimension, x_{2k} exhibits the workforce development dimension, x_{3k} the economic conditions, x_{4k} the access dimension, x_{5k} the continuity dimension, x_{6k} the comprehensiveness dimension, and x_{7k} the coordination dimension. As in the previous regression, this analysis is also controlled for the income of the patient and GDP per capita (in US$). The corresponding βs represent the related coefficients; v_{0k} is the error term at the country level and u_{0jk} is the error term at the GP practice level.

In order to benchmark the results found for financially driven postponement, we provide the reader with the same analysis, but with an alternative outcome measure, that is, postponement in general. Postponement was measured by asking patients whether they had postponed a GP visit within the past 12 months (yes or no). Analyses were

conducted in MLwiN (University of Bristol, the United Kingdom, version 2.31); first-order penalized quasi-likelihood was used as the nonlinear estimation procedure. Finally, for the null model, which is a model with only the intercept term β_{0jk} and no explanatory variables, we calculated the variance partition coefficient (VPC) for each level. This VPC shows us the proportion of explained variance at the three levels (country, GP practice, and patient level), and indicates whether multilevel analyses are required (if VPC at the second and third level is >0% [Hox, Moerbeek, & van de Schoot, 2010]).

RESULTS

(Financially driven) postponement of GP care

On average, 15.0% of the respondents postponed a GP visit at least once within the past year. The countries in the upper quartile concerning general postponement rates were the following: Hungary (24.9%), FYR Macedonia (24.6%), Lithuania (23.0%), Estonia (21.5%), Poland (20.6%), Romania (20.3%), Ireland (18.4%), and Spain (18.4%). The countries with the lowest postponement rates that were thus situated in the weak quartile were the following: Portugal (11.4%), Sweden (11.4%), England (11.2%), Iceland (10.5%), Switzerland (9.5%), Malta (8.9%), Cyprus (8.6%), and Turkey (6.1%). When we focused on postponement for financial reasons, we found that an average 8.5% of the patients had postponed care for this reason. Romania (23.8%), New Zealand (23.2%), Bulgaria (22.8%), Cyprus (22.4%), Ireland (21.9%), Slovakia (14.9%), Australia (14.8%), and Greece (14.7%) had the highest financial postponement rates and were thus situated in the upper quartile. Luxembourg (2.5%), Spain (2.5%), the Netherlands (1.4%), Slovenia (1.3%), Denmark (1.2%), England (1.1%), and Austria (0.7%) reported the lowest financially driven postponement rates.

Table 1 National distributions of patients that postponed a GP visit in the last year

	Patients that postponed a visit to the GP in the last year				Patients that postponed a GP visit in the last year, due to financial reasons			
Country	N	Missing N(%)	Yes N (%)	No N (%)	N	Missing N (%)	Yes N (%)	No N (%)
Austria	1592	68 (4.3)	208 (13.1)	1316 (82.7)	276	74 (26.8)	2 (0.7)	200 (72.5)
Belgium	3670	62 (1.7)	564 (15.4)	3044 (82.9)	626	90 (14.4)	45 (7.2)	491 (78.4)
Bulgaria	1971	12 (0.6)	317 (16.1)	1642 (83.3)	329	12 (3.6)	75 (22.8)	242 (73.6)
Cyprus	603	6 (1.0)	52 (8.6)	545 (90.4)	58	6 (10.3)	13 (22.4)	39 (67.2)
Czech Republic	1980	9 (0.5)	272 (13.7)	1699 (85.8)	281	14 (5.0)	18 (6.4)	249 (88.6)
Denmark	1877	64 (3.4)	258 (13.7)	1555 (82.8)	322	71 (22.0)	4 (1.2)	247 (76.7)
England	1296	38 (2.9)	145 (11.2)	1113 (85.9)	184	40 (21.7)	2 (1.1)	142 (77.2)
Estonia	1121	25 (2.2)	241 (21.5)	855 (76.3)	266	20 (7.5)	9 (3.4)	237 (89.1)
Finland	1196	19 (1.6)	183 (15.3)	994 (83.1)	204	21 (10.3)	7 (3.4)	176 (86.3)
FYR Macedonia	1283	16 (1.2)	314 (24.6)	953 (74.3)	325	17 (5.2)	41 (12.6)	267 (82.2)
Germany	2117	8 (0.4)	271 (12.8)	1838 (86.8)	279	13 (4.7)	12 (4.3)	254 (91.0)
Greece	1954	58 (3.0)	350 (17.9)	1546 (79.1)	456	69 (15.1)	67 (14.7)	320 (70.2)
Hungary	1934	25 (1.3)	482 (24.9)	1427 (73.8)	507	25 (4.9)	65 (12.8)	417 (82.2)
Iceland	761	50 (6.6)	80 (10.5)	631 (82.9)	130	51 (39.2)	5 (3.8)	74 (56.9)
Ireland	1676	89 (5.3)	309 (18.4)	1278 (76.3)	398	87 (21.9)	87 (21.9)	224 (56.3)
Italy	1947	49 (2.5)	341 (17.5)	1557 (80.0)	395	64 (16.2)	14 (3.5)	317 (80.3)
Latvia	1936	78 (4.0)	311 (16.1)	1547 (79.9)	389	47 (12.1)	48 (12.3)	294 (75.6)
Lithuania	2008	15 (0.7)	462 (23.0)	1531 (76.2)	477	16 (3.4)	16 (3.4)	445 (93.3)
Luxembourg	707	23 (3.3)	96 (13.5)	588 (83.2)	119	28 (23.5)	3 (2.5)	88 (73.9)
Malta	626	14 (2.2)	56 (8.9)	556 (88.8)	70	15 (21.4)	2 (2.9)	53 (75.7)
Netherlands	1969	29 (1.5)	258 (13.1)	1682 (85.4)	288	46 (16.0)	4 (1.4)	238 (82.6)
Norway	1529	39 (2.6)	179 (11.7)	1311 (85.7)	218	37 (17.0)	9 (4.1)	172 (78.9)
Poland	1971	3 (0.2)	407 (20.6)	1561 (79.2)	410	3 (0.7)	38 (9.3)	369 (90.0)
Portugal	1877	46 (2.5)	214 (11.4)	1617 (86.1)	261	44 (16.9)	17 (6.5)	200 (76.6)
Romania	1975	3 (0.2)	401 (20.3)	1571 (79.5)	404	2 (0.5)	96 (23.8)	306 (75.7)
Slovakia	1916	11 (0.6)	297 (15.5)	1608 (83.9)	308	11 (3.6)	46 (14.9)	251 (81.5)
Slovenia	1963	36 (1.8)	283 (14.4)	1644 (83.7)	319	34 (10.7)	4 (1.3)	281 (88.1)
Spain	3727	44 (1.2)	687 (18.4)	2996 (80.4)	731	85 (11.6)	18 (2.5)	628 (85.9)
Sweden	769	22 (2.9)	88 (11.4)	659 (85.7)	260	176 (67.7)	7 (2.7)	77 (29.6)
Switzerland	1791	10 (0.6)	170 (9.5)	1611 (89.9)	180	19 (10.6)	7 (3.9)	154 (85.6)
Turkey	2605	0 (0.0)	160 (6.1)	2445 (93.9)	160	5 (3.1)	18 (11.3)	137 (85.6)
Australia	1190	13 (1.1)	162 (13.6)	1015 (85.3)	162	9 (5.6)	24 (14.8)	129 (79.6)
New Zealand	1150	24 (2.1)	161 (14.0)	965 (83.9)	185	3 (1.6)	43 (23.2)	139 (75.1)

The role of health care system characteristics in financially driven postponement of GP care

Bivariate analyses demonstrated significant associations (p <.001) between the finically driven postponement of GP care and all of the independent variables with the exception of the continuity indicator of the process strength.

Table 2 Bivariate associations between financially driven postponement of GP care and healthcare characteristics (structure and process strength), reporting one way ANOVA tests

	Postponement of GP visit due to financial reasons				
	Total N mean (SD)	No N mean (SD)	Yes N mean (SD)	F	P
Strength PC structure	8451 6.67 (0.26)	7618 6.68 (0.27)	833 6.57 (0.23)	**114.18**	**< 0.001**
Governance	8451 2.43 (0.11)	7618 2.44 (0.11)	833 2.40 (0.11)	**66.81**	**< 0.001**
Economic conditions	8451 2.15 (0.10)	7618 2.15 (0.10)	833 2.11 (0.12)	**124.76**	**< 0.001**
Workforce development	8451 2.08 (0.13)	7618 2.09 (0.13)	833 2.06 (0.12)	**33.94**	**< 0.001**
Strength of PC process	8759 8.70 (0.35)	7885 8.71 (0.35)	874 8.53 (0.28)	**220.34**	**< 0.001**
Access	8759 2.25 (0.14)	7885 2.25 (0.14)	874 2.19 (0.14)	**195.48**	**< 0.001**
Continuity	8759 2.36 (0.05)	7885 2.36 (0.05)	874 2.36 (0.05)	0.44	0.506
Coordination	8759 1.77 (0.21)	7885 1.73 (0.21)	874 1.66 (0.19)	**93.96**	**< 0.001**
Comprehensiveness	8759 2.37 (0.16)	7885 2.37 (0.16)	874 2.33 (0.17)	**49.80**	**< 0.001**

Note. GP = general practitioner; PC = primary care; ANOVA = analysis of variance. All significant (p < 0.05) are indicated in bold.

In order to answer Research Question 1 of this article, we built a multivariate multilevel regression model stepwise. In the first model (Table 3), we add first the global structure scale and subsequently the process scale. However, we will first consider the model with no explanatory variables (null model). Using this null model, we can calculate the VPC for each level, giving us the proportion of explained variance at the different levels (i.e., country, GP practice, and patient levels). The null model revealed that the variances at

the country and practice levels were 0.78 (0.22), and 0.93 (0.13), respectively. When we calculate the VPC of each level, we found that 15.52% of the differences in the postponement of GP care were situated at the country level and 18.60% at practice level.

First, the analyses reveal that compared with patients with a middle income, low-income groups are more likely to postpone a GP visit due to financial reasons. While patients with a high income are less likely, compared with patients with a middle income, to postpone a GP visit because of financial reasons. Second, according to this first multilevel model, strength of the PC process is significantly related to financially driven postponement. No significant association between strength of the PC structure and postponement for financial reasons was found.

Subsequently, the specific indicators of both the structure and process measure of PC strength were entered step-by-step into a second multivariate multilevel model (Table 4). As in the previous model, the significant association between income and financially driven postponement stays significant in the same direction. In other words, low-income groups are more likely and high-income groups are less likely to postpone a GP visit due to financial reasons, compared with middle-income groups. As in the first model, the structural strength (i.e., governance, economic conditions, and workforce development) of PC was less relevant for explaining financially driven postponement than the strength of the strength of the process level of PC. Access and comprehensiveness were relevant process characteristics in this model. In other words, health care systems with strong foci on PC in terms of access to and comprehensiveness of care resulted in less postponement of GP care for financial reasons. Last, GDP per capita is significantly inversely associated with financially driven postponement. In other words, the higher the GDP per capita in a country, the less likely patients postpone care for financial reasons.

Benchmarking of the results using an alternative outcome measure, that is, postponement in general

Multilevel modelling shows that patients with a low income are more likely to postpone GP care, compared with middle-income patients. Furthermore, according to the results presented in Table 3, no strength levels are significantly associated with postponement of care. However, when dividing these strengths levels into strength dimensions (Table 4), a significant association between continuity of PC and postponement can be observed.

The negative significant effect between low-income groups and postponement of care stays significant in this model.

Table 3 Multilevel logistic regression of financially driven postponement of GP care (and postponement of care in general) on primary healthcare characteristics (log odds and their standard error)

	Financially driven postponement			Postponement (in general)
	Null model	**Strength PC structure**	**Strength PC process**	
Strength PC structure		**- 2.63 (0.96) ****	- 1.41 (1.05)	- 1.11 (0.47)
Strength PC process			**- 3.21 (1.47) ***	0.60 (0.68)
Low income		**0.65 (0.08) *****	**0.66 (0.08) *****	**0.19 (0.03) *****
High income		**- 0.44 (0.17) ***	**- 0.43 (0.17) ***	0.02 (0.04)
GDP per capita (in US $)		**- 0.14 (0.06) ****	**- 0.10 (0.05) ***	- 0.04 (0.02)
Intercept	**- 2.60 (0.16) *****	3.53 (2.16)	**7.71 (2.79) ****	**- 2.79 (1.26) ***
Variance country	**0.78 (0.22) *****	**0.52 (0.16) *****	**0.44 (0.13) *****	**0.11 (0.03) *****
Variance GP	**0.93 (0.13) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.50 (0.02) *****
N	8723	8723	8723	55685

Note. PC = primary care; GP = general practitioner.
All significant results ($p < 0.05$) are indicated in bold.
* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

Table 4 Multilevel regression of financially driven postponement (and postponement on primary healthcare systems characteristics: including specific structure and process strength scales (log odds and their standard error)

		Null model		Financially driven postponement					Postponement (in general)
Structure	Governance		**- 3.66 (1.23) ****	**- 3.14 (1.31) ***	**- 3.04 (1.35) ***	- 1.67 (1.12)	- 1.55 (1.10)	- 1.35 (1.13)	- 1.01 (1.08)	0.24 (0.61)
	Economic conditions			- 1.46 (1.43)	- 1.28 (1.52)	- 0.11 (1.21)	- 0.14 (1.18)	- 0.13 (1.16)	- 0.73 (1.12)	- 0.51 (0.67)
	Workforce development				- 0.36 (1.08)	- 0.47 (0.85)	- 0.55 (0.83)	- 0.41 (0.85)	0.27 (0.86)	- 0.02 (0.47)
Process	Access					**- 3.78 (0.87) *****	**- 3.94 (0.86) *****	**- 3.92 (0.84) *****	**- 4.06 (0.79) *****	0.40 (0.46)
	Continuity						2.92 (1.87)	2.66 (1.89)	3.28 (1.81)	**2.00 (0.99) ***
	Coordination							- 0.37 (0.57)	- 0.26 (0.54)	0.18 (0.30)
	Comprehensiveness								**- 1.53 (0.72) ***	- 0.47 (0.42)
	Low income		**0.65 (0.08) *****	**0.65 (0.08) *****	**0.65 (0.08) *****	**0.66 (0.08) *****	**0.66 (0.08) *****	**0.66 (0.08) *****	**0.66 (0.08) *****	**0.19 (0.03) *****
	High income		**- 0.44 (0.17) ***	**- 0.43 (0.17) ***	**- 0.43 (0.17) ***	**- 0.43 (0.17) ***	**- 0.43 (0.17) ***	**- 0.43 (0.17) ***	**- 0.43 (0.17) ***	0.02 (0.04)
	GDP per capita (in US $)		**- 0.17 (0.06) ****	**- 0.16 (0.06) ****	**- 0.16 (0.06) ****	**- 0.16 (0.05) *****	**- 0.17 (0.05) *****	**- 0.16 (0.05) *****	**- 0.13 (0.05) ****	- 0.03 (0.02)
	Intercept	**- 2.60 (0.16) *****	**6.63 (3.04) ***	**8.49 (3.50) ***	**8.59 (3.52) ***	**11.41 (2.89) *****	4.82 (5.09)	5.24 (5.06)	6.47 (4.77)	- 5.99 (2.64) *
	Variance country	**0.78 (0.22) *****	**0.50 (0.15) *****	**0.48 (0.14) *****	**0.48 (0.14) *****	**0.27 (0.09) *****	**0.25 (0.09) *****	**0.24 (0.08) *****	**0.20 (0.07) *****	**0.09 (0.02)**
	Variance GP	**0.93 (0.13) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.50 (0.02)**
	N	8723	8723	8723	8723	8723	8723	8723	8723	55685

Note. GP = general practitioner.

All significant results ($p < 0.05$) are indicated in bold.

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

DISCUSSION

Policy makers all over the world are urged to strengthen their PC health care systems in response to several societal evolutions. The process of strengthening PC health care systems will improve the functioning of health care systems (Starfield, 1994). The core of PC is the provision of universal accessible care and responding to the need for medical care and not providing care according to age, gender, education, income, or ethnicity (Goddard & Smith, 2001). Despite this goal, there are still high rates of postponement of medical care among different social groups (Burström, 2002; Whitehead & Hanratty, 2004). Previous studies indicate the importance of individual sociodemographic characteristics in the postponement care seeking; people with low-income postpone visits to GPs more often than people in higher socioeconomic groups (Vilhjalmsson, 2005; Whitehead & Hanratty, 2004). Some of the reasons for these postponements could include lack of time, wait-and-see, language barriers, availability (i.e., restricted opening hours), health beliefs, cultural habits, and financial problems. European research indicates that 31% of the unmet need for medical care is due to financial reasons (Baert & de Norre, 2009). This study examined the extent to which the strength of the PC system is related to the postponement of GP care for financial reasons. Concerning the prevalence of financially driven postponement of GP care, we found that the highest rates occurred in Cyprus, Romania, and New Zealand, and the lowest rates occurred in Austria, Denmark, and England. System characteristics (at both the national health care system and local GP levels) explained more than one third of the differences (i.e., 34.1%) in the financially driven postponement of GP care. In other words, the organization of all different dimensions of the (primary) health care system and the GP practice can decrease patients' financial access and therefore lead them to postpone GP care. These system characteristics could also compensate for the most important influence of the individuals' characteristics on care-seeking behavior. Future research could assess in further depth the influences of system characteristics on the different operating levels and also the potential of system characteristics to compensate for the socioeconomic disadvantages of some patients. Especially noteworthy, and the most important finding of this study is, when we elaborated the roles of specific health care system characteristics, it became clear that the PC process level was associated with the financially driven postponement of GP care. Particularly in PC systems with accessible and/or comprehensive care, there was less postponement of GP care due to financial reasons. Governments of countries should focus on developing policies that reduce

barriers to access to care. In line with the composition of the access indicator in the analyses, policies should, therefore, be focused on (1) national availability of PC services, (2) geographical availability, (3) accommodation of accessibility, (4) affordability, and (5) acceptability (Kringos, 2012). Last, the way PC systems address the wide variety of basic needs that exist in the community (i.e., comprehensiveness) is negatively associated with postponement for financial reasons.

Consequently, policy makers could consider enhancing the comprehensiveness of their PC system by focus their policy on (1) adequate medical equipment available, (2) PC as first contact for common health problems, (3) PC for treatment and follow-up of diagnoses, (4) preventive care, (5) mother and child and reproductive care, and (6) health promotion (Kringos, 2012). This inverse association between financially driven postponement and comprehensiveness can by explained because having a broad range of services in the PC system encourages patients to present their (health) problem at the primary level of care and not at secondary care, which is less cost-effective care, and, therefore, more expensive both for society and for the individual patient. Last, the results of this article show that low-income groups are most vulnerable for both postponing GP care in general and financially driven postponement of care.

Strengths and weaknesses

The QUALICOPC study is the first, largest (61,931 patients, 7,183 GP practices, and 34 countries) and most comprehensive database regarding PC. Its unique structure combining data from three levels (patient level, GP practice level, and country level) is a major strength of current study. The combination of the QUALICOPC data with the PHAMEU data allowed us to evaluate the associations between the structure and the performance of health care systems on different levels (Schäfer et al., 2011) to elaborate on the benefits of PC. Although we feel that the results of the present study are important, there are some limitations that should be considered. First, a limitation of the study that is specifically relevant to care avoidance is the fact that the included patients are visitors of GP practices only. In other words, the participants had overcome some obstacles to visit their GP. Heavy avoidance of care may therefore be underrepresented. Consequently, our postponement distribution is probably biased downward. Furthermore, the data on the strengths of the PC systems were derived from the PC Monitor (PHAMEU), which is a database that was built on available data, dating from 2010. This issue could be a limitation because it may have reduced the comparability

with data regarding financial postponement (that is collected between 2011 and 2013). Additionally, interviews with national experts helped find missing information, validate country results, and deliver consensus-based information (Kringos, Boerma, Bourgueil et al., 2010), which may have affected a portion of the results because the experts may have based their judgments on the objective current statuses or shortcomings of their countries' PC on the one hand or on the prospects for innovations or concerns about declines in the near future on the other hand. Furthermore, because the data on the PC systems' strength are situated at the country level, the PHAMEU data allow only between-country analyses and not within-country analyses. Subsequently, these data do not allow exploration of (or control for) the differences in access between regions in a country. Also, because there is a wide variation in the size of the included countries, the amount of heterogeneity within a country on PC may differ greatly, leading potentially to an underestimation of the variation in financial postponement explained by differences in the strength of a country's PC system. Therefore, we are in favor of future research studying the relationship between regional PC strength and financial postponement at the regional level. Finally, it is possible that other (unobserved) factors affect both dependent and independent variables. We should, therefore, be careful in interpreting causal inference.

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AUTHORS' NOTE

Ethical approval was acquired in accordance with the legal requirements of each country. Both the GP and patient surveys were conducted anonymously.

DECLARATION OF CONFLICTING INTERESTS

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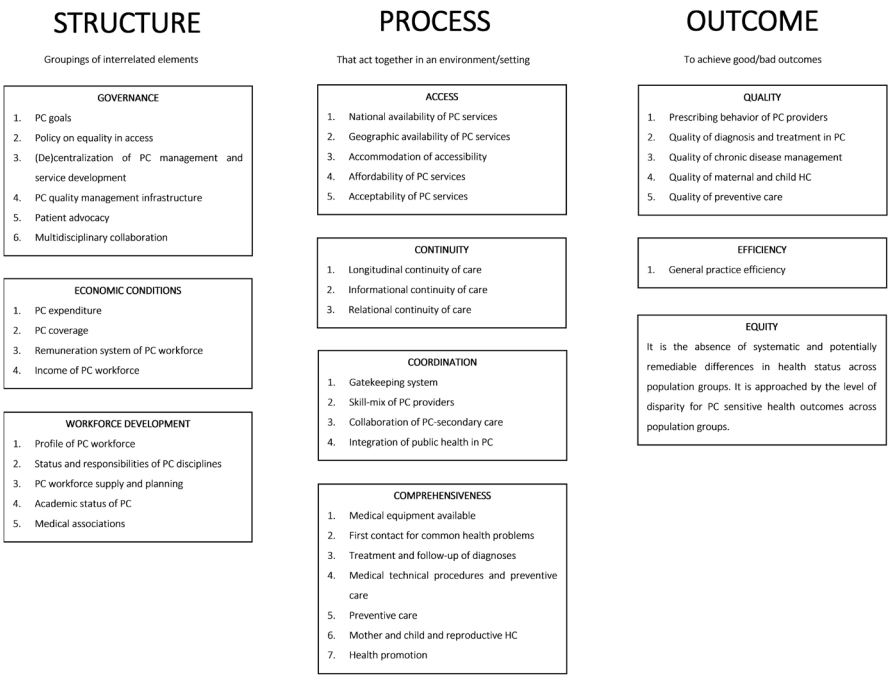
APPENDIX

Appendix 1 Dimensions of the Primary Health Care Activity Monitor for Europe (PHAMEU) and the corresponding features



Source: authors' own representation, based on Kringos (2012)

Appendix 2 Multilevel logistic regression of financially driven postponement of GP care on primary healthcare characteristics (log odds and their standard error) [1]

	Financially driven postponement		
	Null model	**Strength PC structure**	**Strength PC process**
Strength PC structure		**- 2.63 (0.96) ****	
Strength PC process			**- 4.25 (1.27) *****
Low income		**0.65 (0.08) *****	**0.66 (0.08) *****
High income		**- 0.44 (0.17) ***	**- 0.43 (0.17) ***
GDP per capita (in US $)		**- 0.14 (0.06) ****	**- 0.08 (0.05) ***
Intercept	**- 2.60 (0.16) *****	3.53 (2.16)	**6.78 (2.75) ****
Variance country	**0.78 (0.22) *****	**0.52 (0.16) *****	**0.46 (0.14) *****
Variance GP	**0.93 (0.13) *****	**0.97 (0.14) *****	**0.97 (0.14) *****
N	8723	8723	8723

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

1 Considering that only 33 countries are included in the analyses (i.e. 33 different observations on level 3), the multilevel regression, reported in Chapter 4.3, may be overdetermined when including multiple independent explanatory variables. When adding strength-dimensions of primary care one-by-one to the statistical model, the results are comparable to those reported in Chapter 4.3.

Appendix 3 Multilevel regression of financially driven postponement on primary healthcare systems characteristics: including specific structure and process strength scales (log odds and their standard error) [2]

		Null model	Financially driven postponement						
Structure	Governance		**- 3.66 (1.23) ****						
	Economic conditions			- 2.80 (1.43)					
	Workforce development				- 1.62 (1.02)				
Process	Access					**- 4.39 (0.83) *****			
	Continuity						1.99 (2.682)		
	Coordination							- 1.22 (0.69)	
	Comprehensiveness								- 1.40 (0.99)
	Low income		**0.65 (0.08) *****	**0.65 (0.08) *****	**0.65 (0.08) *****	**0.66 (0.08) *****	**0.65 (0.08) *****	**0.65 (0.08) *****	**0.65 (0.08) *****
	High income		**- 0.44 (0.17) ***	**- 0.44 (0.17) ***	**- 0.44 (0.17) ***	**- 0.44 (0.17) ***	**- 0.44 (0.17) ***	**- 0.44 (0.17) ***	**- 0.44 (0.17) ***
	GDP per capita (in US $)		**- 0.17 (0.06) ****	**- 0.12 (0.06) ***	**- 0.12 (0.06) ***	**- 0.15 (0.05) *****	**- 0.13 (0.06) ***	**- 0.12 (0.06) ***	- 0.10 (0.06)
	Intercept	**- 2.60 (0.16) *****	**6.63 (3.04) ***	3.62 (3.08)	0.92 (2.11)	**7.46 (1.87) *****	- 7.07 (6.31)	- 0.32	0.81 (2.29)
	Variance country	**0.78 (0.22) *****	**0.50 (0.15) *****	**0.58 (0.17) *****	**0.62 (0.18) *****	**0.31 (0.10) *****	**0.65 (0.19) *****	**0.59 (0.17) *****	**0.61 (0.18) *****
	Variance GP	**0.93 (0.13) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****	**0.97 (0.14) *****
	N	8723	8723	8723	8723	8723	8723	8723	8723

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

2 Considering that only 33 countries are included in the analyses (i.e. 33 different observations on level 3), the multilevel regression, reported in Chapter 4.3, may be overdetermined when including multiple independent explanatory variables. When adding strength-dimensions of primary care one-by-one to the statistical model, the results are comparable to those reported in Chapter 4.3. Only the comprehensiveness dimension is not significantly associated with financially driven postponement in this model.

4.4

Do we reap what we sow?

Exploring the association between the strength of European primary healthcare systems and inequity in unmet need

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ABSTRACT

Access to healthcare is inequitably distributed across different socioeconomic groups. Several vulnerable groups experience barriers in accessing healthcare, compared to their more wealthier counterparts. In response to this, many countries use resources to strengthen their primary care (PC) system, because in many European countries PC is the first entrypoint to the healthcare system and plays a central role in the coordination of patients through the healthcare system. However it is unclear whether this strengthening of PC leads to less inequity in access to the whole healthcare system. This study investigates the association between strength indicators of PC and inequity in unmet need by merging data from the European Union Statistics on Income and Living Conditions database (2013) and the Primary Healthcare Activity Monitor for Europe (2010). The analyses reveal a significant association between the Gini coefficient for income inequality and inequity in unmet need. When the Gini coefficient of a country is one SD higher, the social inequity in unmet need in that particular country will be 4.960 higher. Furthermore, the accessibility and the workforce development of a country's PC system is inverse associated with the social inequity of unmet need. More specifically, when the access- and workforce development indicator of a country PC system are one standard deviation higher, the inequity in unmet healthcare needs are respectively 2.200 and 4.951 lower. Therefore, policymakers should focus on reducing income inequality to tackle inequity in access, and strengthen PC (by increasing accessibility and better-developing its workforce) as this can influence inequity in unmet need.

INTRODUCTION

The socioeconomic conditions in which people live play a large part in influencing their chances of living a healthy life (Droomers & Westert, 2004; Marmot & Bell, 2010; Verlinde, Bonte, & Willems, 2012; Westert et al., 2001). Access to healthcare is an important and fundamental indicator of health, and its equitable distribution across patients is a never-ending concern within health services research (Pappa et al., 2013; van Doorslaer, Masseria, & Koolman, 2006; Whitehead & Dahlgren, 2006; WHO, 2008). Equitable access to care should be determined by a patient's need for medical care and not by their social status, age, gender, income or ethnic background (Aday & Andersen, 1984). In the present time however, people from some social groups experience more barriers in accessing primary care (PC) compared with other social groups (Diamant et al., 2004; Dias, Severo, & Barros, 2008; Dias et al., 2011; Himmelstein & Woolhandler, 1995; Murray, 2000; Reilly, Schiff, & Conway, 1998; Xu & Borders, 2003). In response to this inequitable distribution of access, many countries aim to improve access to healthcare by strengthening their PC systems. However, until now, it remains unclear whether strong PC systems are associated with equity in access to healthcare.

For those in need, access to healthcare has a positive influence on self-perceived health and life expectancy (EXPH, 2016; Nolte & McKee, 2011). Moreover, good health outcomes at a national level are related to beneficial economic outcomes, such as productivity and output (EXPH, 2016). Therefore, it is not surprising that providing citizens with adequate access to healthcare services has been a major goal of many European policymakers. According to several European policy documents (e.g., EU Charter for Fundamental Rights, Treaty on the Functioning of the EU and the International Covenant on Economic, Social, and Cultural Rights) it is the responsibility of all European Union (EU) member states to establish a right of access to core healthcare services for everyone, especially vulnerable and marginalised patients, with an equitable distribution based on health needs (EXPH, 2016). However, notwithstanding the intentions of these policy documents, there is still great variation among the proportions of populations reporting unmet healthcare needs across Europe. The organisation and financing of PC in European countries is characterised by a variety of delivery models, but, recent reforms have led to an increase in convergence (Masseria et al., 2009). Various disciplines are involved in PC delivery, although GPs in Europe are usually the main PC actors and guide patients through the healthcare system (Boerma, van der Zee, & Fleming, 1997). These GPs are

almost always self-employed, and paid through a mix of fee-for-service and capitation payment systems. Additionally, most European countries use the GP as gatekeeper and financial incentives to regulate access to secondary care (Masseria et al., 2009).

The most commonly used measure of access to healthcare is self-assessed unmet need (Allin & Masseria, 2009). Carr and Wolfe (1976) define unmet healthcare needs 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'. This definition is the most suitable method for measuring unmet healthcare need. This subjective assessment of unmet healthcare need perceives the patient to be the best assessor of their health status and whether they have received the most convenient healthcare (Cavalieri, 2013).

Reported unmet need ranges from less than 1% in Slovenia and Belgium to 26% in Latvia (Allin, Grignon, & Le Grand, 2010). In addition, the prevalence of unmet healthcare need appears to be increasing over time. From 2005-2008 unmet healthcare need in the EU decreased by 2%; however this downward trend reversed from 2008-2013, when the prevalence of unmet need began to grow again. It reached 3.6% in 2013. According to Reeves, McKee & Stuckler (2015), more than 1.5 million additional people have reported unmet healthcare needs since the beginning of the financial and economic crisis. This reversing trend can be explained by the onset of the financial and economic crisis and the related introduction of austerity measures in several European countries (Elstad, 2016; EXPH, 2016), especially in countries with a large income inequality (Elstad, 2016). Reeves, McKee & Stuckler (2015) identified demand-side factors (e.g., increasing co-payments, rising transport costs and reduced incomes) and supply-side factors (e.g., closing times of health facilities and reduction in opening hours) as potential mechanisms underlying this evolution. Furthermore, a recent European contribution shows that countries with a large income inequality were associated with a higher prevalence in unmet need. This effect occurred only among the disadvantaged population in a European country, and among the more wealthier population groups. The scarce literature available identifies low income as one of the strongest predictors of experiencing unmet need (Allin & Masseria, 2009; Chaupain-Guillot & Guillot, 2015; Shi & Stevens, 2005). Receiving an adequate income is essential to being able to purchase healthcare and is vital for obtaining access to PC and specialist care.

As mentioned above, this article intends to explore whether the strength of European PC is associated with inequality in unmet need. To the best of our knowledge, the present study is the first attempt to address this association with an international comparison. Nonetheless, the existence of this association is supported by previous studies that have provided evidence of the positive influence of PC strength on several other health(-care)-related measures. For example, strong PC is associated with better population health (Kringos et al., 2013; Macinko, Starfield, & Shi, 2003; Starfield, 1994), improved quality of care (Murray, Davies, & Boushon, 2007), reduced socioeconomic inequality in health (Kringos et al., 2013), higher self-rated health for people with chronic diseases (Hansen et al., 2015) and better cost control (Delnoij et al., 2000). The positive influence of PC strength on health outcomes can be attributed to the main characteristics of PC: providing accessible, comprehensive care in an ambulatory setting to patients in their own context on a continuous basis and coordinating the care processes of patients across the healthcare system (Kringos, 2012). Moreover, PC can act as a mediator for relatively deprived population groups, and in doing so may increase accessibility to other healthcare services (Verlinde, 2012). PC functions as the first point of contact with a healthcare system and facilitates entry to the rest of the system.

Besides the fact that previous literature on unmet healthcare need has not addressed the link between the strength of PC and socioeconomic inequalities in unmet need, it is also characterised by other limitations. Firstly, most of the existing literature on unmet need comprises single-country studies (conducted mainly in the US and Canada). In addition, few of these studies are based on general population groups (Litaker & Love, 2005; Shi & Stevens, 2005), while most focus on specific patient groups (Baggett et al., 2010; Chaupain-Guillot & Guillot, 2015; Dusing, Skinner, & Mayer, 2004; Heslin et al., 2001; Kane, Zotti, & Rosenberg, 2005; Marcus et al., 2000), thereby limiting the generalisability of their findings. Moreover, only a limited number of studies with international comparisons have been conducted (Baert & de Norre, 2009; Chaupain-Guillot & Guillot, 2015; Mielck et al., 2009; van Doorslaer, 2006). Finally, most previous studies in this field focus on the prevalence of, rather than the inequity in, unmet need, while policymakers are particularly interested in the latter aspect. An exception to this is a recent study by Chaupain-Guillot and Guillot (2015) which investigated the relationship between health system characteristics and unmet need across European countries. In the present study we build on and contribute to the mentioned body of literature by answering the following research question: is the strength of European PC systems

associated with income-driven inequity in unmet healthcare need at the macro level? In other, more poetic words, do we reap social inequity in unmet need, when sowing weak PC systems?

METHODS

To answer the research question, data from two European databases were combined: (i) data on national unmet healthcare needs from the 2013 wave of European Union Statistics on Income and Living Conditions (EU-SILC) and (ii) data on the strength of the national PC systems from the Primary Healthcare Activity Monitor for Europe (PHAMEU) (2010).

Data and operationalisation

The EU-SILC, gathered under the coordination of Eurostat, is the EU reference source for comparative statistics on income distribution and social inclusion at the European level (2015). EU-SILC provides two types of data concerning the 27 EU countries, as well as Croatia, Iceland, Norway, Switzerland, and Turkey: (i) longitudinal data containing individual-level changes over time, observed periodically over four years and (ii) cross-sectional data on income, poverty, social exclusion and living conditions. The minimum size of the surveyed population each year is approximately 100,000 households and 200,000 citizens aged 16 years or over for the longitudinal part of the study, and 130,000 households and 270,000 citizens aged 16 years or over for the cross-sectional data. The 2013 wave of data (used for the current study) included the 27 Member States of the European Union, as well as Norway and Iceland. However EU-SILC did not provide data on unmet healthcare needs for some countries for 2013. For these countries, the authors used the data from the most recent wave provided in EU-SILC (for Malta, the Netherlands, Austria and FYR Macedonia this was 2012, for Sweden this was 2009, for Norway this was 2008, for Turkey this was 2007 and for Slovenia this was 2005).

Access to healthcare was measured by asking participants: `Was there any time during the last 12 months when, in your opinion, you needed medical examination or treatment [...] but you did not receive it?' If participants answered `yes' to this question, they were categorised as participants who suffered from unmet healthcare need. Inequity (or the gap) in unmet healthcare need was calculated by subtracting the percentage of participants in the lowest quintile of equivalised income reporting unmet need by the percentage of participants in the highest quintile of equivalised income reporting unmet need. Equivalised income is the total income of a household, after tax and other deductions, divided by the number of household members. To convert the household members into equalised adults, they were each weighted according to their age using the

modified OECD equivalence scale (Eurostat, 2014). This approach to calculating inequity through the interquintile range is similar to that used in previous studies (Jones, 1998; Kalmijn & Veenhoven, 2005). Kalmijn and Veenhoven (2005) explored several statistics to operationalise income-driven inequity across countries. Compared to other statistics (for instance the mean absolute difference), they concluded that the interquartile range proved suitable for operationalising inequity. In the present study, due to the fact that publicly available data was only provided by means of quintiles, the authors were forced to base their measure on interquintile instead of interquartile ranges.

Secondly, given the complexity of and variation in European PC, PHAMEU was used to determine the strength of the national PC systems, and by doing so, made the complex European PC landscape comparable. The seven strength indicators of PHAMEU capture a combination of PC functions both at the structure level (governance, economic conditions and workforce development) and at the process level (access, continuity, coordination and comprehensiveness) (Kringos et al., 2010). A detailed overview of the specific composition of these strength indicators is provided in Table 1.

Table 1 Framework of the European Primary Monitor (Kringos 2012)

	Description by Kringos (2012)	Components
Strength of PC structure		
Governance	Oversees all aspects of PC. It encompasses the tasks of defining the vision and direction of health (care) policy, exerting influence through regulation and advocacy, and collecting and using information.	1. PC goals 2. Policy on equality in access to PC 3. (De)centralization of PC management and service development 4. Quality management infrastructure 5. Patient advocacy 6. Multidisciplinary collaboration
Economic conditions	Are to a great extent shaped by the method of financing healthcare for the population, total expenditures on healthcare and PC, etc.	1. PC expenditure 2. PC coverage 3. Remuneration system of PC workforce 4. Income of PC workforce
Workforce development	Shaped by the profile of PC professionals that make up the PC workforce in a country, and the position they occupy in the healthcare system.	1. Profile of PC workforce 2. Status and responsibilities of PC disciplines 3. PC workforce supply and planning 4. Academic status of PC 5. Medical associations
Strength of PC process services delivery		
Access	Can be defined as the ease with which PC services are reached by patients.	1. Density PC workforce 2. Geographic availability of PC services 3. Accommodation of accessibility 4. Affordability of PC services 5. Acceptability of PC services
Continuity	Conditions related to enduring doctor-patient relationships.	1. Longitudinal continuity of care 2. Information continuity of care 3. Relation continuity of care
Coordination	The ability of PC providers to guide the use of care with other levels of healthcare or other healthcare providers, so that providers can work together to meet patients' needs.	1. Gatekeeping system 2. Skill-mix of PC providers 3. Collaboration of PC-secondary care 4. Integration of public health in PC
Comprehensiveness	Describes the extent to which PC provides the most comprehensive scope of health services within a healthcare system and address the wide variety and often very basic needs existing in the community.	1. Medical equipment available 2. First contact for common health problems 3. Treatment and follow-up of diseases 4. Medical technical procedures 5. Preventive care 6. Mother and child & reproductive healthcare 7. Health promotion

For additional information about the selection of the indicators, data collection, and calculation of the scales see Kringos (35). These European Primary Care Monitor components were used to calculate seven separate scores (one for each indicator of strength) via a two-level hierarchical regression model.

Statistical analysis

The data were analysed using SPSS (version 23.0.0, IBM). The distribution of the dependent variable (social inequity in unmet healthcare need) and the governance-indicator was highly skewed, and because they were rejected by the normal distribution hypothesis using the Shapiro-Wilk test, these two variables were logarithmic transformed. Firstly, the dependence between the seven aforementioned strength indicators (each time used as a scale) and the gap in unmet healthcare need between low- and high-income groups was tested using Pearson correlation coefficients. Secondly, multiple linear regression models were used to assess the relative and independent contribution of the seven strength indicators to the gap between low- and high-income groups in unmet healthcare need. In the second regression model, we additionally controlled for the unequal distribution of countries' wealth by adding the Gini index of income inequality to the model. The World Bank [50] defines the Gini index of income inequality as the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. No variables required exclusion due to multicollinearity issues. The level of statistical significance was set at $p \leq 0.05$.

RESULTS

Firstly, we provide the reader with a brief summary of European PC strength (Table 2). According to PHAMEU, the countries that scored the highest (lowest) on the governance-indicator were the Netherlands and Spain (Switzerland and Luxembourg). Furthermore, concerning economic conditions, the United Kingdom and Spain (Bulgaria and Ireland) scored the highest (lowest). The United Kingdom and the Netherlands (Iceland and Luxembourg) had the best (weakest) developed workforce.

Moreover, the highest (lowest) accessibility was reported in Slovenia and Denmark (Ireland and Luxembourg). Regarding continuity, Denmark and Estonia (Turkey and Malta) were the strongest (weakest). Sweden and the Netherlands (Austria and Germany) had the strongest (lowest) PC coordination. Countries that provided the best (weakest) comprehensive care were Lithuania and Bulgaria (FYR Macedonia and Slovakia). In short, although other countries often had the strongest (weakest) scores on several strength-indicators, the Netherlands, Spain and the UK primarily showed to be the strongest concerning PC, while Luxembourg scored the weakest in this respect.

Table 2 Overview of country characteristics in relation to healthcare system features: structure and process strength.

Country	**Strength PC Structure**	Governance	Economic conditions	Workforce development	**Strength PC process**	Access	Continuity	Coordination	Comprehensive-ness
Austria	Weak	Medium	Medium	Weak	Weak	Medium	Weak	Weak	Medium
Belgium	Medium	Medium	Strong	Medium	Medium	Weak	Strong	Medium	Strong
Bulgaria	Weak	Medium	Weak	Weak	Medium	Weak	Medium	Weak	Strong
Cyprus	Weak	Weak	Weak	Weak	Weak	Weak	Medium	Weak	Weak
Czech Republic	Weak	Medium	Weak	Weak	Medium	Strong	Strong	Medium	Weak
Denmark	Strong	Strong	Medium	Strong	Strong	Strong	Strong	Strong	Medium
England	Strong	Strong	Strong	Strong	Strong	Strong	Medium	Strong	Strong
Estonia	Medium	Strong	Weak	Medium	Strong	Medium	Strong	Medium	Medium
Finland	Strong	Weak	Strong	Strong	Strong	Medium	Weak	Medium	Strong
FYR Macedonia	-	-	-	-	Weak	Strong	Weak	Weak	Weak
Germany	Medium	Medium	Strong	Weak	Weak	Medium	Strong	Weak	Medium
Greece	Weak	Medium	Weak	Weak	Weak	Weak	Weak	Strong	Weak
Hungary	Weak	Weak	Medium	Medium	Medium	Strong	Medium	Weak	Medium
Iceland	Weak	Weak	Weak	Weak	Medium	Medium	Strong	Medium	Medium
Ireland	Medium	Weak	Weak	Strong	Weak	Weak	Strong	Weak	Weak
Italy	Strong	Strong	Strong	Medium	Medium	Medium	Medium	Medium	Weak
Latvia	Weak	Medium	Medium	Weak	Medium	Weak	Medium	Medium	Medium
Lithuania	Medium	Medium	Medium	Medium	Strong	Medium	Weak	Strong	Strong
Luxembourg	Weak	Weak	Weak	Weak	Weak	Weak	Weak	Medium	Medium
Malta	Medium	Weak	Weak	Strong	Medium	Medium	Weak	Strong	Strong
Netherlands	Strong	Strong	Strong	Strong	Strong	Strong	Weak	Strong	Weak

Norway	Medium	Strong	Weak	Medium	Medium	Medium	Medium	Weak	Strong
Poland	Weak	Weak	Weak	Weak	Strong	Strong	Medium	Strong	Weak
Portugal	Strong	Strong	Medium	Strong	Strong	Strong	Medium	Medium	Strong
Romania	Medium	Strong	Medium	Medium	Weak	Medium	Medium	Weak	Weak
Slovakia	Weak	Weak	Medium	Weak	Weak	Medium	Strong	Weak	Weak
Slovenia	Strong	Strong	Strong	Strong	Strong	Strong	Weak	Strong	Weak
Spain	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Sweden	Medium	Medium	Medium	Medium	Strong	Medium	Weak	Strong	Strong
Switzerland	Weak	Weak	Medium	Medium	Medium	Medium	Medium	Medium	Strong
Turkey	Medium	Medium	Strong	Medium	Weak	Weak	Weak	Weak	Medium

Source: authors' calculations based on PHAMEU (2010)

Note: For all countries, the scores for these seven strength dimensions are listed in table 2 as percentiles (33 and 67) rather than the actual five digit decimals to facilitate interpretation.

Fig 1 shows how unmet healthcare need differed by income level. In all European countries, people in the lowest income group reported the highest unmet need. The highest percentage of the population reporting unmet need was observed in Turkey (28.2%) and the lowest in the United Kingdom (0.1%). The country with the highest social inequity in unmet healthcare need between low- and high-income groups was Turkey. Consequently, Turkey reported the highest inequity in unmet healthcare need. The Netherlands had the lowest gap and therefore reported the lowest inequity in unmet healthcare need (Fig 2).

Figure 1 Percentage of people reporting unmet health care needs, comparing the highest and lowest income quintile

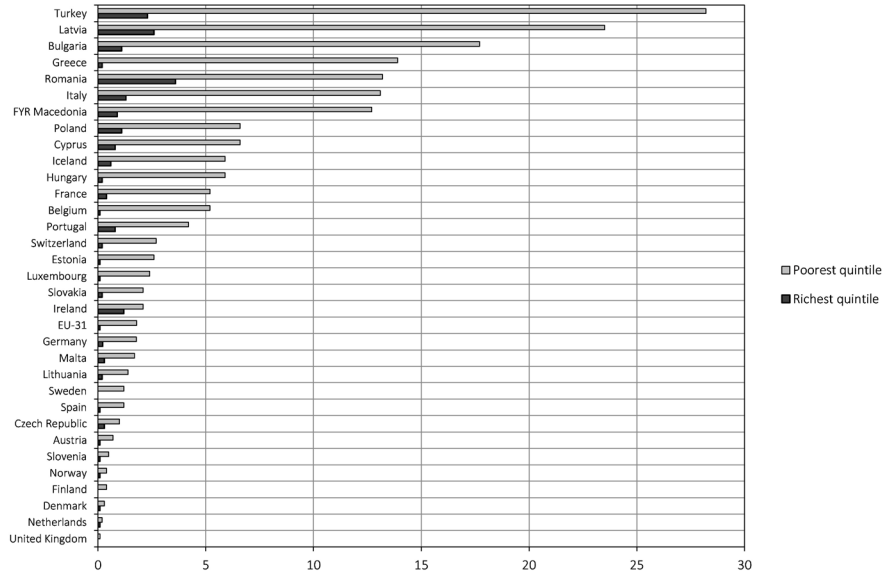
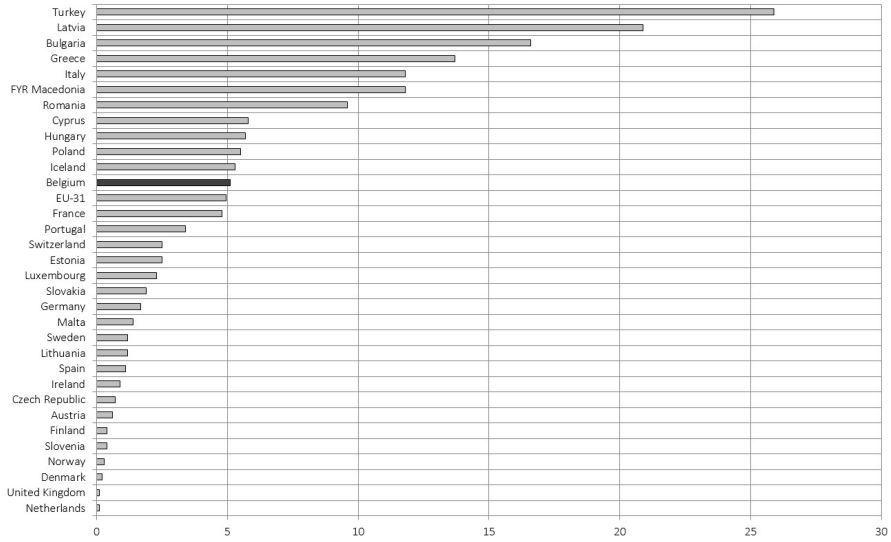


Figure 2 Gap unmet health care needs between low and high income groups



To present the univariate association between the social gap in unmet healthcare need and the seven strength indicators of the PC system, Pearson correlation coefficients were calculated. Table 3 presents the results of this correlation matrix. We observed a significant correlation between unmet healthcare need and economic condition (R:-0.384, p 0.036), workforce development (R:-0.551, p 0.002), access (R:-0.451, p 0.011) and coordination (R:-0.380, p 0.035). Each of these correlations showed that the higher the score on the indicator, the lower the gap in unmet need. Furthermore, the matrix revealed a significant correlation between the Gini coefficient for income inequality and the gap in unmet healthcare need (R: 0.421, p 0.017). There were no associations between the gap in unmet healthcare need and governance, continuity and comprehensiveness.

Table 3 Correlation matrix between the dependent variable and all independent variables

	Gap unmet need	GINI index for income inequality	Governance	Economic conditions	Workforce development	Access	Continuity	Coordination	Comprehen-siveness
Gap unmet need		**0.355 (0.046)**	- 0.236 (0.209)	**- 0.384 (0.036)**	**- 0.551 (0.002)**	**- 0.451 (0.011)**	- 0.152 (0.413)	**- 0.380 (0.035)**	- 0.278 (0.130)
GINI index for income inequality	**0.355 (0.046)**		0.127 (0.502)	0.195 (0.302)	0.264 (0.159)	- 0.062 (0.741)	- 0.114 (0.540)	0.012 (0.947)	- 0.227 (0.220)
Governance	- 0.236 (0.209)	0.127 (0.502)		**0.372 (0.043)**	**0.383 (0.037)**	**0.495 (0.005)**	- 0.031 (0.872)	**0.385 (0.036)**	0.184 (0.330)
Economic conditions	**- 0.384 (0.036)**	0.195 (0.302)	**0.372 (0.043)**		**0.488 (0.006)**	**0.478 (0.008)**	- 0.036 (0.850)	0.268 (0.152)	0.081 (0.669)
Workforce development	**- 0.551 (0.002)**	0.264 (0.159)	**0.383 (0.037)**	**0.488 (0.006)**		0.313 (0.092)	- 0.040 (0.833)	**0.380 (0.038)**	0.301 (0.106)
Access	**- 0.451 (0.011)**	- 0.062 (0.741)	**0.495 (0.005)**	**0.478 (0.008)**	0.313 (0.092)		0.249 (0.177)	0.234 (0.205)	- 0.057 (0.761)
Continuity	- 0.152 (0.413)	- 0.114 (0.540)	- 0.031 (0.872)	- 0.036 (0.850)	- 0.040 (0.833)	0.249 (0.177)		- 0.194 (0.295)	0.146 (0.434)
Coordination	**- 0.380 (0.035)**	0.012 (0.947)	**0.385 (0.036)**	0.268 (0.152)	**0.380 (0.038)**	0.234 (0.205)	- 0.194 (0.295)		0.245 (0.183)
Comprehensiveness	- 0.278 (0.130)	- 0.227 (0.220)	0.184 (0.330)	0.081 (0.669)	0.301 (0.106)	- 0.057 (0.761)	0.146 (0.434)	0.245 (0.183)	

All significant results are indicated in bold

To determine the independent impact of the strength indicators on the observed gap in unmet healthcare need, an initial multiple linear regression model was estimated (Table 4). This model showed significant associations between two of the seven strength indicators and explained 29.5% of the variance in inequity in unmet healthcare need. Consistent with the correlation matrix, the association between access and unmet healthcare need remained significant in the regression model. Access was inverse associated with the gap in unmet healthcare need (p 0.020). The better the access to the PC system, the smaller the gap in unmet healthcare need within a country. More specifically, when the access-indicator is one standard deviation higher, the inequity in unmet need is about 4.371 lower. Secondly, we observed an inverse association between workforce development and the gap in unmet healthcare need (p 0.047).

In other words, the better developed the PC workforce is, the lower the inequity in unmet healthcare need. Specifically, when the workforce development of a country is one standard deviation higher, the index of inequity in unmet need of this particular country is 3.967 lower. The significant correlation in the bivariate analysis for economic conditions and coordination disappears in the multiple regression model. Furthermore, the other three strength indicators (governance, continuity and comprehensiveness) had no significant impact on the gap in unmet healthcare need. In the second and final model we controlled for the Gini index for income inequality. This model explained 46.0% of the variance. The association between access and the gap in unmet need on the one hand (p 0.018) and workforce development and the gap in unmet need on the other (p 0.008) remained statistically significant when the Gini index was taken into account.

When the access- and workforce development indicator of a country are one standard deviation higher, the index of inequity in unmet healthcare needs are respectively 2.200 and 4.951 lower. A positive association between the Gini index for income inequality and the index in unmet healthcare need was shown (p 0.011), indicating that the higher the income inequality, the bigger the gap in unmet healthcare need. Specifically, when the Gini index is one SD higher, the social inequity in unmet need index will be 4.960 higher. Finally, the other five strength indicators (governance, economic conditions, continuity, coordination and comprehensiveness) showed no significant associations with the index in unmet need.

Table 4 Linear regression of the gap between low and high income groups on PC strength indicators, and in the second linear regression controlling for the GINI index for income inequality

	Model 1			Model 2		
	B	**SD**	**p**	**B**	**SD**	**P**
Constant	22.784	11.802	0.067	21.241	10.340	0.053
GINI index for income inequality				**4.960**	**0.057**	**0.011**
Strength PC structure						
Governance	5.534	5.485	0.324	3.436	4.858	0.487
Economic conditions	- 0.348	2.987	0.908	- 1.789	2.664	0.509
Workforce development	**- 3.967**	**1.888**	**0.047**	**- 4.951**	**1.689**	**0.008**
Strength PC process						
Access	**- 4.371**	**2.393**	**0.020**	**- 2.200**	**2.234**	**0.018**
Continuity	- 1.948	4.575	0.674	- 2.875	4.017	0.482
Coordination	- 1.143	1.235	0.365	- 1.300	1.082	0.243
Comprehensiveness	- 0.717	1.846	0.701	- 0.246	1.624	0.881
			Adjusted R^2 : 0.295			Adjusted R^2 : 0.460

All significant results are indicated in bold

DISCUSSION

In most European countries some social groups experience barriers in accessing (primary) healthcare and have therefore an inequitable disadvantage compared to their more wealthier counterparts (Whitehead & Dahlgren, 2006; WHO, 2008). Many countries use resources to strengthen the PC system and tackle this inequity. However, it is unknown whether strong PC systems are related to less inequity in healthcare accessibility. Therefore, the current study empirically investigated the association between the indicators of the strength of PC and inequity in unmet healthcare need in Europe at the macro level. This study complements recent European contributions which have examined the association between health system characteristics and unmet care need (Chaupain-Guillot & Guillot, 2015) by focusing on (i) the characteristics of the PC system (rather than the total healthcare system) and (ii) the inequity dimension in unmet healthcare need (rather than the prevalence of unmet healthcare need). To that end, we merged data from the 2013 wave of EU-SILC and from PHAMEU (2010).

The results of this study show the largest inequity gap in unmet healthcare need in Turkey. Moreover, according to PHAMEU, Turkey has a weak PC system. Bivariate analyses revealed a significant correlation between the social gap in unmet need and (i) the Gini coefficient for income inequality, (ii) the access-indicator of the strength of PC and (iii) the workforce development-indicator of the strength of PC. Furthermore, according to the estimation results of the multiple linear regression model, two indicators of PC strength predict inequity in unmet healthcare need. Firstly, an inverse effect between access and inequity in unmet healthcare need was observed. In other words, a more accessible primary healthcare system was associated with lower inequity in unmet healthcare need. This is consistent with recent literature, in which unmet healthcare need has been shown to be the most commonly used proxy to measure access to healthcare (Allin & Masseria, 2009).[1]

Secondly, this study suggests that a better-developed workforce within PC and a more central role of PC professionals (e.g., a gatekeeping role) within the healthcare system is associated with lower inequity in access to healthcare, thus lowering inequity in unmet need (Allin & Masseria, 2009). Furthermore, the results of the multiple regression model reveal a significant association between the Gini coefficient for income inequality and

1 The Expert Panel on effective ways of investing in Health (2016) also uses unmet need as a proxy for access to care when evaluating the accessibility of European health care services in their recent report.

the social inequity in unmet need. This result is, to some extent, tautological. Given the fact that social inequity in unmet healthcare need is calculated using income quintiles it is not surprising, and even logical, that there is a significant association between this independent variable and inequity in unmet need. However, this association complements the research of Wilkinson and Pickett (2010) that demonstrates the importance of income inequality on health and wellbeing.

Finally, in a recent research, Chaupain-Guillot and Guillot (2015) found a positive link between households' out-of-pocket payments in total health expenditure and the probability of unmet healthcare needs. In this study, we found a significant correlation between economic conditions and inequity in unmet healthcare need. Nonetheless, this effect disappeared when controlling for other strength indictors of PC in the multiple regression models.

To the best of our knowledge, this is the first study to describe an association between the strength of PC systems and inequity in unmet healthcare need at the macro level; however the authors stress the explorative nature of this study. Given the impact of context on the perception of unmet need, we invite further research exploring this association at the micro level (i.e., explaining unmet need at the individual level by means of strength of the relevant PC system for this individual).

Strengths and limitations

The operationalisation of unmet need in this study, consistent with the definition of Carr and Wolfe (1976), has two limitations. According to this definition, only non-objective clinically-assessed needs that are not satisfied by appropriate healthcare can be considered unmet. Therefore, this definition has the purpose of detecting subjective or self-assessed unmet health expectations, which are not always clinically grounded. Subjective interpretation of unmet healthcare need is also highly dependent on patient context. Country-specific social and cultural factors (e.g., patient expectations) can influence the evaluation of unmet need (Allin & Masseria, 2009). Secondly, the definition of Carr and Wolfe (1976) neglects unperceived (but objectively clinically grounded) unmet healthcare need (Allin, Grignon, & Le Grand, 2010). Notwithstanding these two limitations, this definition is the most suitable method for measuring unmet healthcare need. This subjective assessment of unmet healthcare need perceives the patient to be the best assessor of their health status and of whether they have received the most

convenient healthcare (Cavalieri, 2013). Because the question used in EU-SILC not only probes unmet medical healthcare need but also dental need (which is not relevant to this study), it overestimates the prevalence of unmet need. Also, due to lack of recent data for all included countries, data for different time-periods are used, which could influence the study results. Finally, this study is limited to 31 countries, which, from a statistical point of view, is not optimal (Allin & Masseria, 2009. Nevertheless, with this paper, we aimed to take an important step forward in understanding the association between the strength of PC and inequity in unmet healthcare need.

Policy recommendations

From a policy perspective, our results suggest that policymakers should focus on making PC more accessible and expanding the PC workforce in order to reduce the inequity in unmet healthcare need. Policymakers are therefore urged to develop multidimensional and differentiated legislation that will reduce barriers to care access (Cavalieri, 2013). In order for enhanced accessibility, we recognise the importance of universal health coverage (Evans & Etienne, 2010). As mentioned previously, the US took an important step forward in 2010 with the implementation of the Affordable Care Act. However, the significant association we found between inequity and the Gini coefficient for income inequality shows that in order to reduce inequity, policymakers should first attempt to eliminate income inequality. Only then can strengthening PC systems (i.e., increasing the accessibility of PC and developing the PC workforce) influence inequity in unmet healthcare need. Note that the purpose of this study is to explain the association between the strength of PC systems and inequity in unmet need at the macro level rather than the association between the strength of PC systems and the prevalence of unmet need. The latter association requires further investigation.

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4.5

Association between person-centeredness and financially driven postponement in European primary care

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ABSTRACT

Objective. The present study contributes to the large body of knowledge on the beneficial effects of person-centred care by empirically investigating the association between a GP's person-centred attitude and financially driven postponement of care in European countries.

Data Sources. Data were collected within the QUALICOPC study, which included 69,201 patients and 7,183 GPs from 31 European countries.

Study Design. Financially driven postponement was measured by asking patients whether they had postponed care for financial reasons in the last 12 months. Person-centeredness was operationalised using the conceptual framework of Stewart et al. (2013).

Data Collection/Extraction Methods. Data were analysed through multilevel logistic regression modelling.

Principal Findings. Low-income patients are associated with higher financially driven postponement. Furthermore, a GP with a person-centred attitude is associated with lower financially driven postponement rates among her/his patients. We found that an increase in the GP's person-centeredness with one SD is associated with a decreased likelihood of postponing care for financial reasons with 0.923.

Conclusions. Person-centred GPs can mediate the negative effect of primary health care systems on financially driven postponement of care.

Keywords: Europe, financial driven postponement, primary care, strength, person-centred care, access

INTRODUCTION

Primary care systems should provide universal and accessible care that meets the medical need of the patient, regardless of their financial capabilities (Goddard & Smith, 2001). However, a considerable part of patients postpone primary care (Detollenaere et al., 2017). European data shows that approximately 15.0% of European citizens postpone care for financial reasons (Detollenaere et al., 2016). Consequently, financially driven postponement remains one of the main reasons patients delay seeking health care (Baert & de Norre, 2009). The World Health Organization (WHO) proposed strengthening primary care as a major strategy to provide equitable access to the (primary) health care system (Van Lerberghe, 2008). This was hypothesised to decrease the rate of financially driven postponement. However, Detollenaere et al. (2016) demonstrated that this hypothesis is not as straightforward as expected. In a European analysis, not all indicators of primary care strength at the macro level are associated with lower financially driven postponement of care. In addition, they found that a large proportion of the variance in financially driven postponement is attributed to characteristics of the GP and the practice; in other words, not only to the characteristics of strong primary care at the macro level. However, this study excluded provider characteristics (such as organisation of the practice or consultation style) from the analysis.

One of the provider characteristics that has been related to beneficial (health) outcomes is person centeredness. A person-centred provider explores illness and disease experiences, has a perspective on the whole person, and finds common ground, which enhances the patient-physician relationship and extends beyond isolated disease episodes (Bertakis & Azari, 2011; Brown et al., 2016; Starfield, 2011; Stewart et al., 2013). Prior research revealed that person-centeredness positively influences several outcomes such as better objective and subjective health status, therapy adherence, improved patient trust, and reduced utilisation of diagnostic testing (Bertakis & Azari, 2011; Dwamena et al., 2012; Mead & Bower, 2002; Rao et al., 2007; Stewart et al., 2000). Moreover, person-centeredness positively affects equity in health care (Jani et al., 2012). For example, a GP's person-centred attitude has a more positive impact on mental health outcomes for people with a low socioeconomic status than for wealthier people (Jani et al., 2012). Person-centeredness may as such be a driving force of equity, independent of macro level characteristics. In this context, we hypothesise that a GP's person-centred attitude may be related to a lower rate of financially driven postponement.

This study investigates the association between a GP's person-centred attitude and financially driven postponement of care in European countries, adjusting for a country's primary care strength.

DATA AND METHODS

Data

This study merged data from the Quality and Costs of Primary Care in Europe (QUALICOPC)- and Primary Health Care Activity Monitor for Europe (PHAMEU) databases. The QUALICOPC database provides data on both meso and micro level of the health care system, while the PHAMEU-database only provides data on primary care strength on the macro level. Both are co-funded by the European Commission.

QUALICOPC database

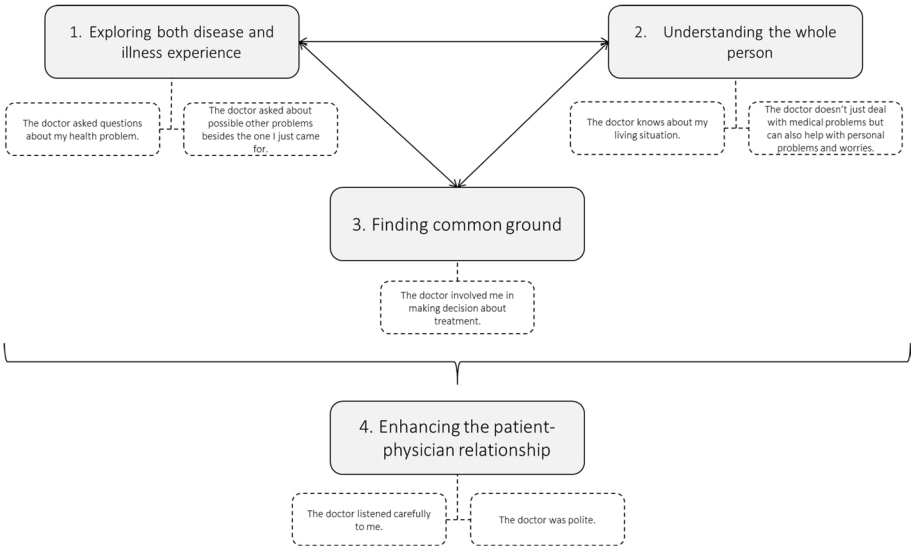
The QUALICOPC study contains cross-sectional data collected among GPs and patients in 31 European countries (including EU-27 [except for France], FYR Macedonia, Iceland, Norway, Switzerland, and Turkey). In each country, an average of 220 general practitioner (GP) practices were selected, except for small countries where the average was 80. Ethical approval was obtained in accordance with the legal requirements of each country. Data collection took place between October 2011 and December 2013. Fieldworkers (N = 6,568) visited selected GP practices and consecutively invited patients (aged 18 years or older), who had a face-to-face consultation with the GP, to complete the questionnaire until 10 patient surveys were collected. The first nine patients willing to participate in the study completed a questionnaire about their experiences during the consultation and the primary care system in general. The tenth patient completed a questionnaire that measured her or his primary care values. Furthermore, one GP per practice was eligible to participate and complete a questionnaire. However, this study only uses data from the patient experience surveys. In total, 69,201 patients and 7,183 GPs completed the questionnaires and were included in the database. For more details regarding the study protocol and questionnaire development, we refer the reader to Schäfer et al. (2011) and Schäfer et al. (2013).

Our main patient-reported outcome, namely financially driven postponement of care, is measured based on the responses of the QUALICOPC participants on the question if they postponed a visit to a GP for financial reasons in the last 12 months.

A variable for person-centeredness is constructed based on the QUALICOPC data, building on the framework proposed by Stewart et al. (2013). The patient experience questionnaire of the QUALICOPC study covers the four domains of person-centred care:

(i) exploring both the disease and illness experience (two questions), (ii) understanding the whole person (two questions), (iii) finding common ground (one question), and (iv) enhancing the patient-physician relationship (two questions). For each question, participants responded whether they agreed by indicitating 'yes' or 'no'. For example, 'did the doctor ask about other possible problems besides the one the patient came in for?' The GPs of participants who answered 'yes' at least one of the seven questions, received a score of '1'. When participants answered all seven questions with 'yes', the GP received the highest score (which is 7) for 'person centred care'. More details on the construction of this scale are provided in Figure 1.

Figure 1 Conceptual framework of patient-centeredness by Stewart et al. (2003) and the operationalisation in this study



PHAMEU database

Primary care strength is based on the work of Kringos (2012), who developed a framework that measured and compared the strength of primary care systems. Her research emphasises that primary care strength is determined by the structure level and process level. The structure level consists of three dimensions, namely governance, economic conditions, and workforce development. Following the operationalisation of Kringos (2012) the structure level is embedded as a continuous variable in the analyses. At the process level four dimensions are identified: access, continuity, coordination, and

comprehensiveness. The PHAMEU database provides for each of these dimensions and each of the countries a scale from 1 to 3 (the higher the score, the stronger the primary care dimension).

In view of potential endogeneity, we included the following exogenous control variables: gender and age of both patient and GP, income of the patient, and location of the GP practice. These variables were all extracted from the QUALICOPC study. Following the answer of the respondent, gender was categorised in 'men' and 'women'. Income of the patient was measured by asking them the following question: 'Compared to the average in your country, would you say your household income is …?'. They could choose between the following answer categories: 'below average', 'around average', or 'above average'. As this variable is only a control variable, we decided to dichotomise the variable in 'low income' (below average and around average) and 'high income' (above average). Last, location of the GP practice was determined by asking the GP how they would characterise the place where they are currently practising, they could choose between 'big (inner) city', 'suburbs', 'small town', 'mixed urban-rural', or 'rural'. These answer categories were dichotomised in 'urban' (combining the categories 'big (inner) city', 'suburbs, and 'small town') and 'rural' (combining the categories 'mixed urban-rural' and 'rural').

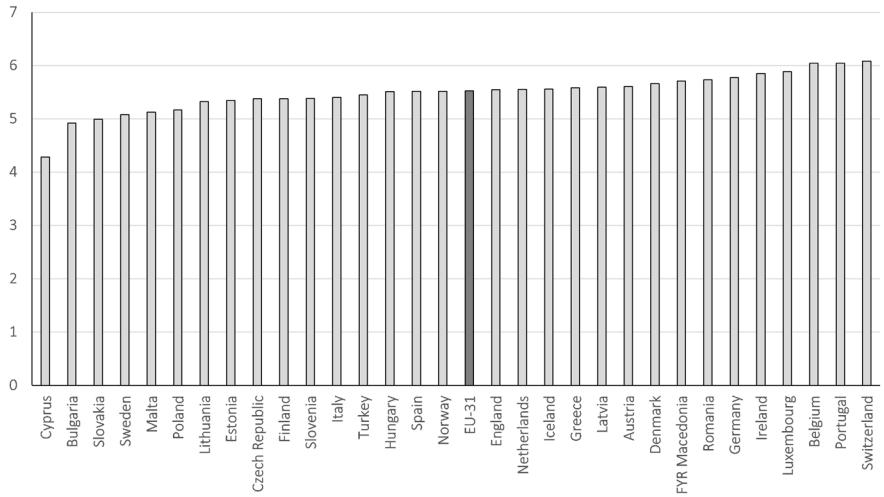
Statistical analyses

To analyse the association between person centred care and financially driven postponement, logistic multilevel regression models were employed. In these multilevel models, patients (level 1) were nested within GP practices (level 2), which were nested within countries (level 3). All multilevel analyses were calculated using MLwiN (University of Bristol, United Kingdom, version 2.33), and first-order PQL was used as the non-linear estimation procedure. In the first model, we described the basic null model (Model A.0), in which we could evaluate the importance of each level independently. In Model A.1, we included the socioeconomic and demographic variables (control variables) of both patients and GPs. Subsequently, in Model A.4.0 to Model A.4.1, we step-by-step added the strength dimensions, which have a significant association (i.e. structure variable, access-, and comprehensiveness dimensions) with financially driven postponement and person-centred care, to the equation (based on preliminary analyses, see Appendix). The table presented in the manuscript summarises the formulation of the statistical model, and a step-by-step description of model construction is provided in the Appendix of this manuscript.

RESULTS

Figure 2 displays the mean score for person centred care per country. The mean score for person-centred care for the EU-31 is 5.48, with Cyprus showing the lowest score (4.28) and Switzerland the highest (6.09).

Figure 2 Score on the person centred scale, mean per country



The bivariate analyses reveal significant associations between financially driven postponement of care and person-centeredness and all the dimensions of primary care strength.

Table 1 Bivariate associations between financially driven postponement and person-centeredness and strength dimensions of the primary care system

	Postponement of GP visit due to financial reasons		
	No N mean (SD)	Yes N mean (SD)	t
Person-centeredness (ranging from 1-7)	7164 5.389 (1.435)	742 5.180 (1.570)	**3.530 *** **
Structure (ranging from 1-3)	7589 2.248 (0.132)	799 2.195 (0.105)	**13.326 *** **
Access (ranging from 1-3)	7589 2.261 (0.133)	799 2.194 (0.138)	**13.031 *** **
Continuity (ranging from 1-3)	7589 2.359 (0.053)	799 2.355 (0.047)	**2.294 ** **
Coordination (ranging from 1-3)	7589 1.727 (0.213)	799 1.647 (0.189)	**11.231 *** **
Comprehensiveness (ranging from 1-3)	7589 2.370 (0.162)	799 2.323 (0.175)	**7.201 *** **

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

Using the variances in Model A.0. we calculated the variance partition coefficient (VPC) for each level, which decomposes the explained variance at different levels (i.e. patient, GP practice, and country levels). This model reveals the variances at the GP practice and country levels as 0.738 and 0.978 respectively. When calculating the VPC for each level [1], we observed that 19.54% of the variance in financially driven postponement in Europe could explained by GP practice characteristics, while 14.74% are at the country level. Table 2 summarises the results of the multilevel regression analyses, all controlled for patient- and GP characteristics. In Model A.1, only the control variables were put into the statistical model. At the individual patient level, only income is significantly associated with financially driven postponement. The estimate for the effect of low income on financially driven postponement is 2.065 (Exp[0.725]). In other words, low-income patients are more likely to postpone care for financial reasons, compared to their middle- and high-income counterparts. Model A.1.0 shows no other significant predictors at the patient- and GP level (i.e. gender and age of both patient and GP and location of the GP) for financially driven postponement.

1 The residual variance at the patient level was estimated as 3.29 (=π2/3) using the latent variable method (Tom, Bosker & Bosker, 1999), because in logistic multilevel analysis, the individual-level residual variance is expressed on a different scale (probability) than the higher residual variances (Merlo et al., 2006).

Considering primary care strength variables at the country level, the structure variable, access, and comprehensiveness dimensions are significantly inversely associated with financially driven postponement. From Models A.4.0 to A.4.2, we introduced the person-centred scale to the analyses, controlling for these strength dimensions (i.e. structure, access, and comprehensiveness), which are significantly associated with financially driven postponement of care (see the Appendix). These models reveal that the person-centred scale is modestly, but significantly related to postponement for financial reasons. Model A.4.0 indicated that when a GP scores one standard deviation (SD) higher on the person-centred scale, her/his patients report 0.923 (Exp[-0,080]) less postponement for financial reasons. This estimate is comparable in size to those reported in Model A.4.1 and Model A.4.2, which all differ significantly from 0 at the 5% significance level.

Table 2 Multilevel logistic regression model (short), log odds and their standard error (SE) are provided

	Model A.0			Model A.1.0			Model A.4.0			Model A.4.1			Model A.4.2		
	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.
Gender (reference: men)															
Female				- 0,110	0,089		- 0,095	0,093		- 0,096	0,093		- 0,094	0,093	
Age (demeaned)				- 0,001	0,003		0,001	0,003		0,001	0,003		0,001	0,003	
Income (reference: middle and high income)															
Low income				**0,725**	**0,090**	***	**0,717**	**0,093**	***	**0,722**	**0,093**	***	0,714	**0,093**	***
Gender GP (reference: men)															
Female				0,049	0,104		0,040	0,107		0,053	0,107		0,031	0,107	
Age GP (demeaned)				- 0,001	0,005		0,001	0,005		0,001	0,005		0,001	0,005	
Location GP practice (reference: urban)															
Rural				- 0,082	0,131		- 0,153	0,138		- 0,153	0,138		- 0,154	0,139	
Person centred care							**- 0,080**	**0,031**	*	**- 0,082**	**0,031**	*	**- 0,079**	**0,031**	*
Structure							**- 3,481**	**1,035**	***						
Process															
Access										**- 4,586**	**1,076**	***			
Comprehensiveness													- 1,893	1,020	
Intercept	**- 2,682**	**0,166**	***	**-2,972**	**0,194**	***	**5,201**	**2,303**	*	**7,723**	**2,406**	**	1,937	2,420	
Variance country	**0,738**	**0,215**	***	**0,787**	**0,232**	***	**0,571**	**0,177**	***	**0,474**	**0,152**	***	**0,723**	**0,217**	***
Variance GP	**0,978**	**0,141**	***	**1,023**	**0,151**	***	**1,069**	**0,159**	***	**1,070**	**0,16**	***	**1,070**	**0,159**	***

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

DISCUSSION

Much evidence has demonstrated the benefits of person-centred care, including better health status, increased therapy adherence, improved patient trust, reduced utilisation of diagnostic testing, and equity (Bertakis & Azari, 2011; Dwamena et al., 2012; Jani et al., 2012; Mead & Bower, 2002; Rao et al., 2007; Stewart et al., 2000). In this study, we aim to understand whether a person-centred health care provider can buffer inequity in access to primary care. Therefore, we empirically test the association between the GP's person-centred attitude and financially driven postponement in 31 European countries, adjusting for the strength of a country's primary care system.

The results of the statistical analysis show, a modest, but significant association between person-centeredness and financially driven postponement rates in Europe. We found that an increase in the GP's person-centeredness with one SD is associated with a decreased likelihood of postponing care for financial reasons by 0.923. Qualitative research of Brown et al. (2016) is in line with our findings. They identified a link between person-centred care and accessibility to primary care in Canada. The association between person-centeredness and (financial) access to primary care can be attributed to the fact that GPs with a person-centred attitude design care around a person by considering their context, such as financial difficulties.

Furthermore, a large body of evidence determined that deprived patient groups in Europe are at risk of postponing care (for financial reasons) (Detollenaere et al., 2016; Detollenaere et al., 2017; Dias, Severo, & Barros, 2008; Dias et al., 2011; Himmelstein & Woolhandler, 1995; Kontopantelis, Roland, & Reeves, 2010; Murray, 2000). For instance, using data for 31 European countries, Detollenaere et al. (2017) demonstrated that low educated or low-income populations and ethnic minorities are more likely to postpone a GP visit. Therefore, this study contributes to the existing literature by showing that a GP can provide equitable access to care by applying a person-centred consultation style. This could be especially relevant for vulnerable patient groups. Research of Jani et al. (2012) supports this result. They found that person-centred consultation by a GP improves the early outcome of depression, especially in deprived areas. In this paper, Jani et al. (2012) emphasize the challenges of providing person-centred care in deprived areas due to the lower number of health care providers and high morbidity rates which may result in a higher workload and pressure among GPs, making it difficult to apply

and design person-centred care. Consequently, we advocate for the monitoring of person-centred care as a core quality outcome measure.

We end this article by discussing some research limitations. Although it is agreed that person-centeredness is a multifaceted construct (Bertakis & Azari, 2011), until now, no validated definition and operationalisation have been identified (Mead & Bower, 2002). In addition, during our literature search, we noticed that the concepts patient- and person-centred care are mixed and used as synonyms. Starfield (2011) argued that these concepts have different nuances; therefore, they cannot be used together. Patient-centred care is disease episode-oriented, concerned with the evolution of a patient's disease, and focuses on managing these diseases. However, person-centred care considers disease episodes as inherently linked to oscillating health during life, focuses on the experience (and its evolution) of people's health problems and diseases, and approaches diseases as interrelated phenomena. The third limitation of this paper is that because of data restrictions, we only measured the GP's person-centeredness. However, other health care professionals also play a major role in providing person-centred primary health care. Nurses are the most trusted professionals by both patients and other health care professionals (Gallup, 2016; Olshansky, 2011). As trust is one prerequisite to achieve person-centred care, we believe that nurses can also exercise this role (Shamian, 2017). We look forward to future research addressing the effect of nurses' person-centred attitudes on accessibility to health care. Bearing these limitations in mind, the novelty of our research is that we are the first to study the association between person-centeredness and financially driven accessibility to primary care by using data from 31 European countries.

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AUTHORS' NOTE

Ethical approval was acquired in accordance with the legal requirements of each country. Both the GP and patient surveys were conducted anonymously.

DECLARATION OF CONFLICTING INTERESTS

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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APPENDIX

Table 1 Multilevel logistic regression model (full model), log odds and their standard error (SE) are provided

	Model A.0			Model A.1.0			Model A.2.0			Model A.3.0			Model A.3.1			Model A.3.2		
	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.
Gender (reference: men)																		
Female				- 0,110	0,089		- 0.096	0.093		- 0.109	0.089		- 0.111	0.089		- 0.111	0.089	
Age (demeaned)				- 0,001	0,003		0.001	0.003		- 0.001	0.003		- 0.001	0.003		- 0.001	0.003	
Income (reference: middle and high income)																		
Low income				**0,725**	**0,090**	***	**0.713**	**0.093**	***	**0.729**	**0.090**	***	**0.734**	**0.090**	***	**0.725**	**0.090**	***
Gender GP (reference: men)																		
Female				0,049	0,104		0.032	0.108		0.057	0.103		0.069	0.104		0.049	0.104	
Age GP (demeaned)				- 0,001	0,005		0.001	0.005		- 0.001	0.005		- 0.001	0.005		- 0.001	0.005	
Location GP practice (reference: urban)																		
Rural				- 0,082	0,131		- 0.154	0.139		- 0.081	0.131		- 0.082	0.131		- 0.082	0.131	
Person centred care							**- 0.080**	**0.031**	*									
Structure										**- 3.346**	**1.002**	***						
Process																		
Access													- 4.304	**1.058**	***			
Continuity																- 2.070	3.080	
Coordination																		
Comprehensiveness																		
Intercept	**- 2,682**	**0,166**	***	**-2,972**	**0,194**	***	**- 2.542**	**0.257**	***	**4.473**	**2.227**	*	**6.653**	**2.362**	**	- 2.486	7.243	
Variance country	**0,738**	**0,215**	***	**0,787**	**0,232**	***	**0.833**	**0.246**	***	**0.540**	**0.167**	***	**0.468**	**0.148**	***	**0.786**	**0.231**	***
Variance GP	**0,978**	**0,141**	***	**1,023**	**0,151**	***	**1.066**	**0.159**	***	**1.024**	**0.151**	***	**1.026**	**0.151**	***	**1.023**	**0.151**	***

*: $p < 0.05$, **: $p < 0.01$, ***: $p \leq 0.001$

Table 1 Multilevel logistic regression model (full model), log odds and their standard error (SE) are provided (continued)

	Model A.3.3			Model A.3.4			Model A.4.0			Model A.4.1			Model A.4.2		
	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.
Gender (reference: men)															
Female	- 0.110	0.089		- 0.108	0.089		- 0,095	0,093		- 0,096	0,093		- 0,094	0,093	
Age (demeaned)	- 0.001	0.003		- 0.001	0.003		0,001	0,003		0,001	0,003		0,001	0,003	
Income (reference: middle and high income)															
Low income	**0.724**	**0.090**	***	**0.727**	**0.090**	***	**0,717**	**0,093**	***	**0,722**	**0,093**	***	**0,714**	**0,093**	***
Gender GP (reference: men)															
Female	0.050	0.104		0.048	0.104		0,040	0,107		0,053	0,107		0,031	0,107	
Age GP (demeaned)	- 0.001	0.005		- 0.001	0.005		0,001	0,005		0,001	0,005		0,001	0,005	
Location GP practice (reference: urban)															
Rural	- 0.083	0.131		- 0.083	0.131		- 0,153	0,138		- 0,153	0,138		- 0,154	0,139	
Person centred care							**- 0,080**	**0,031**	*	**- 0,082**	**0,031**	*	**- 0,079**	**0,031**	*
Structure							**- 3,481**	**1,035**	***						
Process															
Access										**- 4,586**	**1,076**	***			
Continuity															
Coordination	- 1.483	0.732													
Comprehensiveness				**- 1.997**	**0.982**	*							- 1,893	1,020	
Intercept	**- 0.427**	**1.264**	***	**1.753**	**2.327**		**5,201**	**2,303**	*	**7,723**	**2,406**	**	1,937	2,420	
Variance country	**0.667**	**0.201**	***	**0.671**	**0.202**	***	**0,571**	**0,177**	***	**0,474**	**0,152**	***	**0,723**	**0,217**	***
Variance GP	**1.022**	**0.150**	***	**1.025**	**0.151**	***	**1,069**	**0,159**	***	**1,070**	**0,16**	***	**1,070**	**0,159**	***

* : p < 0.05, ** : p < 0.01, *** : p ≤ 0.001

4.6

Reasons why self-referring patients attend the ED during daytime hours, and differences among socioeconomic groups

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ABSTRACT

Background. Numerous studies have shown that during out-of-hours vulnerable patients are more likely to seek medical help in the emergency department (ED). However, little is known about why patients seek help in the ED during daytime hours in a context of a strong primary care system with a high availability of primary care services, and if these reasons differ among self-referring socioeconomic groups.

Objectives. To identify the reasons why patients opt for the ED during daytime hours when primary care services are available, and possible social differences between socioeconomic groups.

Methods. In 2014 and 2015, trained fieldworkers surveyed 723 patients (nested in four EDs in Knokke-Heist, Ghent, Tielt, and Kortrijk) using a structured interview. These quantitative data were analysed using descriptive- and logistic regression analyses.

Results. More than one-third (33.2% and 36.9% respectively) of the self-referring patients reported that they attend the ED during daytime hours because they perceive their (health) problem as urgent and expect they need advanced diagnostic testing. However, the analyses reveal that low-educated and non-employed patients are more likely to consult the ED because they postponed care too long, for financial motives, because they consider the ED as their usual source of care or because their medical history requires it.

Conclusion. This study indicates that increasing patients' health literacy, and identifying and tackling the barriers as vulnerable patients experience them, in the access to primary healthcare are priority areas for policymakers in order to make the Belgian healthcare system more efficient and more equitable.

KEY MESSAGES

Reasons why self-referring patients attend the ED instead of PC during daytime hours are consistent with those for choosing to use the ED during out-of-hours.

Health literacy and accessibility of the PC system should be priority areas in policy to make the healthcare system more efficient and equitable.

Keywords: emergency department, reasons, socioeconomic, referral, GP

INTRODUCTION

The emergency department (ED) has become an increasingly attractive source of care. From 2009 to 2012, the number of ED visits in Belgium increased with 6.7% (290 ED visits per 1000 population in 2012) (Van den Heede, 2016). With this number, the incidence in Belgium is substantially higher than in neighbouring countries (124, 279, and 156 ED visits per 100,000 population in the Netherlands, France, and England respectively) (Van den Heede, 2016).

According to the Primary Health Care Activity Monitor for Europe (Kringos et al., 2012), Belgium has a relatively strong primary care (PC) system. Despite the fact that policymakers made efforts to make Belgian PC (financially) accessible, and by doing so aiming to redirect patients from the ED to the PC setting, the proportion of self-referring patients at the ED increased to 71%. Many of these patients could be treated in PC (Van den Heede, 2016). Scholars as well as policymakers and insurers express their concerns regarding this substantial group of self-referring patients (Detollenaere et al., 2014; Kraaijvanger et al., 2015; Van den Heede, 2016). For example, in March 2016, the Belgian Federal Minister of Social Affairs and Public Health, Maggie De Block, stated: 'It is one of the best kept secrets in the world why everybody goes to the ED and waits there for hours to be cured for a medical condition that can also be treated by a GP. I keep searching for the answer to this secret.'

Identifying the reasons why patients attend the ED without a referral is important in the context of increased cost control, controlling workload in hospitals and- especially - quality improvement of healthcare and so improving the population's health (Kangovi et al., 2013; Kraaijvanger et al., 2015). The large body of literature exploring these reasons describe a wide range of factors of which the following seem to be the most common: patients believe their problem requires immediate care; the PC system is not accessible; and the patients have more trust in the ED than in the PC services are the most commonly reported (Afilalo et al., 2004; Agarwal et al., 2012; Atenstaedt et al., 2015; Doran et al., 2014; Freed et al., 2016; Guttman, Zimmerman, & Nelson, 2003; Kraaijvanger et al., 2015; Kraaijvanger et al., 2016; Lega & Mengoni, 2008; Lowthian et al., 2012; Mahmoud, Eley, & Hou, 2015; Masso et al., 2007; Northington, Brice, & Zou, 2005; Penson et al., 2012; Ragin et al., 2005, Schmidehofer et al., 2016; Thronton et al., 2014; van Charante, ter Riet, & Bindels, 2008). According to Atenstaedt et al. (2015), self-referring patients in the UK would have changed their decision to go to the ED if

they had known other alternatives. However, since the large majority of these studies were conducted during out-of-hours it is not clear whether these reasons are the same during daytime hours, when PC facilities are supposed to be more easily accessible.

The aim of this study is to explore why patients consult the ED without referral during daytime hours when PC services are available and to identify social differences in the reasons why patients consult. To the best of our knowledge, there is no previous research which conducted this study during daytime hours.

The results of this study might inform policymakers in their decision how to direct healthcare seeking behaviour away from the ED, in the direction of PC. Furthermore, we want to explore if these reasons differ among socioeconomic groups.

METHODS

March 2015, data were gathered at the ED of the Zeno general hospital (Knokke-Heist). From July to September 2015, data were collected at the ED of the Sint-Andries hospital (Tielt), the ED of the Sint-Lucas general hospital (Ghent) and the ED of the Groeninge general hospital (Kortrijk).

Participants, sample and instrument

The trained fieldworkers were instructed to invite all adult patients (≥ 18 years) presenting at the aforementioned EDs to participate in the study. Participants should not have been referred by a GP, nor been suffering from a life-threatening or urgent health condition and should not have entered the ED by ambulance or mobile urgency group (MUG). Consecutive patients were excluded when they attended the ED for the second time. Data were collected by means of a face-to-face survey interview. The questionnaire included socio-demographic information and a list of 16 reasons that were based on the dimensions of the behavioural model of access to healthcare (Andersen & Newman, 1973; Andersen, 1997) and reasons reported in other studies (Afilalo et al., 2004; Agarwal et al., 2012; Atenstaedt et al., 2015; Detollenaere et al., 2014; Doran et al., 2014; Freed et al., 2016; Guttman, Zimmerman, & Nelson, 2003; Kangovi et al., 2016; Kraaijvanger et al., 2015; Kraaijvanger et al., 2016; Lega & Mengoni, 2008; Lowthian et al., 2012; Mahmoud, Eley, & Hou, 2015; Masso et al., 2007; Northington, Brice, & Zou, 2005; Penson et al., 2012; Ragin et al., 2005, Schmidehofer et al., 2016; Thronton et al., 2014; van Charante, ter Riet, & Bindels, 2008). These reasons and their abbreviations throughout this article can be consulted in Table 1. The questionnaire was pre-tested using cognitive interviewing. Questionnaires were in Dutch and translated into French, English, Turkish and Arabic using a forward-backward translation procedure.[1] Ethical approval for the study was acquired by the Ethics Committee of Ghent University Hospital, and additionally approved by the Ethics Committee of the Zeno general hospital, Sint-Lucas general hospital and the Groeninge general hospital. The Sint-Andries hospital accepted the approval by the Ethics Committee of Ghent University Hospital.

1 The Dutch questionnaire can be found in Appendix 2 of this doctoral dissertation.

Table 1 Reasons to opt for the ED and their abbreviations in this article

Reason	Abbreviation
I do not have to wait long here.	Waiting time
I did not know where else to go with this problem.	Did not know where else to go
I have already visited the ED in the past.	Experience
I am satisfied with the care that is provided at the ED.	Satisfaction
I usually visit the ED with my (health) problems.	Usual source of care
My family/friends advised me to go to the ED.	Family/friends
I do not have to pay during my visit to the ED.	Financial motives
The ED was the closest healthcare facility for me.	Proximity
The ED provides the best care.	Best care
Given my medical history, the ED is the most appropriate choice for my problem.	Medical history
Given the seriousness of my problem, I think that the ED can give me the best and most appropriate care.	Seriousness of the problem
I have delayed care too long, so my problem can only be solved by care of the ED.	Delayed care too long
I think that additional (medical) and advanced test will be necessary.	Advanced diagnostic tests
The ED is the most easily accessible for me (e.g. regular buses or trams).	Accessibility
I first called my GP, but I could not reach her/him.	Could not reach GP
Other	Other

Dependent and independent variables

Respondents were asked to tick all relevant reasons for consulting the ED that day. In order to determine if the reasons for attending the ED without GP referral differed between socioeconomic groups, the following six variables were entered in the regression models: gender, age, employment, educational level, financial problems, and having a regular GP. For gender, male patients (reference category) were compared to female patients. Age was entered into the models as a centred variable. Employment was recoded into two categories: no paid employment (paid suspended employment, unemployment, retirement, student, and other) and paid employment (reference category). Highest educational attainment was recoded into three categories: low (no diploma, primary school, and first half of secondary school), middle (secondary school) and high education (higher education). Middle-educated patients were entered into the model as the reference category. Financial problems was dichotomised: no financial difficulties experienced by the respondent (very easy or easy to make ends meet at the end of the month) and financial difficulties (difficult or very difficult to make ends meet). No financial difficulties were entered as the reference category. Concerning the regular GP, patients were asked if they had a regular GP (yes/no). Having no regular GP was the reference category.

Data analysis

Multicollinearity between the independent variables was tested by calculating the variance inflation factors (VIF). All VIF values were below 3, which indicated that the independent variables did not interfere with each other. Using multiple logistic regression modelling, the relative contribution of all independent variables on the reasons for attending the ED was assessed. The level of significance was tested by the Bald test, and $p < 0.05$ was set as being the level of statistical significance. Bivariate analyses between the reasons why self-reffering patients opt for the ED and patient characterstics can by consulted in Table 1 in the Supplementary material.

RESULTS

Descriptive statistics

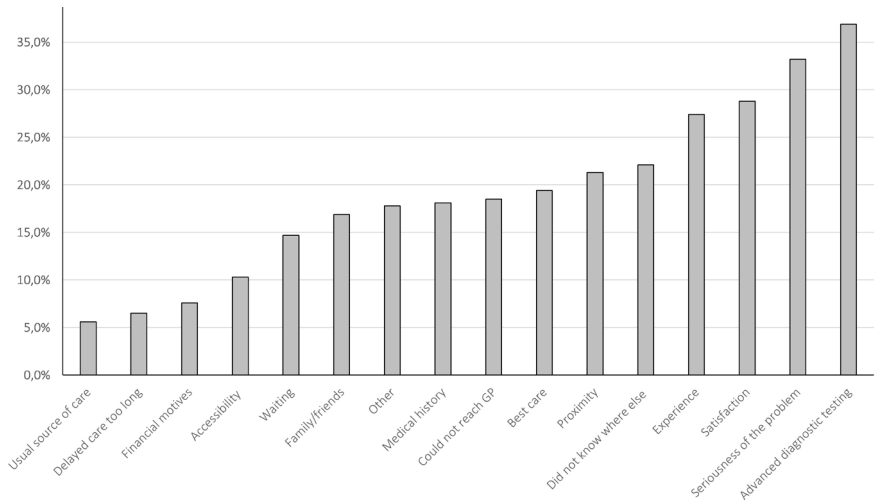
Descriptive statistics can be consulted in Table 2. A total of 723 patients participated in this study, including 55.5% (n=400) men and 44.5% (n=431) women. The youngest participant was 18 years old, and the oldest participant was 98 years old. Distribution among all age groups was: 31.3% (n=226) of the participants were between 18 and 35 years old, 37.4% (n=270) were between 36 and 55 years old, and 31.4% (n=227) of the participants were older than 56 years. Most of the participants were middle-educated (44.5%, n=313), while 34.9% (n=245) were low-educated, and 20.6% (n=145) were high-educated. More than half of the included patients (58.1%, n=413) indicated that they had a paid job at the time the study was conducted, while 41.9% (n=298) had no paid job at that time. Almost all participants (94.2%, n= 669) indicated that they had a regular GP, and only 5.8% (n=41) reported that they do not have a regular GP. Seventy-five percent (n=513) of the included patients indicated not to have financial problems, while 25.0% (n=171) of the participants indicated that they have a (very) difficult financial situation.

Table 2 Descriptive statistics

	n (valid %)
Gender	
Female	321 (44.5)
Age	
18- 35 years	226 (31.3)
36- 55 years	270 (37.4)
> 56 years	227 (31.4)
Educational level	
Low	245 (34.9)
Middle	313 (44.5)
High	145 (20.6)
Employment	
Yes	413 (58.1)
Regular GP	
Yes	669 (94.2)
Financial problems	
Yes	171 (25.0)

Figure 1 presents an overview of the different reasons why patients opt for the ED during daytime hours without the referral of a GP. The most frequently indicated reasons are the expectation that advanced diagnostic tests will be needed (36.9%), perceived seriousness of the problem (33.2%) and prior satisfaction with the offered ED care (28.8%). In contrast, the least indicated reasons for attending the ED are financial motives (7.6%), care that has been delayed for too long (6.5%) and the ED being the usual source of care (5.6%).

Figure 1 Distribution of reasons why patients opt for the ED without the referral of a GP



Gender

Gender was a significant predictor for satisfaction reasons (odds ratio [OR]: 0.662; 95% confidence interval [C.I.]: 0.464-0.944). Female patients were less likely to choose the ED because of satisfaction after previous consultations.

Age

Age is a significant indicator for the following reasons: satisfaction (OR: 1.011; 95% C.I.: 1.000-1.022), seriousness of the problem (OR: 1.017; 95% C.I.: 1.007-1.028), advanced diagnostic tests (OR: 1.011; 95% C.I.: 1.001-1.021), accessibility by public transport (OR: 1.018; 95% C.I.: 1.003-1.034) and could not reach the GP (OR: 1.026; 95% C.I.: 1.011-1.040). This indicates that the odds of choosing the ED for one of these aforementioned reasons increases with increasing age.

Employment status

Not being employed has a significant influence on several reasons for choosing the ED without referral. Patients who do not have a paid job were more likely to indicate that they attend the ED because the ED is their usual source of care (OR: 3.081; 95% C.I.: 1.381-6.877), financial motives (OR: 2.199; 95% C.I.: 1.114-4.341), medical history (OR: 2.800; 95% C.I.: 1.734-4.523) and because they postponed care too long (OR: 3.630; 95% C.I.: 1.795-7.382).

Educational level

Furthermore, when we compare the different reasons between low- and middle-educated patients, the odds for choosing the ED because it is the usual source of care or due to the medical history is higher for low-educated patients compared to their middle-educated counterparts. However, middle-educated patients attend the ED without referral more frequently because these patients believe that advanced diagnostic tests are necessary, compared to patients with a low education. No significant results were found between middle- and high-educated patient.

Perceived financial situation

The financial situation of the patient is not a significant predictor for the different reasons for attending the ED without referral.

Regular GP

Having a regular GP is a significant predictor for when the patient does not know to which healthcare facility else to go (OR: 0.449; 95% C.I.: 0.227-0.889), and when the patient thinks this seriousness justifies the choice for the ED (OR: 2.408; 95% C.I.: 1.032-5.617). This demonstrates that patients who have a regular GP indicate less frequently that they go to the ED because the patient does not know where else she/he should go with the health problem compared to patients without a regular GP. Additionally, patients who have a regular GP indicate more frequently that they attend the ED for the seriousness of their health problem.

There were no significant predictors for the reasons waiting time, experience, family/friends, proximity and other reasons.

Table 3 Results of logistic regression modelling (odds ratio and confidence interval [C.I.] reported)

	Women versus *men (ref.)*		Age (centred)		No paid job versus *paid job (ref.)*		Low education versus *middle education (ref.)*		High education versus *middle education (ref.)*	
	Exp (B)	C.I.	Exp (B)	C.I.	Exp (B)	C.I.	Exp (B)	C.I.	Exp (B)	C.I.
Waiting [1]	0.698	[0.444 - 1.096]	1.004	[0.991 - 1.017]	1.174	[0.702 - 1.962]	1.232	[0.729 - 2.084]	1.432	[0.789 - 2.569]
Did not know where else [2]	1.084	[0.741 - 1.585]	1.001	[0.990 - 1.013]	1.276	[0.824 - 1.976]	0.902	[0.569 -1.430]	1.397	[0.861 - 2.268]
Experience [3]	0.716	[0.499 - 1.029]	1.010	[1.000 - 1.021]	1.471	[0.976 - 2.219]	1.297	[0.855 - 1.969]	1.114	[0.685 - 1.812]
Satisfaction [4]	**0.662**	**[0.464 - 0.944]**	**1.011**	**[1.000 - 1.022]**	1.147	[0.763 - 1.723]	1.169	[0.776 - 1.762]	1.094	[0.683 - 1.751]
Usual source of care [5]	0.782	[0.389 - 1.571]	0.994	[0.977 - 1.013]	**3.081**	**[1.381 - 6.877]**	**3.233**	**[1.390 - 7.520]**	1.246	[0.399 - 3.892]
Family/friends [6]	1.327	[0.868 - 2.028]	0.991	[0.979 - 1.003]	1.572	[0.979 - 2.523]	1.054	[0.641 - 1.732]	0.888	[0.492 - 1.601]
Financial motives [7]	0.588	[0.320 - 1.079]	1.005	[0.898 - 1.022]	**2.199**	**[1.114 - 4.341]**	1.677	[0.855 - 3.289]	0.864	[0.346 - 2.159]
Proximity [8]	0.718	[0.485 - 1.063]	1.005	[0.933 - 1.016]	1.455	[0.932 - 2.271]	1.011	[0.639 - 1.599]	1.183	[0.707 - 1.978]
Best care [9]	0.704	[0.471 - 1.054]	1.011	[0.999 - 1.023]	1.064	[0.667 - 1.697]	1.124	[0.705 - 1.791]	1.044	[0.614 - 1.774]
Medical history [10]	0.712	[0.467 - 1.086]	1.010	[0.998 - 1.021]	**2.800**	**[1.734 - 4.523]**	**1.805**	**[1.106 - 2.945]**	1.438	[0.803 - 2.576]
Seriousness [11]	0.730	[0.520 - 1.025]	**1.017**	**[1.007 - 1.028]**	0.983	[0.660 - 1.464]	1.153	[0.774 - 1.715]	1.285	[0.823 - 2.004]
Postponed care too long [12]	0.782	[0.419 - 1.460]	0.992	[0.976 - 1.009]	**3.630**	**[1.785 - 7.382]**	1.587	[0.744 - 3.386]	2.291	[0.997 - 5.268]
Advanced diagnostic tests [13]	0.937	[0.677 - 1.295]	**1.011**	**[1.001 - 1.021]**	1.102	[0.755 - 1.606]	**0.583**	**[0.395 - 0.860]**	0.828	[0.540 - 1.268]
Transport [14]	0.886	[0.527 - 1.490]	**1.018**	**[1.003 - 1.034]**	1.615	[0.875 - 2.980]	0.911	[0.503 - 1.649]	0.635	[0.287 - 1.402]
Could not reach GP [15]	0.642	[0.409 - 1.007]	**1.026**	**[1.011 - 1.040]**	1.117	[0.656 - 1.901]	0.661	[0.388 - 1.124]	1.052	[0.592 - 1.871]
Other [16]	1.367	[0.914 - 2.043]	0.995	[0.982 - 1.007]	0.830	[0.520 - 1.325]	0.979	[0.606 - 1.583]	1.041	[0.614 - 1.764]

Abbreviations in this article: 1 I do not have to wait long here, 2 I did not know where else to go with this problem, 3 I have already visited the ED in the past, 4 I am satisfied with the care that is provided at the ED, 5 I usually visit the ED with my (health) problems, 6 My family/friends advised me to go to the ED, 7 I do not have to pay during my visit to the ED, 8 The ED was the closest healthcare facility for me, 9 The ED provides the best care, 10 Given my medical history, the ED is the most appropriate choice for my problem, 11 Given my medical history, the ED is the most appropriate choice for my problem, 12 I have delayed care too long, so my problem can only be solved by care of the ED, 13 I think that additional (medical) and advanced test will be necessary, 14 The ED is the most easily accessible for me (e.g. regular buses or trams), 15 I first called my GP, but I could not reach her/him, 16 Other reason.

Table 3 Results of logistic regression modelling (odds ratio and confidence interval [C.I.] reported) – continued

	Financial difficulties versus *no financial difficulties (ref.)*		**Regular GP versus *no regular GP (ref.)***	
	Exp (B)	**C.I.**	**Exp (B)**	**C.I.**
Waiting	1.375	[0.836 - 2.260]	1.722	[0.590 - 5.022]
Did not know where else	1.039	[0.666 - 1.620]	**0.449**	**[0.227 - 0.889]**
Experience	1.218	[0.812 - 1.829]	0.826	[0.401 - 1.702]
Satisfaction	1.290	[0.865 - 1.923]	1.217	[0.572 - 2.587]
Usual source of care	0.522	[0.224 - 1.218]	0.622	[0.170 - 2.227]
Family/friends	1.120	[0.691 - 1.813]	0.885	[0.374 - 2.094]
Financial motives	0.814	[0.411 - 1.613]	1.591	[0.360 - 7.023]
Proximity	1.039	[0.662 - 1.631]	1.961	[0.744 - 5.173]
Best care	0.922	[0.578 - 1.472]	0.931	[0.412 - 2.104]
Medical history	0.792	[0.488 - 1.286]	0.603	[0.272 - 1.336]
Seriousness	1.015	[0.684 - 1.505]	**2.408**	**[1.032 - 5.617]**
Postponed care too log	0.893	[0.436 - 1.832]	1.722	[0.386 -7.693]
Advanced diagnostic tests	1.078	[0.737 - 1.575]	1.867	[0.886 - 3.935]
Transport	1.480	[0.849 - 2.579]	1.322	[0.384 - 4.555]
Could not reach GP	1.502	[0.920 - 2.454]	2.378	[0.703 - 8.045]
Other	1.308	[0.828 - 2.067]	0.587	[0.280 - 1.231]

DISCUSSION

Main findings and interpretations

The first aim of this study was to empirically identify the reasons why patients attend the ED during daytime hours without GP referral. Secondly, this study examined the social differences in these aforementioned reasons.

Regarding the first research aim, we found that most of the participants indicated that they opted for the ED because they expected to need advanced diagnostic testing. This is in line with previous literature, showing that patients are convinced they need advanced radiologic and/or laboratory investigations to get a diagnosis (Doran et al., 2014; Kraaijvanger et al., 2015; Mahmoud, Eley, & Hou, 2015; van Charante, ter Riet, & Bindels, 2008). Given that all these advanced diagnostic tests can be done in one place, it is rather logical to by-pass the GP and go straight to the ED, potentially reducing costs by doing so (Lega & Mengoni, 2008). The second most indicated reason why participants directly opt for the ED is the feeling that their (health) condition is serious/urgent and cannot wait to be treated. This finding is also in agreement with previous studies, underscoring the difficulties patients perceive in determining the seriousness of their condition (Agarwal et al., 2012; Doran et al., 2014; Kraaijvanger et al., 2015; Masso et al., 2007; Penson et al., 2012; Thronton et al., 2014). However, determining what is an appropriate (health) problem for the ED is a long-lasting debate, even among healthcare professionals (Coleman, Irons, & Nicholl, 2011; Guttman, Zimmerman, & Nelson, 2003; Masso et al., 2006; Penson et al., 2012), which highlights the potential danger of turning away non-appropriate or non-emergency problems (Doran et al., 2014). Our questionnaire did not provide data about the nature and seriousness of the reason for the encounter, making it impossible to take this into account in the analyses. These aforementioned findings might mirror a knowledge deficit among patients, e.g. incorrect evaluation when a condition requires care and which facility is the most suitable, etc. Therefore, policymakers should prioritize health literacy and accessibility of the PC system in order to make the Belgian healthcare system more efficient. Additionally, approximately a third of the self-referring patients responded that they opted for the ED for satisfaction-reasons. A possible explanation for this finding could be that this answer is related to the previous two motives. Self-referring patients, who perceive their reason for encounter as urgent and/or are convinced they need advanced labo-

ratory or radiologic investigations, are satisfied if their need is met at the ED. Patients who attended the ED for satisfactory reasons have possibly been at the ED in the past, otherwise it is difficult to know that care provided at the ED would meet their need and therefore be satisfactory.

Regarding the second research aim, our analyses reported clear differences in the main reasons why people choose for the ED according to socio-demographic status.

Men and older participants are more likely to indicate that they opted for the ED for satisfaction-reasons. Older participants and patients with a regular GP are more likely to attend the ED due to the seriousness of their condition. Moreover, age is positively associated with the motives 'transport' and 'could not reach the GP'. Moreover, despite existing social protection mechanisms (maximum billing), policymakers should also accommodate the accessibility of the PC system for unemployed citizens, as our results suggest that unemployed citizens are more likely to attend the ED for financial motives, because they postponed care too long and because the ED is their regular source of care. As a visit to the Belgian PC system must be paid immediately, while an ED-visit does not require immediate payment (Gerkens & Merkur, 2010), it is logical that unemployed participants are more likely to attend the ED for financial motives. Liquidity constraints might push these patients into postponing care (health problems might get worse so that the ED becomes the only appropriate choice), and into ED usage. On the other hand, since October 2015, the Belgian a GPs are obliged to apply the third-party scheme for low-income citizens, hoping to make the healthcare system more accessible for vulnerable groups. Lastly, the results of this study show that low-educated patients are more likely to opt for the ED because it is their usual source of care and due to their medical history.

Strengths and limitations

The merits of present study lie in the fact that, to the best of our knowledge, there is no exisiting literature that addressed these two research aims during daytime hours. Considering that there are easily other healthcare facilities available through the day (i.e. GP in the PC system). An important limitation to keep in mind is that our data-collection ended just before the rollout of the obligatory appliance of the third-party scheme, we encourage future studies to evaluate the (longitudinal) effect on ED care. Furthermore, data was collected by five fieldworkers. Notwithstanding the fact that

they all received an extensive one-on-one introduction in data collection, confidentially and deliverables, it is possible that several factors or characteristics of the fieldworker (for example the attitude) biased the data collection.

CONCLUSIONS

This study has shown that self-referring patients most frequently attend the ED because they perceive their condition as urgent and will need advanced diagnostic testing, and consequently, appropriate for the ED. Furthermore, the present study also shows that vulnerable groups (in terms of low-education and no-employment) are more likely to bypass the GP and go directly to the ED because they postponed care too long, for financial motives, because the ED is their usual source of care or for their medical history.

Implications

These two aforementioned findings might mirror a knowledge deficit among patients, e.g. incorrect evaluation when a condition requires care and which care facility is the most suitable. Taken all these arguments and findings in consideration, policymakers should, therefore, prioritize health literacy and accessibility of the PC system in order to make the Belgian healthcare system more efficient and equitable.

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SUPPLEMENTARY MATERIAL

Table 1 Bivariate associations between reasons why self-referring patients opt for the ED and patient characteristics using chi-square statistics

		Gender			Education				Employment		
		Male n (%)	Female n (%)	χ^2	Low n (%)	Middle n (%)	High n (%)	χ^2	No n (%)	Yes n (%)	χ^2
Reason 1	No	335 (54.5)	280 (45.5)	1.717	205 (34.1)	274 (45.5)	123 (20.4)	1.766	267 (43.9)	341 (56.1)	0.477
	Yes	65 (61.3)	41 (38.7)		40 (39.6)	39 (38.6)	22 (21.8)		49 (47.6)	54 (52.4)	
Reason 2	No	315 (56.0)	247 (44.0)	0.337	195 (35.2)	249 (45.1)	108 (19.6)	1.766	243 (43.8)	312 (56.2)	0.447
	Yes	85 (53.5)	74 (46.5)		50 (33.1)	64 (42.4)	37 (24.5)		73 (46.8)	83 (53.2)	
Reason 3	No	285 (54.3)	240 (45.7)	1.112	165 (32.3)	238 (46.5)	109 (21.3)	**5.753** *	210 (40.6)	307 (59.4)	**11.230** ***
	Yes	115 (58.7)	81 (41.3)		80 (41.9)	75 (39.3)	36 (18.8)		106 (54.6)	88 (45.4)	
Reason 4	No	276 (53.6)	239 (46.4)	2.596	165 (32.7)	231 (45.8)	108 (21.4)	3.522	213 (42.0)	294 (58.0)	**4.235** *
	Yes	124 (60.2)	82 (39.8)		80 (40.2)	82 (41.2)	37 (18.6)		103 (50.5)	101 (49.5)	
Reason 5	No	376 (55.2)	305 (44.8)	0.351	221 (33.3)	303 (45.6)	140 (21.1)	**12.965** **	289 (43.1)	382 (56.9)	**9.125** **
	Yes	24 (60.0)	16 (40.0)		24 (61.5)	10 (25.6)	5 (12.8)		27 (67.5)	13 (32.5)	
Reason 6	No	340 (56.8)	259 (43.2)	2.358	199 (34.0)	263 (44.9)	124 (21.2)	1.392	255 (42.9)	339 (57.1)	3.356
	Yes	60 (49.2)	62 (50.8)		46 (39.3)	50 (42.7)	21 (17.9)		61 (52.1)	56 (47.9)	
Reason 7	No	366 (55.0)	300 (45.0)	0.969	216 (33.3)	294 (45.4)	138 (21.3)	**8.611** *	281 (42.8)	375 (57.2)	**8.892** **
	Yes	34 (61.8)	21 (38.2)		29 (52.7)	19 (34.5)	7 (12.7)		35 (63.6)	20 (36.4)	
Reason 8	No	311 (54.7)	258 (45.3)	0.737	189 (34.1)	251 (45.3)	114 (20.6)	0.769	239 (42.6)	322 (57.4)	3.654
	Yes	89 (58.6)	63 (41.4)		56 (37.6)	62 (41.6)	31 (20.8)		77 (51.3)	73 (48.7)	
Reason 9	No	314 (54.0)	267 (46.0)	2.490	196 (33.9)	257 45.2)	119 (20.9)	1.141	250 (43.6)	323 (56.4)	0.793
	Yes	86 (61.4)	54 (38.6)		52 (38.8)	56 (41.8)	26 (19.4)		66 (47.8)	72 (52.2)	

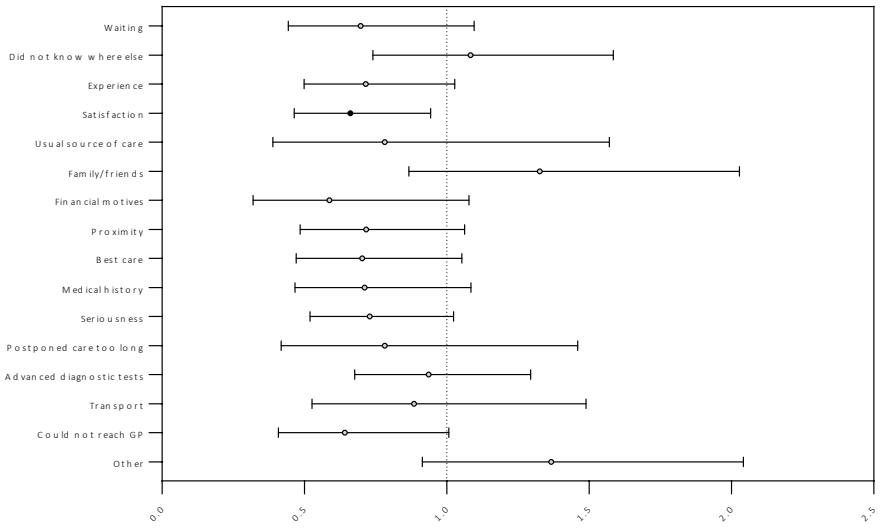
Reason 10	No	323 (54.7)	268 (45.3)	0.904	180 (31.3)	274 (47.7)	121 (21.0)	**18.606** ***	230 (39.6)	351 (60.4)	**30.366** ***
	Yes	77 (59.2)	53 (40.8)		65 (50.8)	39 (30.5)	24 (18.8)		86 (66.2)	44 (33.8)	
Reason 11	No	260 (53.9)	222 (46.1)	1.390	154 (32.6)	223 (47.1)	96 (20.3)	4.490	203 (42.6)	273 (57.4)	1.884
	Yes	140 (58.6)	99 (41.4)		91 (39.6)	90 (39.1)	49 (21.3)		113 (48.1)	122 (51.9)	
Reason 12	No	373 (55.3)	301 (44.7)	0.079	224 (34.1)	299 (45.6)	133 (20.3)	4.441	285 (42.9)	379 (57.1)	**9.433** **
	Yes	27 (57.4)	20 (42.6)		21 (44.7)	14 (29.8)	12 (25.5)		31 (66.0)	16 (34.0)	
Reason 13	No	249 (54.7)	206 (45.3)	0.283	165 (37.6)	182 (41.5)	92 (21.0)	5.038	191 (42.8)	255 (57.2)	1.271
	Yes	151 (56.8)	115 (43.2)		80 (30.3)	131 (49.6)	53 (20.1)		125 (47.2)	140 (52.8)	
Reason 14	No	360 (55.6)	287 (44.4)	0.068	211 (33.5)	283 (44.9)	136 (21.6)	**6.147** *	271 (42.5)	367 (57.5)	**9.747** **
	Yes	40 (54.1)	34 (45.9)		34 (46.6)	30 (41.1)	9 (12.3)		45 (61.6)	28 (38.4)	
Reason 15	No	331 (54.5)	277 (45.6)	1.691	208 (35.0)	264 (44.4)	122 (20.5)	0.050	258 (42.9)	343 (57.1)	3.616
	Yes	69 (61.1)	44 (38.9)		37 (33.9)	49 (45.0)	23 (21.1)		58 (52.7)	52 (47.3)	
Reason 16	No	333 (57.0)	251 (43.0)	2.427	201 (35.4)	253 (44.5)	114 (20.1)	0.701	246 (42.7)	330 (57.3)	0.680
	Yes	67 (49.6)	68 (50.4)		44 (32.8)	59 (44.0)	31 (23.1)		52 (38.8)	82 (61.2)	

* : $p < 0.05$, ** : $p < 0.01$, *** : $p \leq 0.001$

Table 1 Bivariate associations between reasons why self-referring patients opt for the ED and patient characteristics using chi-square statistics (continued)

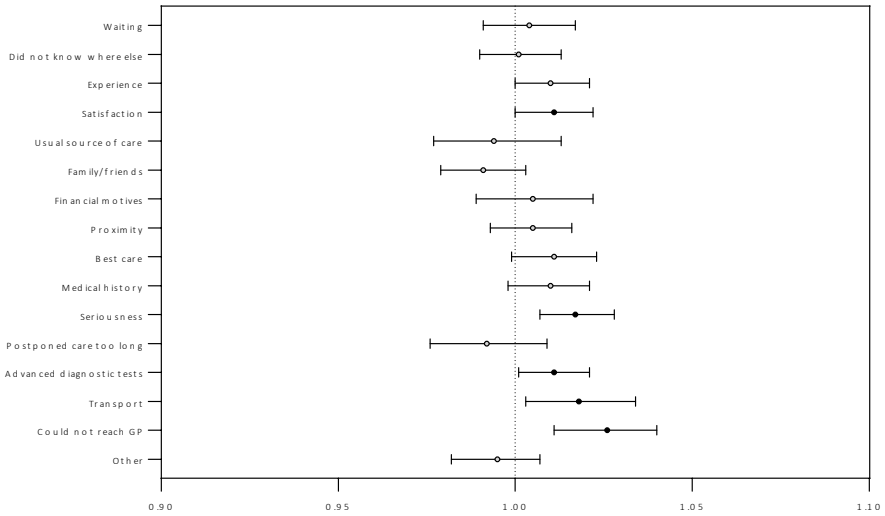
		Regular GP			Financial problems		
		No n (%)	Yes n (%)	χ^2	No n (%)	Yes n (%)	χ^2
Reason 1	No	37 (6.1)	570 (93.6)	0.792	142 (24.3)	443 (75.7)	1.138
	Yes	4 (3.9)	99 (96.1)		29 (29.3)	70 (70.7)	
Reason 2	No	26 (4.7)	528 (95.3)	**5.420 ***	133 (25.0)	400 (75.0)	0.003
	Yes	**15 (9.6)**	**141 (90.4)**		38 (25.2)	113 (74.8)	
Reason 3	No	29 (5.6)	486 (94.4)	0.071	118 (23.6)	381 (76.4)	1.800
	Yes	12 (6.2)	183 (93.8)		53 (28.6)	132 (71.4)	
Reason 4	No	31 (6.1)	477 (93.9)	0.352	115 (23.6)	372 (76.4)	1.732
	Yes	10 (5.0)	192 (95.0)		56 (28.4)	141 (71.6)	
Reason 5	No	38 (5.7)	632 (94.3)	0.232	162 (25.1)	482 (74.9)	0.082
	Yes	3 (7.5)	37 (92.5)		9 (23.1)	30 (76.9)	
Reason 6	No	34 (5.7)	559 (94.3)	0.011	138 (24.1)	435 (75.9)	1.581
	Yes	7 (6.0)	110 (94.0)		33 (29.7)	78 (70.3)	
Reason 7	No	39 (6.0)	616 (94.0)	0.501	158 (25.0)	473 (75.0)	0.007
	Yes	2 (3.6)	53 (96.4)		13 (24.5)	40 (75.5)	
Reason 8	No	36 (6.4)	525 (93.6)	2.028	133 (24.6)	408 (75.4)	0.239
	Yes	5 (3.4)	144 (96.6)		38 (26.6)	105 (73.4)	
Reason 9	No	33 (5.8)	539 (94.2)	0.001	140 (25.5)	410 (74.5)	0.309
	Yes	8 (5.8)	130 (94.2)		31 (23.1)	103 (76.9)	
Reason 10	No	31 (5.3)	549 (94.7)	1.076	138 (24.8)	419 (75.2)	0.081
	Yes	10 (7.7)	120 (92.3)		33 (26.0)	94 (74.0)	
Reason 11	No	33 (6.9)	444 (93.1)	3.494	114 (25.1)	341 (74.9)	0.002
	Yes	8 (3.4)	225 (96.6)		57 (24.9)	172 (75.1)	
Reason 12	No	39 (5.9)	624 (94.1)	0.214	159 (25.0)	478 (75.0)	0.008
	Yes	2 (4.3)	45 (95.7)		12 (25.5)	35 (74.5)	
Reason 13	No	31 (7.0)	415 (93.0)	3.049	108 (25.2)	321 (74.8)	0.019
	Yes	10 (3.8)	254 (96.2)		63 (24.7)	192 (75.3)	
Reason 14	No	38 (6.0)	600 (94.0)	0.381	146 (23.8)	467 (76.2)	**4.406 ***
	Yes	3 (4.2)	69 (95.8)		25 (35.2)	46 (64.8)	
Reason 15	No	38 (6.3)	561 (93.7)	2.282	140 (24.1)	440 (75.9)	1.512
	Yes	3 (2.7)	108 (97.3)		31 (29.8)	73 (70.2)	
Reason 16	No	29 (5.0)	546 (95.0)	3.052	135 (24.2)	423 (75.8)	1.155
	Yes	12 (9.0)	122 (91.0)		36 (28.8)	89 (71.2)	

Figure 1 Forest plot of gender on the reasons for attending the ED without referral of a GP



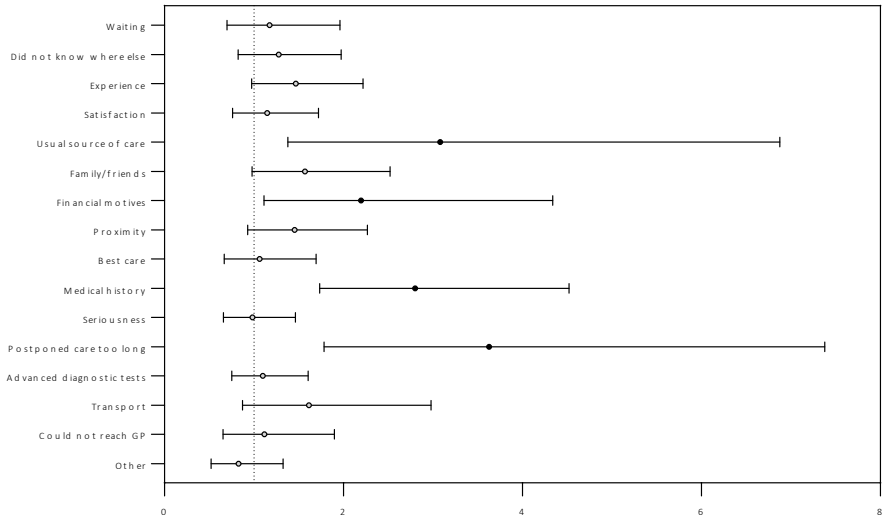
Reference category: men
All significant results are indicated with a black dot

Figure 2 Forest plot of age (centred) on the reasons for attending the ED without the referral of a GP



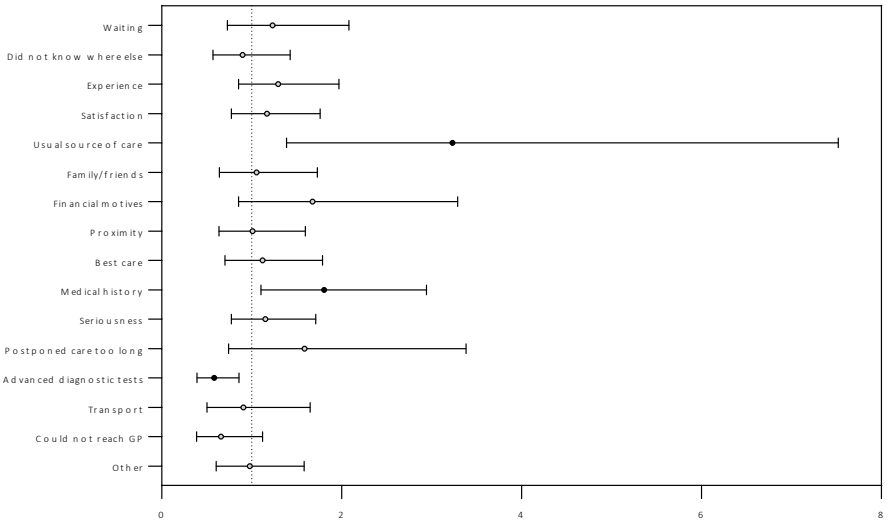
Reference category: N/A
All significant results are indicated with a black dot

Figure 3 Forest plot of employment on the reasons for attending the ED without the referral of a GP



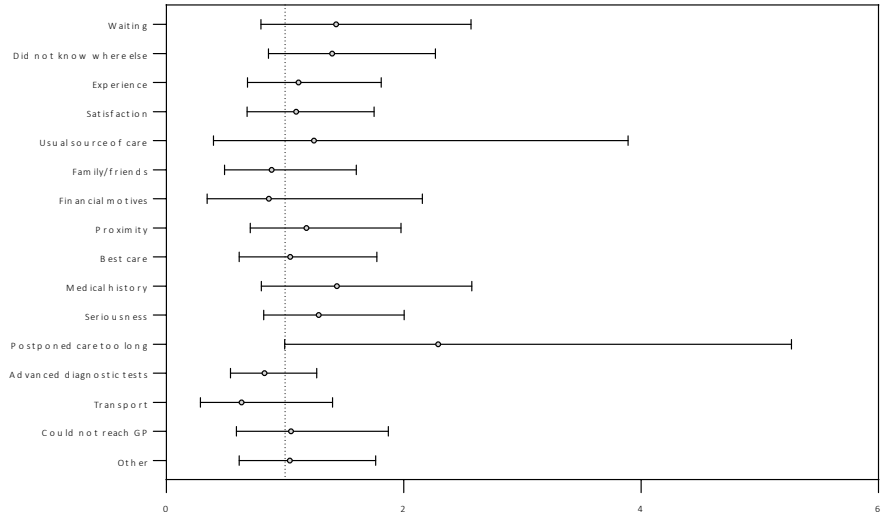
Reference category: paid job
All significant results are indicated with a black dot

Figure 4 Forest plot of education (low-education) on the reasons for attending the ED without the referral of a GP



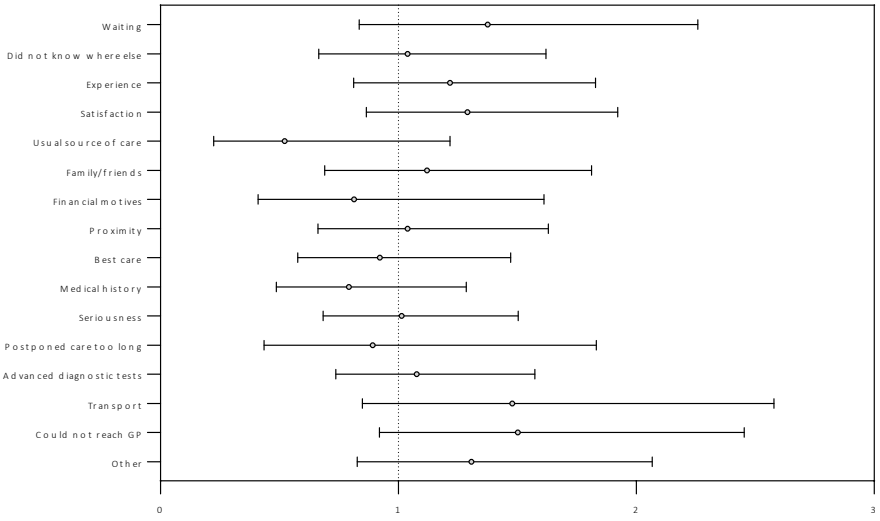
Reference category: middle education
All significant results are indicated with a black dot

Figure 5 Forest plot of education (high-education) on the reasons for attending the ED without referral of a GP



Reference category: middle education
All significant results are indicated with a black dot

Figure 6 Forest plot of financial problems on the reasons for attending the ED without the referral of a GP



Reference category: no financial problems
All significant results are indicated with a black dot

4.7

Can you recommend me a good GP?
Describing social differences in patient satisfaction within 31 countries

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ABSTRACT

Objective. This study aims to explore social differences in patient satisfaction of their GP according to patient's gender, education, household income, and ethnicity in Europe.

Design. By using multilevel logistic modelling the impact of socioeconomic indicators (i.e. gender, education, household income, and ethnicity) on patient satisfaction is estimated. In each model the authors controlled for indicators of person focused care and strength of the primary care system.

Setting. Primary care in 31 European countries.

Participants. Patients who were sitting in the waiting room of the GP were asked to participate. They filled in the questionnaire after the consultation with the GP.

Main outcome measure(s). Patient satisfaction

Results. This study confirms previous research and reveals high levels of satisfaction with primary care in Europe. On average, 92.1% of the respondents would recommend their GP to their family or relatives. Variance in patient satisfaction is mostly explained at patient-level, approximately 75% of the variance can be assigned to patient characteristics. Likewise, women, low-income groups, and first generation migrants are less satisfied with their GP. Lastly, all indicators of person focused care are positively associated with patient satisfaction, showing that the more person focused the care, the higher the satisfaction among the patients.

Conclusions. Notwithstanding the high satisfaction rates in Europe, patient satisfaction is still determined by patients' socioeconomic status (gender and household income), migration background, and the degree of person-centered care. Therefore, policymakers and health professionals should target these population groups in order to improve the satisfaction rates in their country.

Keywords: satisfaction, primary health care, equity, multi-country, Europe, person-centred

INTRODUCTION

Patient satisfaction is a fundamental indicator that can be used to evaluate success of service delivery. It is also regarded as an important outcome of care (Donabedian, 1992) and is increasingly used to evaluate quality of health services (Chang et al., 2006; Clearly & McNeil, 1988; Crow et al., 2002; Fenton et al., 2012; Jaques, 2012; Kupfer & Bond, 2012; Perneger et al., 1996; Poot et al., 2014; Salisbury, Wallace, & Montgomery, 2010). Regardless of this important role, patient satisfaction has a rather ambiguous influence in patient-centred care (Kupfer & Bond, 2012; Poot et al., 2014). Patient satisfaction is, as mentioned above, related to quality of health services but not directly with technical quality of care (Chang et al., 2006). It is linked to health care outcomes such as higher use of inpatient health care facilities, higher health care expenditures, and even higher mortality (Fenton et al., 2012). Moreover, patient satisfaction can influence aspects of (future) health related behaviour (Kersnik & Ropret, 2002; Weiss, 1988), such as compliance with treatment (Weiss, 1988; Yancy et al., 2001) change of provider (Eraker, Kirscht, & Becker, 1984; Linn et al., 1985; Marquis, Davies, & Ware, 1983; Perneger et al., 1996; Rubin et al., 1993; Ware et al., 1983; Yancy et al., 2001), and collaboration with health care professional (Bleich, Ozaltin, & Murray, 2009; Zapka et al., 1995).

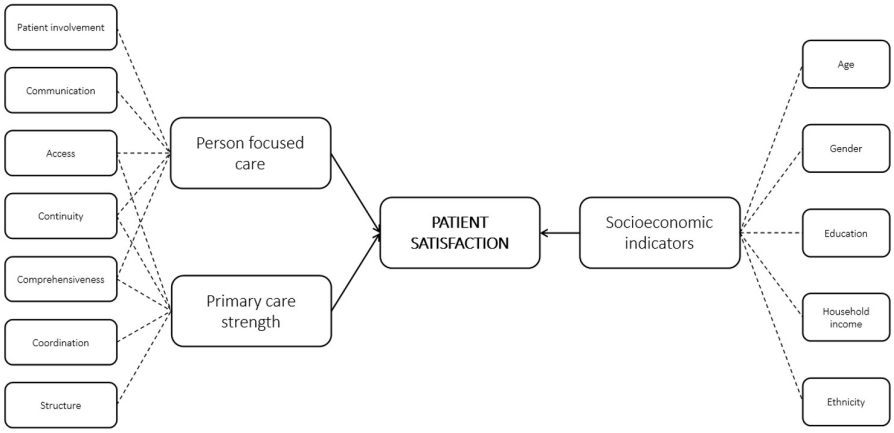
Four major determinants that could influence patient satisfaction are consistently identified: (i) characteristics of care providers (e.g. personality of the care provider), (ii) aspects of the GP-patient relationship (e.g. clarity of communication between patient and GP), (iii) structural and setting determinants (e.g. accessibility, payment system), and (iv) patient characteristics (e.g. sociodemographic characteristics, health status, and expectations) (Weiss, 1988). In this article we will focus on the link between this fourth determinant and patient satisfaction, controlled for the second and third determinant.

Furthermore, despite the fact that patients are generally satisfied with their general practitioner (GP) (Harris-Haywood et al., 2007), some population groups are not equally satisfied with the care they receive. For example, patients in better health report higher satisfaction with medical care (Hall & Dornan, 1988; Hall et al., 1990; Zapka et al., 1995). According to several authors, patients who consider themselves to be in poor health choose extreme ratings on the patient satisfaction scale. These patients have relatively strong opinions in either a positive or negative direction (Auras et al., 2016; Francis et al., 2016; Zapka et al., 1995). Previous studies have shown that differences

in patient satisfaction with the received care can be assigned to patients' demographic characteristics, and among them, their cultural background (Calnan et al., 1994; Gross et al., 1998; Murray-Garcia et al., 2000; Saha et al., 1999; Salisbury, 2009; Salisbury, Wallace, & Montgomery, 2010). For example, previous literature shows lower patient satisfaction rates among several ethnic groups (Bird & Bogart, 2001; Lillie-Blanton et al., 2000; Saha et al., 1999). Also, research has shown that the expectations of patients in different countries are the most important factors contributing to patient satisfaction (Calnan et al., 1994; Kersnik & Ropret, 2002). Nevertheless, these differences in patient satisfaction can also been found within countries (Gross et al., 1998; Kersnik & Ropret, 2002; Murray-Garcia et al., 2000; Saha et al., 1999).

Because patient satisfaction is mainly dependent on cultural norms (Perneger et al., 1996), prior research (mainly emanating from the US or a selection of European countries) is not necessarily generalizable to Europe. In addition, available literature often focuses on specific patient groups and a comprehensive overview of patient satisfaction by SES and ethnicity in PC is, to the best of our knowledge, relatively unexplored. Furthermore, available literature that describes the relationship between socioeconomic determinants and patients satisfaction, does not control for the experience of patients. For example, studies can find that some socioeconomic groups are less satisfied with their GP, but these less-satisfied social groups can experience less access or continuity to care, and therefore be less satisfied. By ignoring patient experiences it is difficult and rather impossible to generalize international findings. In light of this limited available and comprehensive overview of patient satisfaction, we describe the frequency of, and social gradient in patient satisfaction rates in Europe; controlling for patients' actual experiences with the quality of care as provided by their GP and strength of the PC system. To the best of our knowledge, this study is the first attempt worldwide to evaluate patient satisfaction for 31 European countries, and taking several causal determinants (Weiss, 1988). Therefore, this study aims to explore social differences in patient satisfaction of GP care according to the patient's education, household income, ethnicity, and gender in Europe, taking (i) patient experiences by means of indicators of person focused care and (ii) strength of the PC system into account.

Figure 1 Presentation of the analyses in the paper



METHODS

Study design and survey instrument

The Quality and Costs of Primary Care in Europe (QUALICOPC) project is a cross-sectional multi-country study. In this study self-administered questionnaires were collected in 31 European countries (the EU-27 [with the exception of France], FYR Macedonia, Iceland, Norway, Switzerland, and Turkey). In each country, an average of 220 GPs and 2200 patients were included. For smaller countries, such as Cyprus, Iceland, Luxembourg, and Malta, the target was set at 80 GPs and 800 patients. In Turkey, Spain, and Belgium larger samples were collected to allow comparisons between regions. Furthermore, the British sample was collected in England and not in the other parts of the United Kingdom.

Between October 2011 and December 2013 data were collected by trained fieldworkers. In parts of Sweden, Denmark, and England the staff of the local practices collected the data. These trained fieldworkers were instructed to consecutively invite patients in the waiting rooms of GP practices to complete the questionnaire until the responses of 10 patients were collected. The survey consisted of two questionnaires, one on the patient's experiences and one on the patient's values. The first nine patients who were willing to participate filled out the questionnaire about their experiences within the consultation, and the PC system in general. The 10th patient completed the questionnaire which probed the patient's values. Also, one GP per included practice completed a questionnaire. In total, 7.183 GPs and 61.931 patients participated in the study and the average response rate was 74.1% (range: 54.5%- 87.6%). Version 4.2 of the QUALICOPC database was used. Additional details about the study protocol and questionnaire development are provided elsewhere (Schäfer et al., 2011; Schäfer et al., 2013).

Variables

Patient satisfaction was measured by asking the patients whether they would recommend their GP to a friend or relative. For this question patients responded whether they agreed with "yes" or "no".

Social groups were identified according to four patient characteristics: education, household income, ethnicity, and gender (male/female). Education of patients is categorized into "low" (no education and (pre)primary or lower secondary education), "middle"

(upper secondary education), and "high" (post-secondary or higher education). Household income is determined by the patients' answer on the question: "Compared to the average in your country, would you say your household income is …". This variable is categorized in "below average", "around average", and "above average". Ethnicity is determined by the birthplace of the respondent and his/her mother. When both are born in the country of residence or when solely the mother is born in the country of residence, the patient is considered "native". When both patient and mother are born elsewhere, patient is considered as "first generation migrant" (Rumbaut, 2006). When the patient is born in the country of residence and the mother in a foreign country, patient is considered "second generation migrant".

In the multilevel regression model we adjusted on the one hand for indicators of person focused care and on the other hand for strength of the country's PC system. Indicators for person focused care were defined by Schäfer et al. (2016) and consisted of (i) patient involvement, (ii) communication, (iii) access, (iv) continuity, and (v) comprehensiveness. Following the framework of Kringos (2012), five indicators were used to determine the strength of a country's PC strength: (i) structure of PC, (ii) access, (iii) continuity, (iv) comprehensiveness, and (v) coordination. As the reader can see, the access-, continuity-, and comprehensiveness indicators are all part of person focused care and strength of the PC system. These three indicators were, together with the communication- and patient involvement indicator, derived from the QUALICOPC database (patient experience questionnaire). Using latent multilevel variable analyses, for each of these indicators a scale was calculated. This latent multilevel method accounts for differences in the number of respondents on which the estimation is based, individual differences in response to certain items, and for dependency among the items that measure the latent variable (Raudenbush & Sampson, 1999). An extensive overview on the content of each scale and their reliability scores can be consulted in the Appendix of this article. Finally, the structure- and coordination indicator were derived from the Primary Health Care Activity Monitor for Europe (PHAMEU) database (Kringos, 2012).

Statistical analysis

To analyse the relationship between individual patient characteristics and patient satisfaction multilevel logistic regression modelling was used. In this multilevel model patients (level 1) are nested within GP practices (level 2), which are nested in countries (level 3). All variables were checked for multicollinearity with a Spearman-correlation

(0.60 was used a cut-off point), and $p < 0.05$ was set as the level of statistical significance. Bivariate tests and data preparation were conducted in SPSS (version 23.0.0, IBM) and MLwiN (University of Bristol, United Kingdom, version 2.31) was used for the logistic multilevel analysis. In the multilevel model first-order PQL was used as the nonlinear estimation procedure. Table 1 provides an overview of the null- and full model. For a step-by-step building of this model, we refer to reader to the Appendix. Figure 3 visualises the log odds sizes of the main independent variables and their corresponding standard errors.

Ethical approval

Ethical approval was acquired in accordance with the legal requirements of each country. Both the GP and patient surveys were conducted anonymously.

RESULTS

On average, 93.2% of the European respondents were satisfied with their GP (Figure 2). The two countries with the lowest satisfaction rates are Estonia (88.1%) and Sweden (87.0%). The countries where almost all patients are satisfied with their GP and therefore reporting the highest satisfaction rates are Portugal (96.9%) and FYR Macedonia (98.2%).

Table 1 National distributions of patient satisfaction of GP care

Country	Patients that are satisfied with their GP				Valid percentages	
	N	Yes n (%)	No n (%)	Missing n (%)	Yes %	No %
EU - 31	54582	50279 (92.1)	3680 (6.7)	623 (1.1)	93.2	6.8
Austria	1596	1445 (90.5)	125 (7.8)	26 (1.6)	92.0	8.0
Belgium	3677	3401 (92.5)	86 (2.3)	190 (5.2)	97.5	2.5
Bulgaria	1991	1764 (88.6)	219 (11.0)	8 (0.4)	89.0	11.0
Cyprus	624	551 (88.3)	72 (11.5)	1 (0.2)	88.4	11.6
Czech Republic	1980	1871 (94.5)	108 (5.5)	1 (0.1)	94.5	5.5
Denmark	1878	1693 (90.1)	147 (7.8)	38 (2.0)	92.0	8.0
England	1296	1204 (92.9)	71 (5.5)	21 (1.6)	94.4	5.6
Estonia	1121	979 (87.3)	132 (11.8)	10 (0.9)	88.1	11.9
Finland	1196	1147 (95.9)	47 (3.9)	2 (0.2)	96.1	3.9
FYR Macedonia	1283	1243 (96.9)	23 (1.8)	17 (1.3)	98.2	1.8
Germany	2117	2045 (96.6)	68 (3.2)	4 (0.2)	96.8	3.2
Greece	1964	1882 (95.8)	78 (4.0)	4 (0.2)	96.0	4.0
Hungary	1934	1721 (89.0)	202 (10.4)	11 (0.6)	89.5	10.5
Iceland	761	694 (91.2)	45 (5.9)	22 (2.9)	93.9	6.1
Ireland	1694	1508 (89.0)	131 (7.7)	55 (3.2)	92.0	8.0
Italy	1959	1751 (89.4)	184 (9.4)	24 (1.2)	90.5	9.5
Latvia	1951	1748 (89.6)	197 (10.1)	6 (0.3)	89.9	10.1
Lithuania	2011	1815 (90.3)	193 (9.6)	3 (0.1)	90.4	9.6
Luxembourg	713	665 (93.3)	38 (5.3)	10 (1.4)	94.6	5.4
Malta	626	598 (95.5)	25 (4.0)	3 (0.5)	96.0	4.0
Netherlands	2012	1787 (88.8)	172 (8.5)	53 (2.6)	91.2	8.8
Norway	1529	1363 (89.1)	117 (7.7)	49 (3.2)	92.1	7.9
Poland	1975	1817 (92.0)	155 (7.8)	3 (0.2)	92.1	7.9
Portugal	1920	1856 (96.7)	59 (3.1)	5 (0.3)	96.9	3.1
Romania	1975	1902 (96.3)	73 (3.7)	0 (0.0)	96.3	3.7
Slovakia	1918	1705 (88.9)	205 (10.7)	8 (0.4)	89.3	10.7
Slovenia	1963	1788 (91.1)	155 (7.9)	20 (1.0)	92.0	8.0
Spain	3731	3457 (92.7)	260 (7.0)	14 (0.4)	93.0	7.0
Sweden	773	664 (85.9)	99 (12.8)	10 (1.3)	87.0	13.0
Switzerland	1791	1731 (96.6)	56 (3.1)	4 (0.2)	96.9	3.1
Turkey	2623	2484 (94.7)	138 (5.3)	1 (0.0)	94.7	5.3

Multilevel analyses reveal that the variances in the null model at the country level and GP practice level are respectively 0.259 and 0.741. In logistic multilevel regression modelling, the patient level residual variance is expressed on a different scale (probability

scale) than the residual variances on the GP practice and country level [39]. Therefore, using the latent variable method described by Snijders and Bosker [1999], the residual variance at the patient level is estimated to be 3.29 ($\pi 2/3$). Using this estimation to calculate the intra-class correlation (ICC) of each level, 8.74% of the differences in patient satisfaction are situated at the highest level (country), 16.76% at the second level (GP practice), and 74.50% at the lowest level (patient). Therefore, most of the variance in patient satisfaction is situated at the patient level, and can therefore be assigned to patient characteristics.

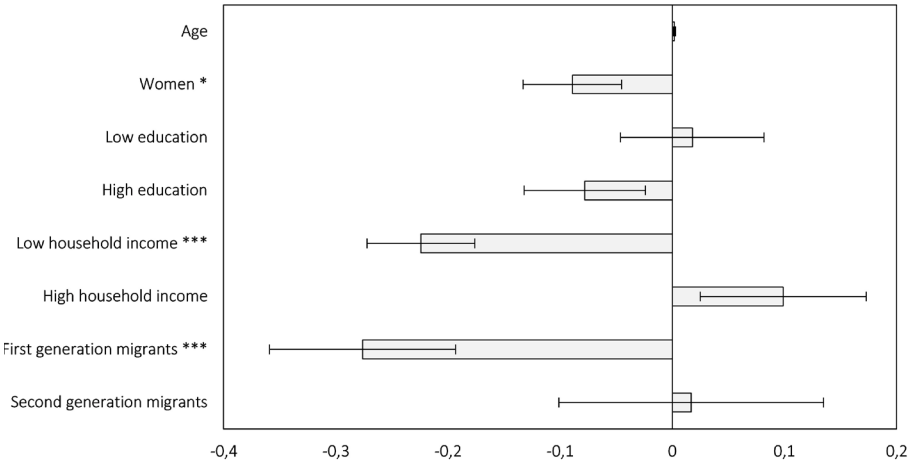
In the first model (Table 1) we add the indicators for person focused care (i.e. patient involvement, communication, access, continuity, and comprehensiveness). According to the estimation results, all these indicators are positively related to patient satisfaction. In other words, the more the care is person focused, the higher the satisfaction of patients. For example, when the patient involvement scale is increased with one unit, the odds for a patient to be satisfied with her/his GP is 5.680 times (Exp[1.737] higher. Subsequently, the structure- and coordination indicator are added to the logistic regression model (Model 2). These two indicators are not significantly related to patient satisfaction. In Model 3, we add age and gender of the patient to the equation. In this model, gender is significant associated with patient satisfaction, showing that the odds for women to be satisfied with their GP is 1.093 times (1/[Exp[-0.089]]) lower compared to men. Age has no significant effect on patient satisfaction. Education is added in Model 4, showing no significant association. Model 5 shows that patients with a low income are less satisfied compared to their counterparts with a middle income: the odds to be satisfied with their GP is for low income groups 1.251 times (1/[Exp[-0.224]]) lower. There is no significant difference between patients with middle and high income. The last model (Model 6) reveals the same significant associations as in the previous models. Indicators of person focused care are positively related to satisfaction, women (compared to men), and patients with a low income (compared to patients with a middle income) are less satisfied with their GP. Furthermore, this model reveals that the odds for first generation migrants to be satisfied with their GP is 1.318 (1/[Exp[-0.276]]) lower, compared to the native population. No significant difference between second generation migrants and natives can be found.

Table 2 Multilevel logistic regression model of individual patient characteristics on patient satisfaction, controlled for person focused care and PC strength

			Null model	Full model
		Intercept	**2.899 (0.109) *** **	**- 10.497 (1.760) *** **
Person focused care		**Patient involvement**		**1.737 (0.044) *** **
		Communication		**10.176 (0.334) *** **
	PC strength	**Access**		**2.160 (0.236) *** **
		Continuity		**2.802 (0.229) *** **
		Comprehensiveness		**0.502 (0.050) *** **
		Coordination		- 0.269 (0.544)
		Structure		- 1.017 (0.856)
	Socioeconomic factors	**Age** (centred)		- 0.002 (0.001)
		Gender (ref: men)		
		Women		**- 0.089 (0.044) ***
		Education (ref: high)		
		Low		0.018 (0.064)
		Middle		- 0.078 (0.054)
		Household income (ref: middle)		
		Low		**- 0.224 (0.048) *** **
		High		0.099 (0.074)
		Ethnicity (ref: native)		
		First generation migrants		**- 0.276 (0.083) *** **
		Second generation migrants		0.017 (0.118)
		Variance country level	**0.386 (0.099) *** **	**0.410 (0.110) *** **
		Variance practice level	**0.740 (0.046) *** **	**0.525 (0.052) *** **

* : p < 0.05, ** : p < 0.01, *** : p < 0.001

Figure 2 Log odds siezs of the main independent variables and their standard error (SE)



DISCUSSION

This study confirms previous results originating from the US (Harris-Haywood et al., 2007) and reveals high levels of satisfaction with primary health care in Europe. On average, 93.2% of the European respondents were satisfied with their GP. The two countries with the lowest satisfaction rates are Estonia (88.1%) and Sweden (87.0%). These percentages are still very high, however, the less-favourable result in Estonia may be explained by the gatekeeping role of the GP. Kroneman et al. (2006) and van der Zee & Kroneman (2007) showed that patient satisfaction is lower in countries where the access to secondary care is regulated through gatekeeping. Despite the fact that the majority of the Swedish counties have no formal gatekeeping regulation (European Observatory on Health Systems, 2017), participants in counties who have a gatekeeping system may have influenced the satisfaction rates in Sweden. However, future (qualitative) research could focus on disentangling the reasons why patients are (not) satisfied with their GP. This research could be an input for a discussion at the European level in which countries share their best practices (and encountered pitfalls). The countries where almost all patients are satisfied with their GP and therefore reporting the highest satisfaction rates are Portugal (96.9%) and FYR Macedonia (98.2%). However, this overall high level of satisfaction with the GP may mask some of the underlying differences in levels of satisfaction across different social groups (Myburgh et al., 2005). Therefore this article gives an overview of the social gradient in patient satisfaction in 31 European countries, by specifically examining the extent to which satisfaction with PC is influenced by socioeconomic determinants (i.e. education, household income, ethnicity, and gender), and controlling for (i) patient experiences by indicators of person focused care (as described by Schäfer et al. (2016)) and (ii) PC strength (following the framework of Kringos (2012)).

Approximately 75% of the variance in patient satisfaction can be explained by characteristics on the patient level, and accordingly, can be explained by patient characteristics. When adding socioeconomic factors of the patients to the equation, the results show a social gradient in satisfaction rates in Europe. This social gradient was also found in prior research Calnan et al., 1994; Gross et al., 1998; Kersnik & Ropret, 2002; Murray-Garcia et al., 2000; Saha et al., 1999; Salisbury, 2009). Our analyses showed a weak or no association with gender, age and education, which has also been found by Auras (2016). Furthermore, the significant association of household income and

ethnicity disappeared for higher income groups and second generation migrants. This disappearing effect for ethnicity may be attributable to acculturation, i.e. the process of adaptation to the mainstream culture (Detollenaere, Baert, & Willems, 2018; Salabarria-Pena et al., 2001). According to the acculturation paradigm, less-acculturated migrants experience more barriers to care (Scheppers et al., 2006, which may lead to lower satisfaction rates. Even after controlling for patient experiences using person-focused care indicators and PC strength, we found lower satisfaction rates among women, low income groups, and first generation migrants patients. Additionally, the analyses reveal that all indicators of person focused care (i.e. patient involvement, communication, access, continuity, and comprehensiveness) are positively related to the satisfaction of European patients, showing the more person-centred the care, the higher the satisfaction among these patients.

Bleich, Ozaltin, & Murray (2009) proposed two different possible explanations for this social gradient in patient satisfaction. Firstly, this social gradient may be explained by differences in patient values. Patients in different social groups prioritize other things in their life, and therefore expect to be attended different by the health care provider. Further research should resolve whether differences in patient values are behind the observed social gradient in patient satisfaction. Secondly, the actual provided treatment to the patient might have been different between several social groups and thereby influencing patient-GP interaction. This would imply inequitable or discriminatory primary health care. For example, Hanssens et al. (2016a) and Hanssens et al. (2016b) showed that European vulnerable groups perceive that they receive less qualitative care and are, consequently, more likely to feel discriminated. In the analyses of this study, the authors aimed to meet this latter explanation by controlling for patient experiences by means of process indicators of PC. The analyses reveal that the better the accessibility and continuity of PC in Europe, the higher the patient satisfaction. Consequently, GPs that provide accessible PC and/or an advanced continuity of PC, are more likely to have a more satisfied patient population.

A limitation with regard of the operationalisation of the concept of patient satisfaction must be mentioned. In this article patient satisfaction was measured by asking one question (i.e. if the patient would recommend their GP to family or relatives). By asking only one question, the measurement of patient satisfaction can be one-sided. As patient satisfaction is a multi-dimensional construct (Cimas et al., 2016), more detailed quantitative or qualitative interview could meet this shortcoming. Considering

that patient satisfaction is partly influenced by the values of the patient, this singular question does not explain “why” patient are satisfied or not. For example, a patient can be unsatisfied with his or her GP because this GP is not so accessible (e.g. long waiting times or bad communication (Mattarozzi et al., 2017)). But this patient would still recommend this GP to their family or relatives for the qualitative medical care this GP offers. Previous research has shown that healthier patients are more likely to be satisfied, compared to their less-healthier counterparts (Auras et al., 2016; Francis et al., 2016; Zapka et al., 1995). In this research we did not control for the health status of the individual. Additionally, we only measured patient satisfaction concerning the GP, it is, therefore, not possible to generalize the results to the whole primary care system. In addition, the variable "income" is based on respondents' subjective percepection of their income. However, this subjective measurement is in line with other international validated and large surveys (such as the Commonwealth Fund survey "International Health Policy Survey of Adults with Health Problems"). While not without limitations, this study contributes to the existing literature of patient satisfaction. Most of the previous research is mainly emanating from the US or a selection of European countries and therefore not generalizable to Europe. However, current study presents the largest and most comparable analysis of differences in patient satisfaction in Europe to date. At last, previous research addressing social differences in patient satisfaction did not take patient experiences and PC strength into account. For example, previous literature points out that some social groups are less satisfied with their GP. But it is possible that these social groups are particularly less satisfied as a result of experiencing less patient involvement, communication, accessibility, continuity, comprehensiveness or living in a country with a weak PC system. To the best of our knowledge, no previous research controlled for person focused care or strength of the PC system, when studying socioeconomic differences in patient satisfaction. However, access is measured with patients who actually visited a GP. Patients who do not have access to a GP did not participate in the study, therefore, association between access and patient satisfaction can be overestimated. We look forward to future research which tackles this particular limitation and includes a comprehensive sample of patients who did not overcome barriers to access the health care system.

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APPENDIX

Appendix 1 Overview on the content of each scale and their reliability scores

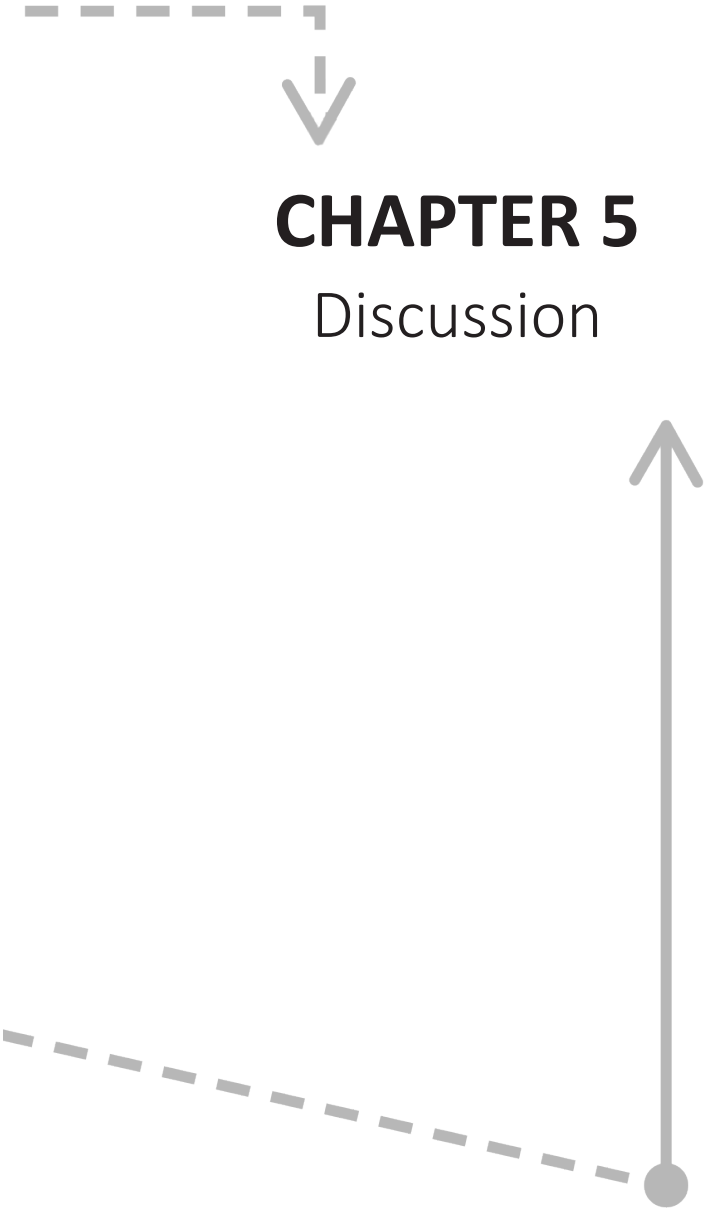
			Content of each scale	Question-naire source	Reliability at levels (average)
PC STRENGTH	PERSON FOCUSED CARE	PATIENT INVOLVE-MENT	The doctor involved me in making decisions about treatment.	PE	N/A
		COMMUNICATION	*Perceived doctor-patient communication* I couldn't really understand what the doctor was trying to explain. The doctor hardly looked at me when we talked. The doctor listened carefully to me. The doctor asked questions about my health problem. The doctor was polite.	PE	**Country:** 0.64534 **GP:** 0.86605 **Patient:** 0.72540
		ACCESS	*Organisational access* Think about the practice that you visited today. Do you agree with the following? The opening hours are too restricted. If I need a home visit I can get one. The practice is too far away from where I am living or working. When I called this practice, I had to wait too long to speak to someone. I know how to get evening, night, and weekend services.	PE	**Country:** 0.85328 **GP:** 0.87579 **Patient:** 0.59078
		CONTINUITY	*Longitudinal continuity of care* Do you have your own doctor (for instance a GP) whom you normally consult first with a health problem? Think about the GP you visited today. Do you agree with the following? He/she knows important information about my medical background. He/she knows about my living situation.	PE	**Country:** 0.93254 **GP:** 0.88895 **Patient:** 0.67292
		COMPREHENSIVE-NESS	*First contact for common health problems* The doctor asked about other problems besides the one I just came for. This doctor doesn't just deal with medical problems but can also help with personal problems and worries.	PE	**Country:** 0.58708 **GP:** 0.61570 **Patient:** 0.74818
		COORDINATION	*Coordination indicator*	PHAMEU	N/A
		STRUCTURE	*Structure indicator* Governance Economic conditions Workforce development	PHAMEU	N/A

PE: patient experience questionnaire

Appendix 2 Multilevel logistic regression model of individual patient characteristics on patient satisfaction, controlled for person focused care and PC strength

			Null model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
		Intercept	**2.899 (0.109) *****	**- 13.576 (0.365) *****	**- 11.026 (1.709) *****	**- 10.991 (1.712) *****	**- 10.853 (1.756) *****	**- 10.697 (1.765) *****	**- 10.497 (1.760) *****
Person focused care		**Patient involvement**		**1.769 (0.042) *****	**1.762 (0.043) *****	**1.756 (0.043) *****	**1.745 (0.044) *****	**1.748 (0.044) *****	**1.737 (0.044) *****
		Communication		**10.459 (0.322) *****	**10.447 (0.324) *****	**10.336 (0.329) *****	**10.249 (0.331) *****	**10.185 (0.332) *****	**10.176 (0.334) *****
	PC strength	**Access**		**2.163 (0.228) *****	**2.114 (0.230) *****	**2.170 (0.234) *****	**2.193 (0.235) *****	**2.173 (0.236) *****	**2.160 (0.236) *****
		Continuity		**2.699 (0.220) *****	**2.722 (0.222) *****	**2.785 (0.227) *****	**2.813 (0.228) *****	**2.832 (0.229) *****	**2.802 (0.229) *****
		Comprehensiveness		**0.495 (0.048) *****	**0.468 (0.049) *****	**0.488 (0.049) *****	**0.497 (0.050) *****	**0.508 (0.050) *****	**0.502 (0.050) *****
		Coordination			- 0.289 (0.580)	- 0.262 (0.580)	- 0.269 (0.591)	- 0.290 (0.594)	- 0.269 (0.044)
		Structure			- 0.871 (0.832)	- 0.901 (0.833)	- 0.934 (0.852)	- 0.994 (0.857)	- 1.017 (0.856)
	Socioeconomic factors	**Age** (centred)				- 0.002 (0.001)	- 0.002 (0.001)	- 0.002 (0.001)	- 0.002 (0.001)
		Gender (ref: men)							
		Women				**- 0.086 (0.043) ***	**- 0.082 (0.043) ***	**- 0.093 (0.043) ***	**- 0.089 (0.044) ***
		Education (ref: high)							
		Low					- 0.047 (0.060)	0.020 (0.064)	0.018 (0.064)
		Middle					- 0.094 (0.052)	- 0.081 (0.054)	- 0.078 (0.054)
		Household income (ref: middle)							
		Low						**- 0.225 (0.048) *****	**- 0.224 (0.048) *****
		High						0.087 (0.074)	0.099 (0.074)
		Ethnicity (ref: native)							
		First generation migrants							**- 0.276 (0.083) *****
		Second generation migrants							0.017 (0.118)
		Variance country level	**0.386 (0.099) *****	**0.426 (0.108) *****	**0.403 (0.104) *****	**0.403 (0.104) *****	**0.418 (0.110) *****	**0.422 (0.110) *****	**0.410 (0.110) *****
		Variance practice level	**0.740 (0.046) *****	**0.509 (0.049) *****	**0.525 (0.050) *****	**0.532 (0.051) *****	**0.530 (0.051) *****	**0.527 (0.052) *****	**0.525 (0.052) *****
		ICC country	8.1%	10.1%	9.5%	9.7%	9.8%	10.0%	9.7%
		ICC practice	16.8%	12.0%	12.4%	12.7%	12.5%	12.4%	12.4%

* : p < 0.05, ** : p < 0.01, *** : p < 0.001



CHAPTER 5

Discussion

DISCUSSION

We end this doctoral dissertation by summarising how our studies contribute to the body of knowledge, elaborate on their policy and societal implications ('take home messages for policymakers') and key directions for future research ('take home messages for researchers').

1. Main findings: summary of the results

In this dissertation, we built on previous research on the association of primary care strength and inequity in health and health care by unfolding and expanding the theory of Starfield and Kringos and merging data from two cross-sectional multi-country studies that provide data for the macro, meso, and micro levels, namely QUALICOPC (macro, meso, and micro levels) and PHAMEU (macro level).

Primary care is often the entry level of the health care system, and provides accessible, comprehensive, and coordinated care for a country's population. A large body of literature shows the beneficial effects of strong primary care on several outcome measures. Nevertheless, the evidence describing the association between primary care strength and inequity in health and health care is inconclusive. Following the work of Starfield, the strength of a primary care system (further referred to as primary care strength) is associated with more equity. For example, a higher density of primary care doctors is associated with lower neonatal and infant mortality, lower stroke mortality, higher self-rated health, and higher birth weight in countries with high inequality in income (Starfield, Shi & Macinko, 2005). However, critics argue that these results cannot be generalized to other (lower income) OECD countries, meaning the results are not necessarily transferable to Europe. In addition, primary care in Europe is patterned by a divergence in organisational composition, making it difficult to translate results from other countries to this setting. Starfield's theory operationalised primary care strength using seven core components at the aggregated macro level: first contact, longitudinality, comprehensiveness, coordination, family orientation, community orientation, and cultural competence. However, Kringos et al. (2010a) argued that this operationalisation of primary care strength (i.e. one indicator for each primary care component) is not applicable to the wide variation in European primary care characteristics. In 2009-2010, Kringos developed the Primary Health Care Activity Monitor, which measures and evaluates the strength of primary care systems in the European context. This monitor

comprises the structure level (containing the dimensions of governance, economic conditions, and workforce development) and process level (containing the dimensions of access, continuity, coordination, and comprehensiveness). When studying the association between European primary care strength and inequity in health, the results are inconclusive. Specifically, Kringos et al. (2013a) found that only the structure and continuity dimensions of their monitor were associated with lower inequity in self-rated health. Furthermore, they found no significant association between primary care strength dimensions and inequity in the prevalence of diseases such as diabetes and COPD. Other researchers ascribe these inconsistent results in Kringos' research to the unit of analysis, namely the primary health care system at the macro level (Haggerty et al., 2013). Consequently, Kringos (2012) recommended more in-depth research to disentangle the complex association between primary care strength and inequity in health and health care, preferably by combining macro level data on primary care strength with data from the meso and micro levels.

The initial central aim of this PhD dissertation is to assess the association between the strength of primary health care and inequity in health (care) in Europe. This topic is delineated into four research questions. Figure 1 provides the reader with an overview of the research questions and corresponding hypotheses. Hereto, seven quantitative papers were written: four papers focusing on the association between primary care strength and several outcomes related to inequity, one paper exploring the role of a GPs person-centred attitude, and two paper examining why (vulnerable) patients bypass the primary care system. Most of the papers included in this thesis use data from the QUALICOPC and/or PHAMEU databases. These two databases contain data of the primary care systems in 31 European countries on the macro, meso, and micro levels. Table 2 summarises the hypotheses and aligns them with the results of current doctoral dissertation.

Figure 1 Overview of the main research questions of this doctoral thesis, the hypotheses and the research papers

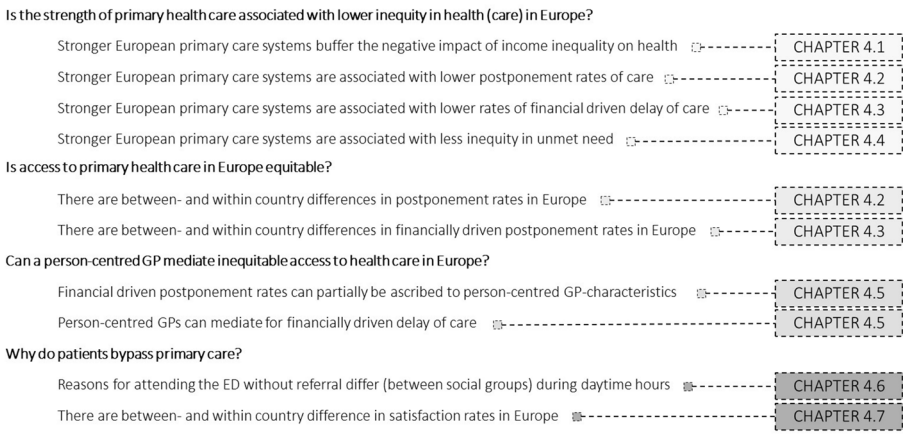


Table 1 Overview of the hypotheses from Chapter 2 and the results from this doctoral dissertation

	No	Hypothesis		Results	Chapter
RESEARCH QUESTION 1	1.1	Stronger European primary care systems are associated with a lower negative impact of income inequality on health.	+/-	Primary care systems with a strong structure and continuity dimension are associated with a lower negative impact of income inequality on health. Primary care systems with a strong comprehensiveness dimension are associated with a higher impact of income inequality on health. Chapter 4.1 reveals mixed associations for the access- and coordination dimension of primary care.	4.1
	1.2	Stronger European primary care systems are associated with lower postponement rates.	-	No significant association is found.	4.2
	1.3	Stronger European primary care systems are associated with lower rates of financially driven delay.	+/-	Primary care systems with a stronger governance, access, and comprehensiveness dimension are associated with lower rates of financially driven postponement rates. No significant association is found between financially driven postponement and the other primary care strength dimensions.	4.3
	1.4	Stronger European primary care systems are associated with less inequity in unmet need.	+/-	Primary care systems with a stronger workforce development and access dimension are associated with less inequity in unmet need.	4.4
RESEARCH QUESTION 2	2.1	Postponement of GP care differs between European countries.	+	Postponement of care in the last 12 months between European countries ranges from approximately 6 percent (Turkey) and 25 percent (Hungary).	4.2
	2.2	There are social differences in postponement rates according to patients' income, education, ethnicity, and gender in Europe.	+	A social gradient in postponement of care is found. Low income- and ethnic minority patients show higher postponement rates in Europe.	4.2
	2.3	Low income groups are more likely to postpone GP care because of financial reasons.	+	Low income patients are associated with higher financially driven postponement rates.	4.3

+: hypothesis supported by results of this doctoral dissertation.

+/-: hypothesis partly supported by results of this doctoral dissertation.

- : hypothesis not supported by results of this doctoral dissertation.

Table 1 Overview of the hypotheses from Chapter 2 and the results from this doctoral dissertation (continued)

	No	Hypothesis		Results	Chapter
RESEARCH QUESTION 3	3.1	Country differences in financially driven postponement rates can partially be ascribed to person-centred characteristics of the GP.	+	Approximately 20 percent of the total variance in financially driven postponement can be explained by GP (practice) characteristics.	4.5
	3.2	Person-centred GPs are associated with lower financially driven postponement of care.	+	Patients with a person-centred GP report lower financially driven postponement rates.	4.5
RESEARCH QUESTION 4	4.1	Self-referring patients attend the ED because of financial reasons.	+/-	The main reasons why self-referring patients attend the ED is because of the seriousness of the (health) problem and because they expect to need advanced diagnostic testing.	4.6
	4.2	The reasons patients attend the ED without referral differ between different socioeconomic groups.	+	Low educated and non-employed patient are more likely to consult the ED because they postponed care too long, for financial motives, because the ED is their usual source of care or because their medical history requires it.	4.6
	4.3	The reasons self-referring patients opt for the ED differ between patients who have a regular GP and those who have no regular GP.	+/-	Self-referring patients with no regular GP are more likely to attend the ED because they did not know where else to go. Self-referring patients with a regular GP are more likely to attend the ED because of the seriousness of their (health) problem.	4.6
	4.4	Lower socioeconomic patient groups are more likely to be dissatisfied with their GPs.	+	A social gradient in patient satisfaction is found. Low income patients and first generation migrants are less satisfied with their GP.	4.7

+: hypothesis supported by results of this doctoral dissertation.

+/-: hypothesis partly supported by results of this doctoral dissertation.

- : hypothesis not supported by results of this doctoral dissertation.

Main finding 1 Particular primary care strength dimensions are associated with more equitable health care and less health inequity

Chapter 4.1 to Chapter 4.4 explores the association between primary care strength and several outcomes related to inequity in Europe. Furthermore, Table 2 provides a detailed summary of the relevant findings related to our first overall research question, 'Is the strength of primary health care associated with lower inequity in health (care) in Europe?'.

Table 2 Summary of the research findings concerning the association between primary care strength (dimensions) and inequity in health and health care

		Association income inequality - self-rated health[i]	Association income inequality - life expectancy[i]	Association income inequality - mental wellbeing[i]	Postponement of care[ii]	Financially driven postponement of care[iii]	Inequity in unmet need[iv]
PRIMARY CARE STRENGTH	**STRUCTURE**	NS	-	-	NS	-	
	Governance					-	NS
	Economic conditions					NS	NS
	Workforce development					NS	-
	PROCESS					-	
	Access	-	-	-	NS	-	-
	Continuity	NS	-	-	NS	NS	NS
	Coordination	+	+	-	NS	NS	NS
	Comprehensiveness	+	+	+	NS	-	NS

Note Because of its inverse association compared to the other, the results of the association between income inequality and infant mortality were excluded to simplify the visualisation

i Results chapter 4.1, ii results chapter 4.2, iii results chapter 4.3, iv results chapter 4.4

NS: no significant association, +: higher score on this particular dimension is associated with higher inequity in this outcome,-: higher score on this particular dimension is associated with lower inequity in this outcome, grey shaded: not included in the analysis

In general, the association between primary care strength and equity in Europe is revealed as being less straightforward than expected. On the one hand, the overall **structure** level of primary care strength (including the dimensions of *governance*, *economic conditions*, and *workforce development*) show either an association with equity in health or health care (meaning that a higher score on the structure dimension is

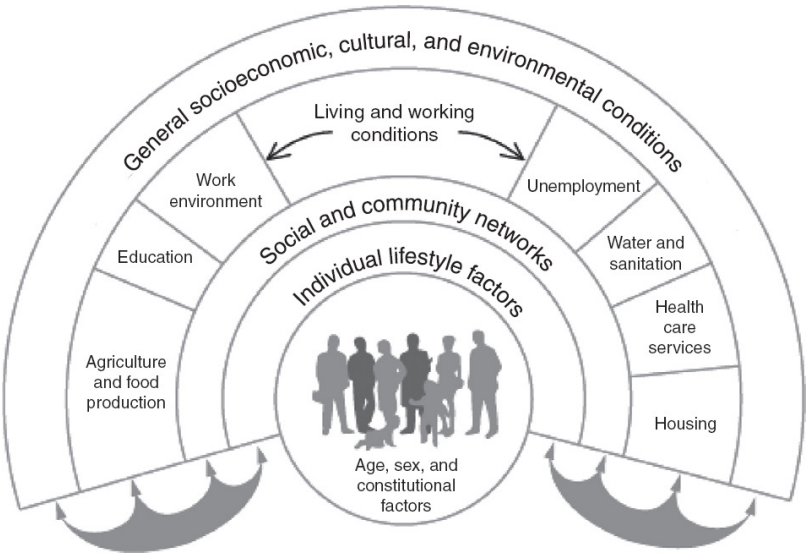
associated with more equity in health and health care) or a non-significant association. In addition, regarding the **process** dimension, *access* shows a significant association with equity in health and health care. We elaborate on the results for this specific dimension in the following main finding. Moreover, we observe an inverse association between *continuity* of primary care and the association of income inequality with life expectancy, mental wellbeing, and infant mortality. On the other hand, the associations between the *coordination* and *comprehensiveness* dimensions and inequity are ambiguous, with positive, neutral, and negative associations. This ambiguity may be related to a methodological challenge of our research. For all studies, we used cross-sectional data, not capturing the fast-moving changes and trends over time. The extent to which our society is characterised by social, organisational, and technological changes makes it questionable to assume that differences in attitudes or behaviours are the result of the passage through time, rather than cohort differences. For example, it is unclear whether the surprising positive association between comprehensiveness and (income-related) inequity is driven by more comprehensiveness of primary care leading to inequity, or the other way round, by countries attempting to tackle high inequity in health by broadening the scope of primary care. However, this can also be questioned for all the other significant associations (even with positive directions). Based on the cross-sectional nature of our data, we are not able to distinguish between these potential mechanisms underlying the measured associations. We elaborate on this limitation in the 'Methodological reflection' section of this chapter.

However, these inconsistent findings are in line with Kringos et al. (2013a). In their explorative research, they studied the effect of primary care strength on inequity in health (operationalised through self-rated health, diabetes, and COPD). They only found a significant association between the structure and continuity dimension and inequity in self-rated health. No significant results were reported for inequity for diabetes and COPD. We expanded this research by studying the effect of primary care strength on other concepts related to inequity.

Furthermore, in our statistical models, the strength of the association between European primary care strength and inequity in health and health care is generally modest. This might indicate that other determinants or factors influence our outcome measures, which emerges in the decomposition of the variance in inequity in health and health care. We elaborate on this variance decomposition in *Main finding 2*. Furthermore, during the development of the PHAMEU monitor, Kringos et al. (2012) found that ine-

quity can be explained by more than primary care strength. Initially, the outcome level of the PHAMEU monitor entailed an equity dimension. However, during the selection round for adequate indicators of each dimension, national experts remarked that the selected indicators for the equity dimension were not suitable for this particular dimension. They felt that inequity in health is influenced by factors (such as the social conditions in which people live and work) other than social disparities in primary care access and use (Kringos et al., 2010b; Kringos, 2012). For example, according to the conceptual framework by Dahlgren and Whitehead (1991) (Figure 2), health inequity is determined by a complex and conjoined set of genetic, physical, psychological, social, and environmental factors at the micro, meso, and macro levels (European Commission, 2014; Whitehead & Dahlgren, 2006). Marmot (2015) argues that access to high-quality health care for all people in society would be a good thing, but it would not eliminate health inequities. Health inequity arises from inequities in society. Social conditions have a determining impact on access to health care, as they do on access to other aspects of society that lead to good health. Social conditions make people ill, health care is needed to treat people when they get sick. Nevertheless, in several papers, we fill this gap by adding several explanatory meso and micro variables to the statistical models.

Figure 2 Determinants of health according to Dahlgren & Whitehead (1991)



Main finding 2 The access dimension of primary care strength is inversely associated with several inequity in health and health care

A general pattern throughout our findings in Chapter 4.1, Chapter 4.2, Chapter 4.3, and Chapter 4.4 is the recurring association between the access dimension of primary care strength and equity in health and health care. Specifically, our results demonstrate that countries with a more accessible primary care system are characterised by lower financially driven postponement, lower inequity in unmet need, and a weaker association between income inequality and self-rated health, life expectancy, mental well-being, and infant mortality. Again, due to the cross-sectional character of this doctoral dissertation, it is difficult to determine the direction of the association that we found. It is unclear whether countries with an accessible primary health care system lead to more equitable health and health care. Or the other way around, do countries that assess high levels of inequitable health and health care want to tackle this inequitable distribution by increasing the accessibility of their primary care system.

Nevertheless, this main finding further supports the paradigm that ensuring equitable access to primary care (i.e. equal access for equal need) is one major pathway to tackle inequity in health and health care (EXPH, 2016; Goddard & Smith, 2001). Access to and provision of health care should not vary according to patients' demographic or socioeconomic levels but to their health care needs (Bayoumi, 2009; Cuyler, 2001; Goddard & Smith, 2001). Patients should be able to access health services without financial hardship and be treated according to their needs (EPXH, 2014). This paradigm is elaborated in 'Implications for policy and practice'.

However, equitable accessibility to primary care is not only attributable to primary care strength at the macro level. The decomposition of the variance of financially driven postponement in Chapter 4.3 shows that the largest proportion of this variance (18.60%) can be explained by the characteristics of GP practice (compared to 15.52% by country-level characteristics). This variance decomposition is aligned to that calculated for general postponement in Chapter 4.2. This is an important finding, since it suggests that accessibility to primary care, specifically postponement of care (because of financial reasons), cannot be eliminated by only focusing on system-level characteristics (e.g. of the national health care system). Here, GPs and the organisation of their practices also play an important role in preventing (financially driven) postponement of primary care. We return to the association between the person-centred attitude of the primary health care professional and accessibility of European primary health care in *Main finding 4*.

Main finding 3 Access to primary care in Europe is still determined by patients' socioeconomic status and migration background

The results in Chapters 4.2 and 4.3 demonstrate that a large proportion of European citizens still report difficulties in accessing primary health care. For example, approximately 15% of European respondents indicate that they have postponed primary care in the last year. When focusing on financially driven postponement of primary care, 8.5% of the respondents postponed care for this reason. Notwithstanding that a great proportion of EU countries have achieved universal (or near-universal) coverage (OECD, 2016a), there is still a critical access problem to health care in Europe. Furthermore, we confirm that there is still large between- and within-country variation regarding accessibility to European primary health care. This between- and within-country variation violates several human and social rights treaties (European Commission, 2017a; European Union, 2010; United Nations, 1948; World Health Organization, 1946).

Regarding between-country variation, our results demonstrate that in six European countries (Romania, Poland, Estonia, Lithuania, FYR Macedonia, and Hungary), more than 20% of the population postponed GP care in the last year. In these countries, more than 20% of the participants reported financially driven postponement. Countries with the lowest (financially driven) postponement rates are Turkey, Malta, Switzerland, and Iceland (lower than 10%).

Moreover, also within countries, there is large variation in postponement rates. In Chapter 4.2, we found that low education, low income, and/or ethnicity are associated with higher postponement rates. In addition, Chapter 4.3 associates low-income patient groups with lower financially driven postponement of primary care. This on-going social gradient in accessibility to European primary care should function as a flashing alarm that European (primary) health care systems are failing to deliver timely care to the entire population, and therefore, should be a major concern of all European countries (EXPH, 2016). We describe how to deal with this flashing alarm in the 'Implications for policy and practice' section'.

Main finding 4 Health (care) literacy is a major determinant of why vulnerable patients bypass the primary care system

In Chapter 4.6, the reasons patients intentionally bypass the primary care system are identified. Hereto, we collect data through face-to-face survey interviews with patients

self-referring to the emergency department in Belgium, a country with a relatively strong primary care system (Kringos et al., 2013b). Data is collected during daytime hours, when primary care is supposed to be easily accessible. More than 60% of the interviewed respondents report attending the ED without GP referral, because they perceive their health problem as serious and/or requiring advanced diagnostic testing. The combination of these two reasons might mirror a knowledge deficit in terms of health (care) literacy (i.e. incorrect evaluation when a health problem requires urgent care and which facility is the most suitable). The WHO defines health literacy as 'the cognitive and social skills that determine the motivation and ability of individuals to gain access to understand and use information in ways which promote and maintain good health' (Nutbeam, 1998; Nutbeam, 2008). Low health literacy is associated with reduced patient safety, less prevention, increase in hospitalisations, worse health outcomes, and increased mortality risk (De Walt & McNeill, 2013; Omachi et al., 2013; Parker & Ratzan, 2010). Inaccessibility to understandable information or health care is seldom or never exclusively attributable to patients, health care professionals, or the health care system. Rather, it is a mismatch between the micro, meso, and macro levels in the health care system (EXPH, 2016), for example, a mismatch of a patient's ability to understand health-related information and the health care provider or health system's response (Parker & Ratzan, 2010).

Main finding 5 Person-centred GPs are associated with a lower social gradient in accessibility to primary care

As mentioned when discussing *Main finding 3*, a significant amount of the variance in (financially driven) postponement can be explained by the characteristics of the GP (practice). Therefore, the results of Chapters 4.5 and 4.7 associate a person-centred GP with higher satisfaction among patients. Furthermore, higher person-centeredness is associated with a lower rate of financially driven postponement. European patients who estimate the consultation style of their GP as person-centred are associated with lower financially driven postponement of care. These results add to the person-centeredness discourse within health care and emphasizes its beneficial effects (Bertakis & Azari, 2011; Dwamena et al., 2012; Jani et al., 2012; Mead & Bower, 2002; Rao et al., 2007; Stewart et al., 2000).

Person-centred care puts people at the centre of the health care process. Person-centred care is customised to the needs, preferences, values, and resources of patients. It

acknowledges that patients and health care providers should work together and that patients have the expertise in their own lives. Furthermore, it provides support and coaching. As patients present themselves with undifferentiated (health) problems, especially at the primary care level, the GP's person-centred attitude has been increasingly advocated (Grol et al., 1990; Levenstein et al., 1986; McWhinney, 1989; Mead & Bower, 2002; Van Lerberghe, 2008). As such, primary care is defined as person-centred (instead of disease-centred) care (De Maeseneer et al., 2007; Starfield, 2011). Primary health care professionals are educated using a generalist perspective of the person, embedded in her/his own context. Primary care is not the sum of care for individual diseases. Rather, it is care employing a drone perspective on the patient for different disease and/or illness episodes.

2. Implications for policy and practice

The results of this doctoral dissertation, as summarised in the previous section, have several implications for the current policy and practice discourse on primary health care in Europe. Next, we elaborate on these implications and formulate several take away messages for policymakers and health care professionals.

2.1 Providing equitable access to high quality (primary) health care

Together, two of our main findings reveal a crucial area of concern regarding primary health care in Europe. On the one hand, our results in Chapter 4.1, 4.2, and 4.4 demonstrate that an accessible European primary health care system is associated with higher equity in health and health care. On the other, if we assess the actual accessibility of European primary care systems (Chapter 4.2 and 4.3), large between- and within-country differences in access to primary care remain. Therefore, a need for action to tackle this inequitable accessibility to (primary) health care emerges. We now describe ways in which access to (high quality, primary) health care can be made more equitable.

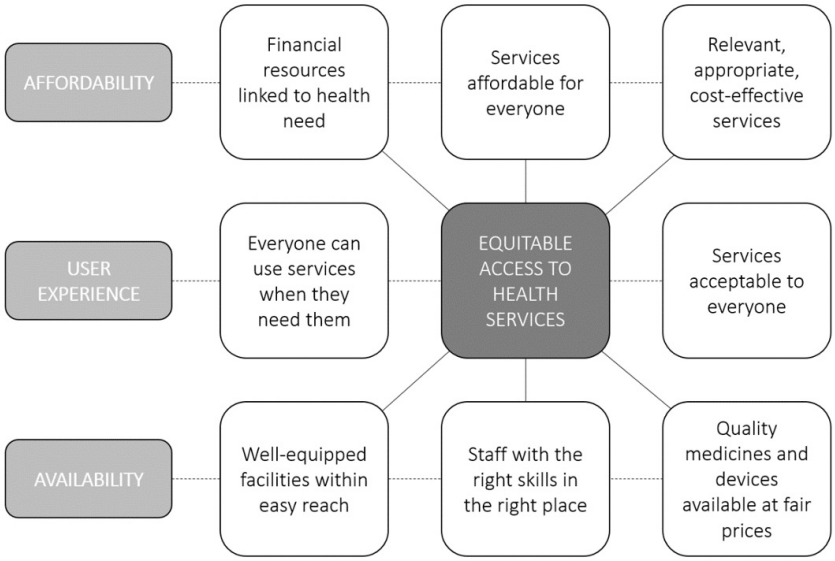
As mentioned in the Chapter 1 to this doctoral dissertation, (primary) health care systems should be designed to provide equal access to patients with equal health needs (Whitehead & Dahlgren, 2006). **Universal health coverage** is advocated as one of the best mechanisms to provide accessible health care (OECD, 2016a). This is also supported by embedding universal health coverage as a key objective in the European Pillar of Social Rights (European Commission, 2017) and Sustainable Development Goals (United Nations, 2015).

Critically, when we advocate universal health coverage for all people, we also advocate that policymakers be cautious with actions exclusively targeting vulnerable populations. These targeted actions may create new vulnerable groups and stigmatise deprived groups, creating a 'we' versus 'they' mentality and thereby, a fragmented society (De Maeseneer, 2017). When designing care, **proportionate universalism** should be considered. Proportionate universalism refers to the fact that health actions must be universal, but with intensity proportionate to the level of disadvantage (Marmot, 2010).

Specifically, based on a systematic literature review, the Expert Panel on effective ways of investing in Health (EXPH, 2016) points out eight policy areas clustered in three dimensions that can increase equitable access to primary care services in Europe. The

factors enabling equitable access to primary care are schematised in Figure 3. First, policymakers should ensure that financial resources are aligned to patients' health needs, care should be affordable for everyone, and should be relevant, appropriate, and cost-effective. These three prerequisites are referred to as the affordability dimension. The Expert Panel argues that improving this dimension is only possible when policymakers address the gaps in publicly financed coverage to keep out-of-pocket payments feasible. Second, all citizens should have the ability to use care when they feel the need for it, and this care should be acceptable for everyone. This is referred to as the 'user experience' dimension. Last, regarding the availability dimension, health care facilities should be well equipped and easy to reach, and the workforce should possess the required skills.

Figure 3 Factors enabling equitable access to primary care



Source: authors' own representation, based on EXPH (2016)

The findings of this doctoral dissertation support the expansion of the **affordability** dimension of this framework. This dimension is linked to the payment mechanism through which health care professionals are paid. Most European countries apply either a fee for service payment, capitation payment, or a mix of both in primary care (OECD, 2016a). However, these payment mechanisms have several weaknesses and are not always aligned to the priorities of health care systems (OECD, 2016b). For example,

fee for service payment incentivises health care providers to increase their activities, resulting in higher costs (through supply-induced demand) and does not necessarily reward the value of quality of the care provided. Capitation payment better controls costs, but may lead to a selection of patients needing less clinical care or worse care (OECD 2016a; OECD, 2016b). In addition, exclusive use of the fee for service or capitation systems does not acknowledge the societal challenges discussed in the Introduction to this thesis (e.g. ageing population, increase of multimorbidity, and inequity). Patients confronted with these 'extreme' systems will struggle to achieve person-centred care across several health care providers (OECD, 2016a). Therefore, one could hypothesise that a **blended payment system** (i.e. combining the best of both payment mechanisms) that **incentivises high-quality care** and complements the **coordination of care for patients with complex needs**, of whom many are vulnerable, is recommended (OECD, 2016a). This can be operationalised using a blended mechanism with a yearly risk-adjusted population-based global payment supplemented by a pay-for-coordination and quality system (Tsiachritas, 2016).

In light of the recent refugee crisis, it is also important to reflect on accessibility for this (vulnerable) subpopulation. Many countries in the European Union restrict access to health care for refugees for cost-related motives (WHO, 2017). Using a quasi-experimental study with data from two time points (1994 and 2013), Bozorghmehr & Razum (2015) demonstrated that the costs of excluding refugees from the (primary) health care system in Germany increased health expenditure. This was because of delayed care focused on treating acute conditions, rather than prevention and health promotion, and the higher administrative costs consequent to the restrictive parallel system (with its own funding and reimbursement schemes). Therefore, access to (primary) health care should not be exclusive to a country's permanent residents, but also to temporary inhabitants. These temporary inhabitants may be the permanent residents of tomorrow, and their improved health status will increase labour force participation and production (Dahlgren & Whitehead, 2007; McKee, Figueras & Saltman, 2011), inherently leading to economic growth (and higher tax income).

Certainly, the user experience and availability dimensions also play a major role in enabling equitable access to care. However, these dimensions were not the focus of this dissertation. Therefore, we look forward to future research expanding knowledge pertaining to these two latter dimensions.

Finally, as this thesis demonstrated that not only primary care strength determines equity in health and health care, a more **integrated approach across all concerned social sectors** is needed. First, the health and social care sectors should be harmonised to provide better interaction. This will lead to an increased targeted approach that considers all contextual factors (such as financial and personal situation) and consequently, more person-centred care. Second, the integrated health care strategies proposed by Dahlgren and Whitehead (2007) should focus both on up- and downstream (social) determinants of health. Only access to high-quality health care will not eliminate inequity in health from this world. According to Marmot (2015), the social conditions of a person have a determining impact on access to health care, as they do on access to other aspects of society that lead to good health. If policymakers want to provide equitable access to (primary) health care, they should focus on determinants of health such as housing, education, work environment, social and community networks, and individual lifestyle factors. For example, if people live a healthy lifestyle, with a large social network, in a healthy house, and are better educated, they are less likely to need health care. If they do, they will more easily navigate their way through the system (and need less support).

2.2 Increasing health (care) literacy

Focusing on the demand side of health care, the results of Chapter 4.6 reveal that patients have difficulties in terms of health literacy in accessing high-quality care aligned with their needs. Enhancing the health literacy level of a country's population does not only require a wide range of interventions tailored at the micro level (in health care), but also actions at the meso and macro levels (beyond the health care sector). Next, we give examples of potentially fruitful policy actions in this regard.

Regarding enhancing individuals' health literacy, at the most functional level, we talk about **learning to read, write, and calculate**. In Europe, a large proportion of the population still experience literacy problems. Specifically, the PIAAC survey demonstrates that 55 million adults (approximately 16% of the European population) have literacy problems (ELINET, 2015). Following the principles of health education and promotion, Rademakers (2014) argues that health literacy is a competence that can be expanded and further developed. Both cognitive development and the social skills and beliefs of people in their own effectiveness play important roles in health literacy (Nutbeam, 2000).

Moreover, **health care professionals** (meso level) and **health care systems** (macro level) play important **roles in caring for persons with low health literacy**. Kripaline and Weiss (2006) explain that physicians tend to overestimate the health literacy level of their patients and are mostly unaware of the barrier these patients experience in health care. In addition, even when physicians are aware of this barrier, they are not always able to adjust their communication style to patients with low health literacy. This inability to tailor communication style to the patient was also shown in Verlinde et al. (2012). For example, they found that patients from lower socioeconomic groups are more likely to receive a directive consultation style and less likely to receive adequate diagnostic and treatment information. According to Rademakers (2014), the ability to tailor communication to patients' health literacy level should be learned and **embedded in the education of the health care professional**. Furthermore, the way a health care institution or system is organised can accommodate care for patients with low health literacy. Branche et al. (2012) developed ten guidelines to which a 'health literate care organisation/system' should comply:

i. have leadership that facilitates health literacy in the mission, structure, and operations;
i. integrate health literacy into planning, evaluation, patient safety, and quality improvement;
iii. encourage the workforce to be aware of health literacy;
iv. embed patients in the design, implementation, and evaluation of health information services;
v. meet the needs of the population concerning health literacy;
vi. use health literacy strategies in interpersonal communication;
vii. provide easy accessible health information;
viii. design and provide easily understandable health information content;
ix. address health literacy in difficult situations, especially during care transitions and treatment communication; and
x. communicate clearly about the fact that patients will have to pay for diagnostics and/or treatment.

2.3 Offering person-centred care

Last, Chapter 4.5 supports the person-centred discourse dominating health care services nowadays. We contribute to the literature by showing that a **GP can enhance accessibility to primary care by adopting a person-centred attitude**. Angel Gurria, Secretary-General of the OECD, emphasises the beneficial effects of person-centred care in meeting challenges related to societal and health care (Gurria, 2017). In his opinion, the shift to person-centred health care will inherently lead to better health outcomes valued by citizens. However, Angel Gurria cautions that if policymakers want to deliver person-centred (primary) health care, they should redesign how care is provided and health systems are measured. In the following section, we elaborate directions for this redesign.

The shift to person-centred health care will inherently lead to better health outcomes valued by citizens. Health care systems that support a person-centred relation between health care professionals and their patients, aim to respect, validate, and empower patients (Haggerty et al., 2013). Health care professionals and patients are experts in their domain and can learn from each other, leading to social uplifting that lowers inequity in health and health care. We advocate for the coordinating role of a primary health care professional who guides persons through the complex health care labyrinth. The organisational mechanism for coordinating care across different levels in the health care system is often referred to as **gatekeeping** (Saltman, Bankauskaite & Vrangbaek, 2005). Historically, gatekeeping systems were encapsulated in the health care system to limit access for reasons such as cost control and regulating waiting times for specialist care (EXPH, 2014). However, gatekeeping should aim to guide patients towards the most appropriate care, not limit access (EXPH, 2014). Reibling and Wendt (2013) showed that in **gatekeeping countries**, there is **less inequity** in specialist utilisation among patients with different education levels. Consequently, gatekeeping decreases utilisation and increases equity in accessibility to care. Gatekeeping systems can be classified into two categories. The first is the **linear referral process**, whereby a patient is transferred from one provider to another (with more specialisation). This linear model is most appropriate for people with new (non-life threatening) health problems that may be unclear for the patient and provider and therefore best presented first at the primary care level. The second type is the **spiral referral process**, which is most appropriate for people with chronic or multiple conditions. Patients are referred within primary care and between different levels of the system on an on-going basis. This requires a high

degree of coordination. Appropriate mechanisms should be put in place to optimise the gatekeeping process according to different contexts (EXPH, 2014). Nevertheless, de Bakker and Groenewegen (2009) question the sustainability of the gatekeeping system in Europe in the long run. Several European regulations and policies emphasise consumer sovereignty or consumer orientation, which may be impeded by restrictions inherent to gatekeeping.

Moreover, health care organisation models concentrated on specialist hospital care should refocus on prevention and high-quality, affordable, integrated, community-based, and people-centred primary care. According to the WHO (2016), this can be achieved in all countries, even those that do not yet have universal health coverage. However, to do so, countries should meet the following four components: (i) health care professionals with a focus on generalist care (such as GPs and nurses) should be prioritised, (ii) health care professionals should be used to their full potential (and not be under- or over-skilled), (iii) the health and social sector should work more strongly together, and (iv) patients should be empowered to take up a central role in the development of health systems and participate in their own care (WHO, 2016).

3. Methodological reflections and directions for future research

The research in this doctoral dissertation is conducted using two multi-country, cross-sectional databases, namely QUALICOPC and PHAMEU (Chapter 3). This doctoral thesis contributes to the literature by merging these two European databases to study the association between primary care and inequity in health and health care at the micro, meso, and macro levels. Specific limitations of the papers included in the thesis pertaining to the construction of these databases were discussed in the related chapters. In this section, we highlight three general limitations of our approach and relate them to potential fruitful directions for further research.

First, numerous (European) countries are included in the databases; however, this sample of countries is selected through a non-random sampling technique (convenience sampling). This implies that our research sample is potentially a selective subsample of countries, making it impossible to generalise the research findings to other countries or contexts. In general, the number of observations at the country level (34 countries) is limited, which influences the reliability of the multilevel analyses. Therefore, it is not possible to conduct cross-level interaction analyses. This cross-level interaction analysis could have provided more evidence regarding the interplay between meso and macro level characteristics of the primary care system. For example, in Chapter 4.5, we associate a person-focused GP with the accessibility of primary care in Europe. However, we look forward to future research dissecting and revealing the pathways through which person-centeredness and primary care strength are interrelated. Supplementary, current descriptive doctoral research demonstrated that the association between strength of the primary care system at the macro level and equity in health and health care in Europe is less straightforward than theoretically expected. Therefore, future research should study how several individual primary care characteristics (such as the amount of out-of-pocket payments or GP density) or other GP characteristics (such as accessibility of the GP practice) are associated with equity in health and health care in European countries. In addition, countries are embedded in the model as separate entities; however, they cannot be viewed as separate in the way we operationalised them. Nations border each other, and can therefore influence each other. The literature refers to this phenomenon as the 'Galton problem' (Ross & Homer, 1976; Schäfer et al., 2016).

Second, the data in the QUALICOPC and PHAMEU databases were collected at a single

point in time. Given this cross-sectional nature of our data and that our independent and dependent variables derived from these data may correlate with other unobserved variables, we were not able to interpret our research findings in a causal way. Moving forward, we recommend monitoring the performance of primary care and inequity over a longer period. The collection of reliable longitudinal country-specific and EU/OECD-wide indicators regarding inequity and (primary care) health system performance is also widely advocated by a large body of seminal reports and advisory institutions (De Maeseneer, 2007; EXPH, 2014; EXPH, 2016; OECD, 2016a). Reliable indicators should be (i) robust and statistically validated, (ii) responsive to effective policy interventions, (iii) measurable in a sufficiently comparable way across countries, (iv) timely and susceptible to revision, and (v) not require a large effort to collect (European Commission, 2017b). However, we urge international policymakers and institutions to also be sensible towards social indicators and include them in their data collections. For example, the Health Consumer Powerhouse (Björnberg, 2017) annually evaluates the performance of European health care systems. By using indicators such as direct access to specialist care and waiting times for cancer treatment or CT scans, they assess the accessibility of specialist care (and not primary care). In addition, this result does not consider the social gradient in access, which is one of the main findings (i.e. accessibility to health care in Europe is still determined by patients' socioeconomic status and migration background) of this doctoral dissertation. As such, we can only support and endorse new socially sensible data collection such as the 'European Union Social Indicators: Europe 2020 poverty and social exclusion target' project and the inclusion of measures related to inequity in the European Core Health Indicators such as health inequities in self-rated health, HIV/AIDS, and psychosocial wellbeing.

More in general, given the survey nature of our data, many of the indicators used in our studies are self-reported and, therefore, perception-based. This should be kept in mind when interpreting our results. For instance, we make use of self-rated health as an outcome variable in Chapter 4.1. Following the WHO definition of health in terms of 'physical, mental, and social well-being, and not merely the absence of disease and infirmity', objectively measuring health is a difficult – nearly impossible – exercise. For this reason, and reasons of simplicity and cost, the subjective operationalisation of health has been commonly used in the literature (McDowell, 2006; Oswald & Wu, 2010). More importantly, many studies have shown that self-rated health is not only a commonly used, but also, a valid predictor of the actual health status (Idler & Benyamini, 1997;

Snead, 2014). Additionally, measuring health from the perspective of the respondents captures also health indicators that are hard to measure by physical measurement (such as pain, suffering, or depression) (McDowell, 2006).

In addition, one could question if the fact that the fieldworkers in the QUALICOPC study were sitting in the waiting room of a GP (practice) could induce an observer-effect, also referred to as the Hawthorne effect in the literature. The knowledge or awareness of being a participant under study or observation may cause GPs to change their behaviour (Polit & Beck, 2010). However, recent research demonstrated that there is little or no effect of GPs' behaviour during consultations when being a participant under study (Goodwin et al., 2017; Paradis & Sutkin, 2017).

Finally, we return to a limitation concerning the included patient population in the QUALICOPC study. For the data collection, only patients sitting in the waiting room of a GP practice were eligible for inclusion in the study. Therefore, our results are only representative for the population visiting GP practices and not for the entire population of a country. Throughout this doctoral dissertation, we focus on accessibility of primary care as one mechanism to tackle inequity in health and health care. However, given this limitation of representativeness, we suspect that the accessibility of primary care in Europe is overestimated, making the problem of access to European health care more pronounced than expected.

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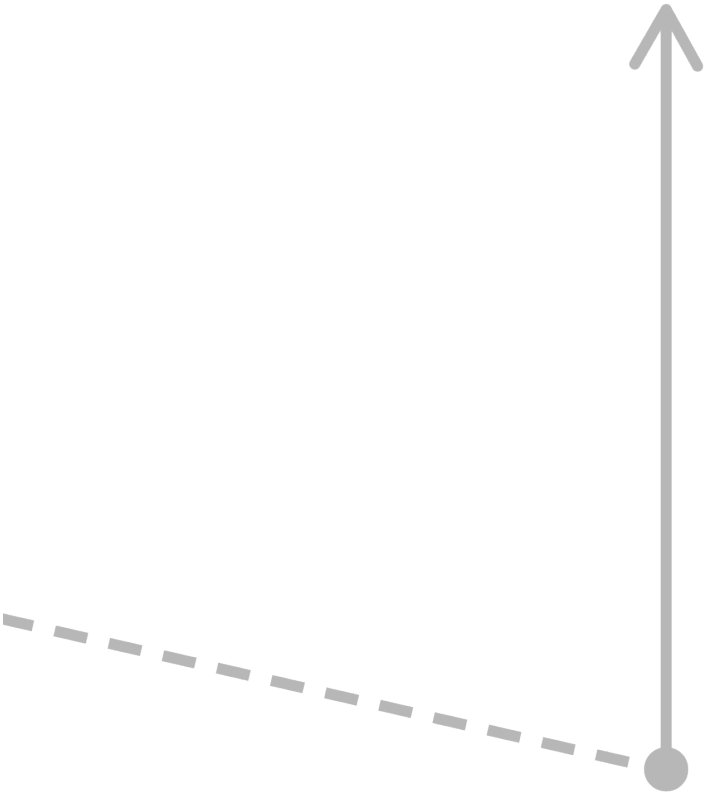
DANKWOORD



DANKWOORD

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Het feit dat ik hier vandaag sta is in zekere zin terug te brengen tot één gesprek in 2007. Toen ik na mijn examenperiode in het eerste jaar Bachelor in de Verpleegkunde de boodschap kreeg dat ik drie vakken moest hernemen, zakte de moed me in de schoenen en schoten de tranen in mijn ogen. Ik zag het niet zitten en wou er gewoon mee stoppen. Toen kwam echter een klein dametje naast me zitten, in de zetel bij mijn oma, en sprak me, liefhebbend maar toch kordaat toe 'Allé, probeer het toch gewoon. Daar heb je niets mee verloren!'. Zonder die woorden had ik mijn Bachelor waarschijnlijk nooit gehaald. En zonder Bachelor geen Master en geen doctoraat. Dankjewel tante Marijke, ik denk nog veel aan dat moment terug en ben er zeker van dat je ook voor anderen een grote houvast bent geweest, bent en zal zijn.

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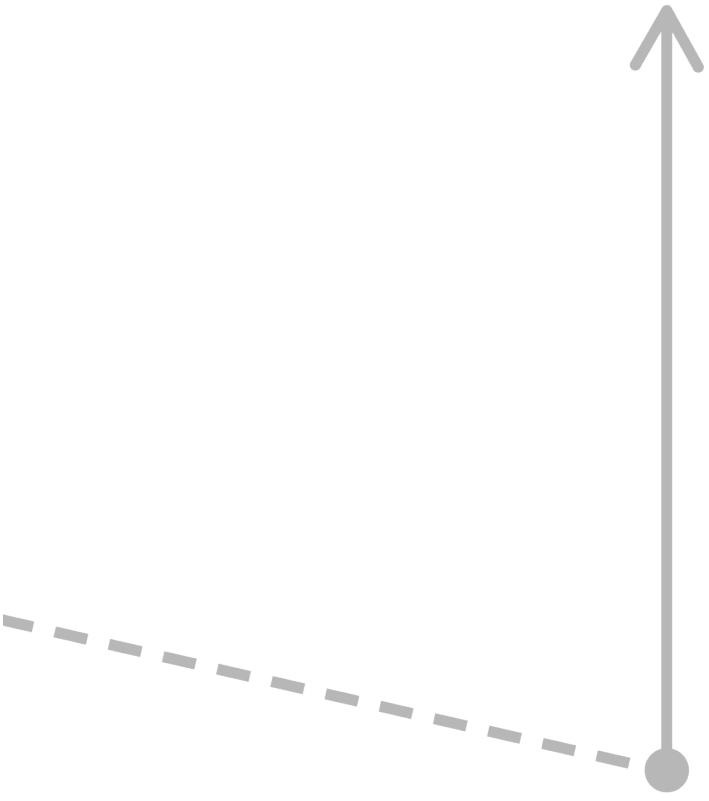
Jens
11 november 2017

CURRICULUM VITAE



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	Advanced Quantitative Techniques Ghent University Docent: prof. dr. John Lievens	2014- 2015
	Train-the-trainer: ICF RIVM Docent: drs. Huib Ten Napel	2014- 2015
	Entrepreneurial education Photography Syntra Mid-Flanders Docent: Joost D'Huyvetters and Tim Luyten	2013- 2016
	Introduction to multilevel analysis Utrecht University Docent: dr. Leoniek Wijngaards – de Meij	07/2013

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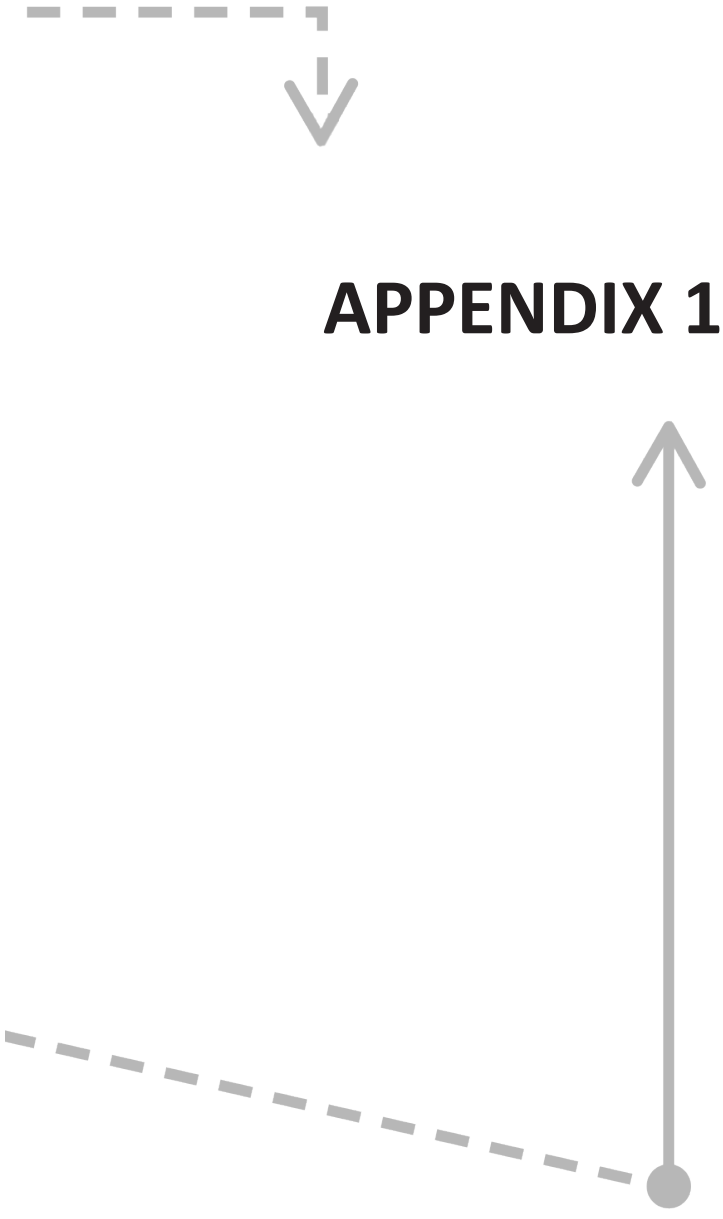
APPENDIX 1



QUALICOPC questionnaires

Appendix A: QUALICOPC questionnaire for general practitioners

Question	Response categories	Source(s)	Theme(s)
1. Are you male or female?	☐ Male ☐ Female	New	BACK
2. What is your year of birth? Please fill in:	Year of birth: 19__	New	BACK
3. Were you born in this country?	☐ Yes ☐ No	New	BACK
4. How would you characterise the place where you are currently practising?	☐ Big (inner)city ☐ Suburbs ☐ (Small) town ☐ Mixed urban–rural ☐ Rural	Ref. 10, Q1.7 to make comparison possible	PRACC
5. What is the (estimated) size of your practice population? (In a joint practice, estimate your share of the population).			
If you do not have a formal list, please estimate the number of people who normally rely on you for primary medical care.	Number of patients: ____	Question and response based on Ref. 10, Q1.12	PRACC
6. To what extent do you think your practice population compares to the average national level with respect to the following categories?	Below average / Average / Above average / Don't know	Question and response based on Ref. 10, Q1.18 but updated (other groups of people)	PRACC
1. Elderly people (over 70 years)	☐ ☐ ☐ ☐		
2. Socially disadvantaged people	☐ ☐ ☐ ☐		
3. Ethnic minority people	☐ ☐ ☐ ☐		
7. To what extent do you think that the patient turnover in your practice compares to other practices in this country?	Below average / Average / Above average / Don't know ☐ ☐ ☐ ☐	New	PRACC
8. How many hours per week do you work as a GP (excluding additional jobs and on-call or out-of-hours services)?	___ hours per week	Response categories based on Ref. 10, Q1.4	EFF
9. How many of these hours do you spend on direct patient care (consultations, home visits, telephone consultations)?	___ hours per week	Based on Ref. 25: combination of a set of Q11–13	EFF
10. How many patient contacts do you have on a normal working day? 1. Face-to-face in your office (number) 2. By telephone 3. By email	___ per day ___ per day ___ per day	Ref. 10, combination of a set Q1.13–1.14+ update (email)	EFF
11. How long does a regular patient consultation in your office usually take?	___ minutes	Based on Ref. 10, Q1.16 but changed (not only appointment system)	EFF

12. In a normal working week, how many patients do you see? 1. At home visits 2. In hospital 3. In homes for the elderly 4. In other institutions or settings	 ___ per week ___ per week ___ per week ___ per week			New	EFF
13. In the past 3 working months (excluding holidays, etc.), how often and for how long did you have on-call duties during evenings, nights and weekends? 1. During evening(s) 2. During night(s) 3. During weekend days	 ___ times; in total ___hours ___ times; in total ___hours ___ times; in total ___hours			Ref. 26	EFF
14. Beside your work as a GP in this practice, do you have any other paid professional activities? (multiple answers possible)	☐ No ☐ Yes, as a physician for privately paying patients ☐ Yes, in a residential setting (e.g. nursing home, prison) ☐ Yes, as a company doctor ☐ Yes, in teaching/medical education ☐ Yes, other			New	WORK
15. As a GP, are you self-employed or in salaried employment?	☐ Salaried employment with centre or authority ☐ Salaried employment with other GP ☐ Self-employed with contract(s) with health service, insurance or authority ☐ Self-employed without contract(s)			Ref. 10, Q1.3 updated	ECON
16. For each of the following components please estimate whether they contribute to your income as a GP, and if so, up to what percentage.	☐ Salary __% ☐ Capitation payments (a fixed sum per patient for a certain period of time) __% ☐ Fee for services from third-party payer __% ☐ Out-of-pocket payments from patients __% ☐ Performance payments (for instance related to targets)__ % ☐ Other sources __%			Ref. 25, Q36 (percentages are new)	ECON
17. Can you receive an extra financial incentive or bonus for:	Yes	No	Don't know	Ref. 8, Q26; Ref. 11, exhibit 6; rephrased and different topics	ECON; EQ
1. Management of patients with diabetes	☐	☐	☐		
2. Management of patients with hypertension	☐	☐	☐		
3. Achievement of targets for screening or prevention	☐	☐	☐		
4. Referral rates below a certain level	☐	☐	☐		
5. Having disadvantaged patients in your practice	☐	☐	☐		
6. Working in a remote area	☐	☐	☐		

18. Do you work alone or in shared accommodation with one or more GPs and/or medical specialists? Please also fill in their number of Full-Time Equivalents (FTEs). (For instance, one doctor working 5 days a week and 1 other doctor working 2.5 days a week makes 1.5 FTEs).	☐ Alone ☐ With __ other GPs in shared accommodation ☐ With __ medical specialist(s) in shared accommodation	FTE (including yourself) counting for ___FTE counting for ___FTE			Ref. 10, Q1.11, FTE added (nowadays many GPs work part-time)	WORK
19. Which of the following disciplines are working in your practice/centre? 1. Receptionist/medical secretary 2. Practice nurse 3. Community/home care nurse 4. Psychiatric nurse 5. Nurse practitioner (function between physician and nurse) 6. Assistant for laboratory work 7. Manager of the centre or practice (not a physician) 8. Midwife 9. Physiotherapist 10. Dentist 11. Pharmacist 12. Social worker	 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				Ref. 10, Q 1.19 & Ref. 25, Q18 (+ some extra disciplines based on expert opinion)	WORK; COOR
20. Do you use clinical guidelines for the treatment of the following?	Guideline Yes	No	Not available		Ref. 8, Q7 with slight adjustments	CONT; QUAL
1. Chronic heart failure	☐	☐	☐			
2. Asthma	☐	☐	☐			
3. COPD	☐	☐	☐			
4. Diabetes	☐	☐	☐			
21. In the past 12 months, have you been involved in a disease management programme for patients with the following chronic conditions? (Such programmes are multidisciplinary approaches across practices, often based on protocols).	Yes		No		New	CONT and COOR; QUAL
1. Chronic heart failure	☐		☐			
2. Asthma	☐		☐			
3. COPD	☐		☐			
4. Diabetes	☐		☐			
22. In the past 12 months, has the following occurred in your practice/centre?	Yes		No		Ref. 25, Q1	CONT; QUAL
1. Feedback on your prescriptions or referrals by health authority or insurer	☐		☐			
2. Feedback from colleague GPs (peer review or practice visitation)	☐		☐			
3. Investigation into the satisfaction of your patients						
23. In cases of referral, who usually decides where the patient is referred to?	☐ I do ☐ The patient does ☐ It is a shared decision				New	CONT; COOR

24. In cases of referral, to what extent do you take into account the following considerations?	Always	Sometimes	Never	New	CONT; COOR
1. The patient's preference where to go	☐	☐	☐		
2. The travel distance for the patient	☐	☐	☐		
3. Your previous experiences with the medical specialist	☐	☐	☐		
4. Comparative performance information on medical specialists	☐	☐	☐		
5. Waiting time for the patient	☐	☐	☐		
6. Costs for the patient	☐	☐	☐		
25. Please tick the equipment used in your practice by yourself or your staff: Laboratory ☐ Haemoglobinometer ☐ Any blood glucose test set ☐ Any cholesterol meter ☐ Blood-cell counter Imaging ☐ Ophthalmoscope ☐ Proctoscope ☐ Otoscope ☐ Gastroscope ☐ Sigmoidoscope ☐ X-ray ☐ Ultrasound for abdomen/fetus ☐ Microscope	Functions ☐ Audiometer ☐ Bicycle ergometer ☐ Eye tonometer ☐ Peak flow/PEF meter ☐ Spirometer ☐ Electrocardiograph ☐ Blood-pressure meter ☐ Infusion set ☐ Doctor's bag for emergencies and home visits Other ☐ Urine catheter ☐ Coagulometer ☐ Set for minor surgery ☐ Suture set ☐ Defibrillator ☐ Disposable syringes ☐ Disposable gloves ☐ Refrigerator for medicines ☐ Resuscitation equipment			Ref. 10, Q1.22 (some small adjustments)	COMPR
26. What access do you have to laboratory facilities?	☐ Within my practice/centre ☐ Easy access outside my practice/centre ☐ Insufficient access			Ref. 10, Q1.23, changed answering categories	COMPR
27. What access do you have to X-ray facilities?	☐ Within my practice/centre ☐ Easy access outside my practice/centre ☐ Insufficient access			Ref. 10, Q1.23, changed answering categories	COMPR
28. What is the distance by road from your (main) practice building to:	In the same building	Less than 10 km	11–20 km	More than 20 km	Ref. 10, Q1.0, changed answering categories	ACCS
1. The nearest GP practice (not in your group or centre)	☐	☐	☐	☐		
2. The nearest consultant/outpatient clinic (independent or part of hospital)	☐	☐	☐	☐		
3. The nearest general or university hospital	☐	☐	☐	☐		
29. How many hours on an average working day is your practice/centre open for patient care (lunch breaks excluded)?	____ hours per working day				New	ACCS

30. Is it possible for your patients to visit your practice/centre: 1. After 18.00 h (at least once per week) 2. On a weekend day (at least once per month)	 ☐ Yes ☐ No ☐ Yes ☐ No	Ref. 27, Q20, slightly different wording	ACCS
31. During evenings and nights on weekdays, what access do your patients have to (non-emergency) medical services?	☐ Not applicable (I am always available for my patients) ☐ I am available on a rota basis with a group of GPs ☐ I am not available, but other GPs are available (on a rota basis) ☐ Other physicians (not GPs) provide out-of-hours care ☐ Other arrangements are available	New, but answering categories derived from Ref. 10, Q1.21	ACCS
32. On Saturdays and Sundays, what access do your patients have to (non-emergency) medical services?	☐ Not applicable (I am always available for my patients) ☐ I am available on a rota basis with a group of GPs ☐ I am not available, but other GPs are available (on a rota basis) ☐ Other physicians (not GPs) provide out-of-hours care ☐ Other arrangements are available	New, but answering categories derived from Ref. 10, Q1.21	ACCS
33. What percentage of your patient consultations are by appointment?	About _____%	Ref. 27, Q21	ACCS
34. Do you offer a walk-in hour?	☐ Yes ☐ No	New	ACCS
35. In the past 12 months, have you ever done the following to reduce financial obstacles to disadvantaged patients? 1. Provide free samples of medication 2. Prescribe the cheapest equivalent medicine 3. Not charge the patient (e.g. for co-payments)	 ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	New	EQ; ACCS; ECON
36. In the past 12 months, how often have you noticed that patients delayed their visits for financial reasons?	☐ Frequently ☐ Occasionally ☐ Never	New	EQ; ACCS; ECON
37. If new patients enter your practice, do you receive their medical records from their previous doctor?	☐ Yes, always or usually ☐ Only occasionally ☐ Rarely or never	New	COOR; CONT
38. Which restrictions do you apply to accepting new patients? (More than one answer can be given)	☐ No restrictions (everyone is accepted) ☐ No new patients are taken above a maximum number ☐ No new patients are taken above a certain age ☐ No new patients are taken outside my geographical working area ☐ I use a wait period for new patients ☐ Acceptance depends on patient's medical history ☐ Acceptance depends on patient's insurance status	Question based on Ref. 28, Q1 Different wording and answering categories	EQ (AC)

39. Do you provide health care to people when you are not remunerated for this (for instance uninsured, illegal immigrants)?	☐ Yes, (almost) always ☐ Yes, but only in urgent cases ☐ Yes, sometimes ☐ No ☐ No such people show up in my practice ☐ Not applicable (in this country such care is remunerated)	New but topic based on Ref. 13, Q other1	EQ (AC)
40. Do your medical files normally include the following information? (Tick all that apply)	☐ Living situation ☐ Ethnicity ☐ Patient's family history (e.g. depression, cancer) ☐ Patient's weight and height ☐ Smoking ☐ Blood pressure ☐ Reason for encounter ☐ Diagnosis ☐ Prescribed medications ☐ Test results	New	CONT
41. How do you keep patient medical records? (tick all that apply)	☐ I keep records except for minor or trivial complaints ☐ I only keep records of regularly attending patients ☐ I keep records unless I am too busy ☐ I keep records routinely of all patient contacts ☐ Don't know	Ref. 27, Q28, wording slightly adjusted	CONT
42. In the past 2 years, have you used your medical record system to list a selection of patients on the basis of age, diagnosis or risk? (tick all that apply)	☐ No ☐ Yes, by age (e.g. those above age 50) ☐ Yes, by diagnosis or health risk (e.g. diabetes or hypertension) ☐ Yes, by medications they take (e.g. patients on multiple medications) ☐ Yes, to send reminders for prevention or follow-up	Based on Ref. 12, Q18, but with different answering categories and different wording	CONT
43. For which of the following purposes do you use a computer in your practice? (tick all that apply)	☐ Not applicable (I don't use a computer) ☐ Making appointments ☐ Issuing invoices ☐ Issuing drug prescriptions ☐ Keeping records of consultations ☐ Sending referral letters to medical specialists ☐ Storing diagnostic test results ☐ Searching medical information on the Internet ☐ Sending prescriptions to the pharmacy	Ref. 27, Q29, wording slightly adjusted	CONT; COOR

44. How often do you meet face to face with the following professionals (either professionally or socially)?	Seldom or never	Every 1–3 months	More than once a month	Combination of Ref. 10, Q1.20 and Ref. 27, Q41, extra disciplines added	COOR
1. Other GP	☐	☐	☐		
2. Practice nurse	☐	☐	☐		
3. Ambulatory medical specialist	☐	☐	☐		
4. Hospital medical specialist	☐	☐	☐		
5. Pharmacist	☐	☐	☐		
6. Home care nurse	☐	☐	☐		
7. Midwife	☐	☐	☐		
8. Physiotherapist	☐	☐	☐		
9. Social worker	☐	☐	☐		
10. Dietitian	☐	☐	☐		
45. How often do you ask for advice (e.g. by telephone) from the following medical specialists?	Seldom or never	Every 1–3 months	More than once a month	Ref. 27, Q42, extra disciplines added	COOR
1. Paediatrician	☐	☐	☐		
2. Internist	☐	☐	☐		
3. Gynaecologist	☐	☐	☐		
4. Surgeon	☐	☐	☐		
5. Neurologist	☐	☐	☐		
6. Dermatologist	☐	☐	☐		
7. Geriatrician	☐	☐	☐		
8. Psychiatrist/mental health professional	☐	☐	☐		
9. Radiologist	☐	☐	☐		
46. Does your practice nurse or assistant independently provide:	☐ Not applicable (no nurse in my practice)			New	COOR
1. Immunisation	☐ Yes ☐ No				
2. Health promotion (e.g. giving lifestyle or smoking cessation advice)	☐ Yes ☐ No				
3. Routine checks of chronically ill patients (e.g. those with diabetes)	☐ Yes ☐ No				
4. Minor procedures (e.g. ear syringing, wound treatment)	☐ Yes ☐ No				
47. To what extent do you use referral letters (including details on provisional diagnosis and possible test results) when you refer patients to a medical specialist?	I use letters: ☐ for all patients that I refer ☐ for most patients that I refer ☐ for a minority of patients that I refer ☐ seldom or never			Ref. 27, Q31, slightly different wording	COOR
48. To what extent do medical specialists inform you after they have finished the treatment or diagnostics of your patients?	☐ (Almost) always ☐ Usually ☐ Occasionally ☐ Seldom or never			Ref. 27, Q32, wording changed	COOR
49. After a patient has been discharged, how long does it usually take to receive a (summary) discharge report from the hospital most frequented by him or her?	☐ 1–4 days ☐ 5–14 days ☐ 15–30 days ☐ More than 30 days ☐ I rarely or never receive a discharge report			Ref. 27, Q33, wording slightly changed	CONT; COOR

50. For the following health problems, to what extent will patients in your practice population (people who normally apply to you for primary medical care) contact you as the first health care provider? (This is only about the first contact, not about further diagnosis or treatment.)	(Almost) always	Usually	Occa-sionally	Seldom/ never	Ref. 10, Q3 First contact, several items removed	COMPR
1. Child with severe cough	☐	☐	☐	☐		
2. Child aged 8 with hearing problem	☐	☐	☐	☐		
3. Woman aged 18 asking for oral contraception	☐	☐	☐	☐		
4. Man aged 24 with stomach pain	☐	☐	☐	☐		
5. Man aged 45 with chest pain	☐	☐	☐	☐		
6. Woman aged 50 with a lump in her breast	☐	☐	☐	☐		
7. Woman aged 60 with deteriorating vision	☐	☐	☐	☐		
8. Woman aged 60 with polyuria	☐	☐	☐	☐		
9. Woman aged 60 with acute symptoms of paralysis/paresis	☐	☐	☐	☐		
10. Man aged 70 with joint pain	☐	☐	☐	☐		
11. Woman aged 75 with moderate memory problems	☐	☐	☐	☐		
12. Man aged 35 with sprained ankle	☐	☐	☐	☐		
13. Man aged 28 with a first convulsion	☐	☐	☐	☐		
14. Anxious man aged 45	☐	☐	☐	☐		
15. Physically abused child aged 13	☐	☐	☐	☐		
16. Couple with relationship problems	☐	☐	☐	☐		
17. Woman aged 50 with psychosocial problems	☐	☐	☐	☐		
18. Man aged 32 with sexual problems	☐	☐	☐	☐		
19. Man aged 52 with alcohol addiction problems	☐	☐	☐	☐		

51. To what extent are you involved in the treatment and follow-up of patients in your practice population with the following diagnoses ('practice population' means people who normally apply to you for primary medical care)?	(Almost) always	Usually	Occa-sionally	Seldom/ never	Ref. 10, Q5 Disease management, several items removed	COMPR
1. Chronic bronchitis/COPD	☐	☐	☐	☐		
2. Hordeolum (stye)	☐	☐	☐	☐		
3. Peptic ulcer	☐	☐	☐	☐		
4. Herniated disc lesion	☐	☐	☐	☐		
5. Congestive heart failure	☐	☐	☐	☐		
6. Pneumonia	☐	☐	☐	☐		
7. Peritonsillar abscess	☐	☐	☐	☐		
8. Parkinson's disease	☐	☐	☐	☐		
9. Uncomplicated diabetes (type 2)	☐	☐	☐	☐		
10. Rheumatoid arthritis	☐	☐	☐	☐		
11. Depression	☐	☐	☐	☐		
12. Myocardial infarction	☐	☐	☐	☐		

52. To what extent are the following activities carried out in your practice population by you (or your staff) and not by a medical specialist? (Practice population means people normally applying to you for primary medical care.) For example, if fundoscopy is (almost) always done by you, tick that box.	(Almost) always	Usually	Occa-sionally	Seldom/ Never	Ref. 10, Q2, application of medical techniques, several items removed	COMPR
1. Wedge resection of ingrown toenail	☐	☐	☐	☐		
2. Removal of sebaceous cyst from the hairy scalp	☐	☐	☐	☐		
3. Wound suturing	☐	☐	☐	☐		
4. Excision of warts	☐	☐	☐	☐		
5. Insertion of IUD	☐	☐	☐	☐		
6. Fundoscopy	☐	☐	☐	☐		
7 Joint injection	☐	☐	☐	☐		
8. Strapping an ankle	☐	☐	☐	☐		
9. Cryotherapy (for warts)	☐	☐	☐	☐		
10. Setting up an intravenous infusion	☐	☐	☐	☐		
53. When do you, or your staff, measure blood pressure? (more than one answer can be given)	☐ In connection with relevant clinical conditions ☐ On request ☐ Routinely in office contacts with adults (regardless of the reason for visit) ☐ In adults invited for this purpose				Ref. 10, Q4.1, slightly changed	COMPR
54. When do you, or your staff, measure blood cholesterol level? (more than one answer can be given)	☐ In connection with relevant clinical conditions ☐ On request ☐ Routinely in office contacts with adults (regardless of the reason for visit) ☐ In adults invited for this purpose ☐ No such measures				Ref. 10, Q4.2, slightly changed	COMPR
55. To what extent are you involved in health education on the following topics? (more than one answer can be given)	Not involved	In connection with normal patient contacts	In group sessions or special pro-grammes		Ref. 10, Q4.5, item 4 added and wording slightly changed	COMPR
1. Smoking	☐	☐	☐			
2. Diet	☐	☐	☐			
3. Problematic use of alcohol	☐	☐	☐			
4. Physical exercise	☐	☐	☐			
56. Are you or your practice staff involved in the following activities?	Involved	Not involved			Ref. 10, Q4.6, activities removed and two added	COMPR
1. Routine antenatal care	☐	☐				
2. Immunisation of children (as part of a programme)	☐	☐				
3. Paediatric surveillance of children under 4 years	☐	☐				
4. Influenza vaccination (as part of a programme)	☐	☐				
5. Palliative care	☐	☐				

57. During the past 12 months, have you offered special session(s) or clinics for the following groups?		Yes	No			Ref. 27, Q23, wording and answer categories changed	COMPR
1. Diabetic patients		☐	☐				
2. Hypertensive patients		☐	☐				
3. Pregnant women		☐	☐				
4. Elderly		☐	☐				
58. If you were confronted through your patient contacts with the following occurrences, would you report this (for instance to an authority)?	Yes	Probably yes	Probably not	No	Don't know	New, community responsibility	COMPR
1. Repeated accidents in an industrial setting	☐	☐	☐	☐	☐		
2. Frequent respiratory problems in patients living near a certain industry	☐	☐	☐	☐	☐		
3. Repeated cases of food poisoning among people living in a certain district	☐	☐	☐	☐	☐		
59. In the past 12 months, about how many weeks altogether have you been away from the practice due to:						Ref. 29, Q13b, different wording, categories	EFF
1. Attending conferences or other educational activities		___ weeks					
2. Research activities		___ weeks					
3. Vacations		___ weeks					
4. Illness		___ weeks					
60. To what extent do you agree with the following statements?		Strongly agree	Agree	Disagree	Strongly disagree	Ref. 10, Q6, job satisfaction, slightly changed	WORK
1. I feel that some parts of my work do not really make sense		☐	☐	☐	☐		
2. My work still interests me as much as it ever did		☐	☐	☐	☐		
3. My work is overloaded with unnecessary administrative detail		☐	☐	☐	☐		
4. I have too much stress in my current job		☐	☐	☐	☐		
5. Being a GP is a well-respected job		☐	☐	☐	☐		
6. In my work there is a good balance between effort and reward		☐	☐	☐	☐		

BACK, background; PRACC, practice characteristics; ECON, economic conditions; WORK, workforce; ACCS, accessibility; CONT, continuity; COOR, coordination; COMP, comprehensiveness; EFF, efficiency; EQ (AC) and (TR). equity in access and treatment.

Appendix B : QUALICOPC questionnaire for patients (Experiences)

Question	Response categories	Source(s)	Theme(s)
1. How would you describe your own health in general?	☐ Very good ☐ Good ☐ Fair ☐ Poor	Ref. 30, wording changed	BACK
2. Do you have a longstanding disease or condition such as high blood pressure, diabetes, depression, asthma or another longstanding condition?	☐ Yes ☐ No	New	BACK
3. Do you have your own doctor (for instance a GP) whom you normally consult first with a health problem?	☐ Yes, the doctor I just visited ☐ Yes, but another doctor in this practice or centre ☐ Yes, but another doctor from somewhere else ☐ No, I do not have my own doctor	New, but topic derived from Ref. 16, Q507	BACK
4. In the last 6 months, how often have you visited or consulted a GP (this GP or another one)?	☐ This was the first time in the past 6 months ☐ Once before this visit ☐ 2 to 4 times before this visit ☐ 5 times or more before this visit ☐ Don't know	Ref. 31, Q3; Ref. 14, Q2; Ref. 16, Q500	BACK
5. What was the main reason for your visit to this GP today? (More than one answer can be given)	☐ Because you were ill or didn't feel well ☐ For a medical check-up ☐ To get a repeat prescription ☐ To get a referral ☐ To get a medical certificate ☐ For a second opinion ☐ Other reason	Topic derived from Ref. 32, Q4 (very different wording)	BACK
6. Think about the consultation that you just finished. Do you agree with the following?	Yes / No	Ref. 27, Q22	CONT
6.1. The doctor had my medical records at hand	☐ / ☐		
6.2. The doctor was polite	☐ / ☐	New	QUAL
6.3. The doctor listened carefully to me	☐ / ☐	Ref. 31, Q10; Ref. 15, Q5(topic)	QUAL
6.4. The doctor hardly looked at me when we talked	☐ / ☐	Ref. 33, Q3 (topic)	QUAL
6.5. The doctor asked questions about my health problem	☐ / ☐	New	QUAL
6.6. I couldn't really understand what the doctor was trying to explain	☐ / ☐	Ref. 34, Q14; Ref. 17, Q14; Ref. 31, Q9 (topic); Ref. 14, Q30; Ref. 27, Q22; Ref. 21, QD3 (topic)	QUAL

6.7. The doctor took sufficient time	☐	☐		Ref. 14, Q42; Ref. 15, Q1; Ref. 14, Q32	ACCS
6.8. The doctor involved me in making decisions about treatment	☐	☐		Ref. 15, Q4; Ref. 35, Q10d ; Ref. 14,Q66	AUTN
6.9. I would recommend this doctor to a friend or relative	☐	☐		Ref. 21, QK2	QUAL
6.10. The doctor asked about possible other problems besides the one I just came for	☐	☐		New	QUAL
7. If you were to need an interpreter to help you speak with a doctor in this practice, is such a service available?	☐ I never need an interpreter ☐ Yes, it is always available ☐ Yes, it is usually available ☐ No, it is insufficiently or not available ☐ Don't know			Ref. 17, Q57	EQ (AC)
8. Think about the doctor you visited today. Do you agree with the following?	Yes	No	Don't know	Ref. 31, Q12; Ref. 34, Q18	CONT
8.1. He/she knows important information about my medical background	☐	☐	☐		
8.2. He/ she knows about my living situation	☐	☐	☐	Ref. 27, Q22	CONT
8.3. This doctor doesn't just deal with medical problems but can also help with personal problems and worries	☐	☐	☐	Ref. 15, Q2 ; Ref. 36, ; Ref. 14, Q25	QUAL
8.4. After this visit, I feel I can cope better with my health problem/illness than before	☐	☐	☐	Ref. 37, (topic)	QUAL
9. In the past 12 months, has a GP from this practice talked to you about how to stay healthy? (for instance about diet, alcohol or smoking)	☐ Yes ☐ No ☐ Don't know			Ref. 14;21, QH1 Ref. 14, Q40	COMPR
10. In the past 2 years, has a GP from this practice ever asked you about all the medications you take (also those prescribed by other doctors)?	☐ Yes ☐ No ☐ Don't know			Ref. 18, Q625	CONT
11. Think about the practice that you visited today. Do you agree with the following?	Yes	No	Don't know		
11.1. The opening hours are too restricted	☐	☐	☐	Ref. 27, Q20	ACCS
11.2. If I need a home visit I can get one	☐	☐	☐	Ref. 27, Q22	ACCS
11.3. The practice is too far away from where I am living or working	☐	☐	☐	Ref. 33, Q33	ACCS
11.4. When I called this practice, I had to wait too long to speak to someone	☐	☐	☐	Ref. 14, Q5	ACCS
11.5. I know how to get evening, night and weekend services	☐	☐	☐	Ref. 27, Q20	ACCS
11.6. People were polite and helpful at the reception desk	☐	☐	☐	Ref. 34, Q24	QUAL
12. How long does it usually take you to travel from your home to this practice?	☐ Less than 20 minutes ☐ 20–40 minutes ☐ 40–60 minutes ☐ More than 1 hour ☐ Don't know			Ref. 27, Q19	ACCS

13. Did you make an appointment for this visit to your doctor?	☐ Yes ☐ No → Go to Question 16			Ref. 27 (topic)	ACCS
14. Was it is easy to get the appointment?	☐ Yes ☐ No			Ref. 21, QC8 (topic)	ACCS
15. How many days did you wait for this visit?	☐ I made the appointment earlier today ☐ I made the appointment yesterday ☐ I waited 2–7 days ☐ I waited more than a week ☐ Don't know			Ref. 27, Q23	ACCS
16. How long did you wait today between arriving in the practice and the consultation?	☐ Less than 15 minutes ☐ 15–30 minutes ☐ 30–45 minutes ☐ 45–60 minutes ☐ More than an hour ☐ Don't know			Ref. 27, Q26; Ref. 21, QC9 (topic)	ACCS
17. Do you think it is too difficult to see a GP during evenings, nights and weekends?	☐ Yes ☐ No ☐ Don't know			Ref. 18, Q510	ACCS
18. In the past 12 months, has one of the following happened to you in this practice?	Yes	No	Don't know		
18.1. The doctor or staff acted negatively to you	☐	☐	☐	Ref. 19, Q41.2	EQ (TR)
18.2. Other patients were treated better than you	☐	☐	☐	Ref. 19, Q41.4	EQ (TR)
18.3. The doctor was too much concerned about money	☐	☐	☐	Ref. 19, Q41.11	EQ (TR)
18.4. The doctor or staff showed disrespect because of your ethnic background	☐	☐	☐	Ref. 19, Q40; Ref. 17, Q33c	EQ (TR)
18.5. The doctor or staff showed disrespect because of your gender	☐	☐	☐	Ref. 19, Q40	EQ (TR)
19. In the past 12 months, have you ever had the following experiences in this practice?	Yes	No	Don't know		
19.1. I thought tests or examinations were repeated unnecessarily	☐	☐	☐	Ref. 38, Q5	COOR
19.2. I thought I got the wrong medication or wrong dose	☐	☐	☐	Ref. 16–18,	QUAL
19.3. I thought I got incorrect results of a test or X-ray	☐	☐	☐	Ref. 17, Q38a rephrased	QUAL
20. If you are unhappy with the treatment you received, do you think this doctor would be prepared to discuss it with you?	☐ Yes ☐ No ☐ Don't know			Ref. 14, Q45 rephrased	QUAL
21. In the past 12 months, did you postpone or abstain from a visit to this doctor or another GP when you needed one?	☐ Yes ☐ No → Go to Question 23			Ref. 19, Q10 rephrased	EQ (AC)
22. What was the most important reason why you did not visit a GP? (more than one answer can be given)	☐ I did not have insurance ☐ Other financial reasons ☐ I could not get there (physically) ☐ I was too busy ☐ Other reason			Ref. 19, Q11 rephrased and items added	EQ (AC)

23. How many times in the past 12 months have you consulted a medical specialist for yourself?	☐ None ☐ Once or twice ☐ 3 to 5 times ☐ 6 to 10 times ☐ More than 10 times				New	BACK
24. Do you agree with the following statements?	Yes	No	Don't know	Not applicable		
24.1. If I visit another GP besides my own GP, he/she has the necessary information about me	☐	☐	☐	☐	Ref. 27, Q25 rephrased	COOR/ CONT
24.2. When I am referred, my GP informs the medical specialist about my illness	☐	☐	☐	☐	Ref. 27, Q25 rephrased	COOR
24.3. When I am referred, my GP decides to whom I should go	☐	☐	☐	☐	New	AUTN
24.4. After treatment by a medical specialist, my GP knows the results	☐	☐	☐	☐	Ref. 27, Q25 rephrased	COOR/ CONT
24.5. It is difficult to get a referral to a medical specialist from my GP	☐	☐	☐	☐	New	COOR/ ACCS
25. In the last 12 months, how often did you visit a hospital emergency department for yourself?	☐ Never → Go to Question 27 ☐ 1 time ☐ 2 or 3 times ☐ 4 or more times				Ref. 18, Q750 Topic	BACK
26. Why did you go to the emergency department instead of going to a GP? (more than one answer can be given)	☐ I had something GPs do not treat ☐ There was no GP available ☐ For financial reasons ☐ At the emergency department I expected a shorter waiting time ☐ The emergency department provides better care ☐ The emergency department is more convenient to reach ☐ Other reason(s)				Ref. 18, Q750 Topic	ACCS
27. In the past 12 months, have you been examined or treated by a nurse at your GP's practice?	☐ Yes ☐ No ☐ Don't know				Ref. 39, QD1 rephrased	COOR

28. Would most people visit a GP for the following?	Yes	Probably yes	Probably not	No	Don't know	Ref. 21, Reprashed, different items	COMPR
28.1. Cut finger that needs to be stitched	☐	☐	☐	☐	☐		
28.2. Removal of a wart	☐	☐	☐	☐	☐		
28.3. Routine health checks	☐	☐	☐	☐	☐		
28.4. Deteriorated vision	☐	☐	☐	☐	☐		
28.5. Help to quit smoking	☐	☐	☐	☐	☐		
28.6. A child with a severe cough	☐	☐	☐	☐	☐		
28.7. Stomach pain	☐	☐	☐	☐	☐		
28.8. Blood in the stool	☐	☐	☐	☐	☐		
28.9. Sprained ankle	☐	☐	☐	☐	☐		
28.10. Anxiety	☐	☐	☐	☐	☐		
28.11. Domestic violence	☐	☐	☐	☐	☐		
28.12. Sexual problems	☐	☐	☐	☐	☐		
28.13. Relationship problems	☐	☐	☐	☐	☐		
28.14. Advice for choosing the best hospital or specialist for a certain treatment	☐	☐	☐	☐	☐		

29. How important would it be for you to see a doctor if you had:	Extremely important	Rather important	Somewhat important	Not important	Ref. 40,	AHOSP
29.1.Weight loss of more than 2 kilograms in a month when not dieting	☐	☐	☐	☐		
29.2. Shortness of breath with light exercise or light work	☐	☐	☐	☐		
29.3. Chest pain when exercising	☐	☐	☐	☐		
29.4. Loss of consciousness, fainting or passing out	☐	☐	☐	☐		
29.5. Headache for more than one day	☐	☐	☐	☐		
29.6. Abdominal pain for more than one day	☐	☐	☐	☐		
29.7. Severe worries for more than a month	☐	☐	☐	☐		

30. Would you expect to benefit from a GP visit for:	Yes	No	Don't know	Ref. 41	AHOSP
30.1. Stomach problems	☐	☐	☐		
30.2. Shoulder and neck pain	☐	☐	☐		
30.3. Feeling nervous	☐	☐	☐		
30.4. Diarrhoea	☐	☐	☐		
30.5. Sore throat	☐	☐	☐		
30.6. Headache	☐	☐	☐		
30.7. Feeling tired	☐	☐	☐		
30.8. Flu	☐	☐	☐		
30.9. Feeling nauseous	☐	☐	☐		

31. Do you agree with the following statements?	Strongly agree	Agree	Disagree	Strongly disagree	New	BACK
1. In general, doctors can be trusted	☐	☐	☐	☐		
2. In general, people can be trusted	☐	☐	☐	☐		

Finally, we would like to ask you some questions about your personal background

32. Are you male or female?	☐ Male ☐ Female	New	BACK
33. What is your year of birth? Please fill in:	Year of birth: 19__	New	BACK
34. Where were you born?	☐ In this country ☐ In another EU country ☐ In a European country outside the EU ☐ In North America, Australia or New Zealand ☐ In another country	New	BACK
35. Where was your mother born?	☐ In this country ☐ In another EU country ☐ In a European country outside the EU ☐ In North America, Australia or New Zealand ☐ In another country	New	BACK
36. Are there other adults in your household (including children older than 18)?	☐ Yes ☐ No	New	BACK

37. Are there any children (under 18) in your household?	☐ Yes ☐ No	New	BACK
38. How would you describe your current occupation or employment status? (more than one answer can be given)	☐ Employed (including civil service) ☐ Self-employed or family business ☐ Student ☐ Looking for a job (unemployed) ☐ Unable to work due to illness or disability ☐ Retired ☐ Mainly homemaker (including looking after children, etc.)	New	BACK
39. What is the highest level of education that you achieved?	☐ No qualifications/pre-primary education or primary education or lower secondary education ☐ Upper secondary education ☐ Post-secondary, non-tertiary education or higher	Ref. 42	BACK
40. How well do you speak an official language of this country [fill in language(s)]?	☐ Fluently/native speaker level ☐ Sufficiently ☐ Moderately ☐ Poorly ☐ Not at all	New	BACK
41. Compared with the average in this country, would you say your household's income is:	☐ Below average ☐ Around average ☐ Above average	Ref. 20, Q140, rephrased and less categories	BACK

BACK, background; ACCS, accessibility; CONT, continuity; COOR, coordination; COMP, comprehensiveness; QUAL, quality; EQ (AC) and (TR), equity in access and treatment; AUTN, patient autonomy; AHOSP, avoidable hospitalisation.

Appendix C : Patient Values Questionnaire

Question	Response categories				Source(s)	Theme(s)
1. How would you describe your own health in general?	☐ Very good ☐ Good ☐ Fair ☐ Poor				Ref. 30, wording changed	BACK
2. Do you have a longstanding disease or condition such as high blood pressure, diabetes, depression, asthma or another longstanding condition?	☐ Yes ☐ No				New	BACK
3. How important are the following to you?	Not important	Somewhat important	Important	Very important	*Weighing Patient Experiences*	
1. That this doctor has my medical records at hand	☐	☐	☐	☐	6.1	CONT
2. That this doctor is polite	☐	☐	☐	☐	6.2	QUAL
3. That this doctor asks questions about my health problem	☐	☐	☐	☐	6.5	QUAL
4. That I understand clearly what this doctor explains	☐	☐	☐	☐	6.6	QUAL
5. That this doctor involves me in making decisions about treatment	☐	☐	☐	☐	6.8	AUTN
6. That this doctor asks about possible other problems besides the one I came for	☐	☐	☐	☐	6.10	QUAL
7. That people at the reception desk are polite and helpful	☐	☐	☐	☐	11.6	QUAL
4. How important are the following to you?	Not important	Somewhat important	Important	Very important	*Weiging Patient Experiences*	
1. That this doctor knows important information about my medical background	☐	☐	☐	☐	8.1	CONT
2. That this doctor knows about my living situation	☐	☐	☐	☐	8.2	CONT
3. That I feel able to cope better with my health problem/illness after this visit	☐	☐	☐	☐	8.4	QUAL
5. How important are the following to you?	Not important	Somewhat important	Important	Very important	*Weiging Patient Experiences*	
1. That this practice has extensive opening hours	☐	☐	☐	☐	11.1	ACCS
2. That I can get an appointment easily at this practice	☐	☐	☐	☐	13	ACCS
3. That I know how to get evening, night and weekend services	☐	☐	☐	☐	11.5	ACCS
4. That this practice is close to where I live or work	☐	☐	☐	☐	12	ACCS
5. That I have a short waiting time on the phone when I call this practice	☐	☐	☐	☐	11.4	ACCS

6. How important are the following to you?	Not important	Somewhat important	Important	Very important	Ref. 23	QUAL
Before the consultation with your GP						
1. That I don't need to tell a receptionist or nurse about details of my health problem before seeing my doctor	☐	☐	☐	☐		
2. That the doctor has prepared for the consultation by reading my medical notes	☐	☐	☐	☐		
3. That I have prepared for the consultation by keeping a symptom diary or preparing questions	☐	☐	☐	☐		
4. That I can bring a family member/ friend to the consultation if I think this is useful	☐	☐	☐	☐		
5. That I know which doctor I will see	☐	☐	☐	☐		
6. That I keep to my appointment	☐	☐	☐	☐		
7. From the above-mentioned 6 items, which one do you find the most important one?	Most important is item number: ___ (fill in)					

7. How important are the following to you?	Not important	Somewhat important	Important	Very important	Ref. 23	QUAL
During the consultation with your GP						
1. That the doctor makes me feel welcome by making eye contact	☐	☐	☐	☐		
2. That the doctor listens attentively	☐	☐	☐	☐		
3. That the doctor does not make me feel under time pressure	☐	☐	☐	☐		
4. That the doctor is aware of my personal, social and cultural background	☐	☐	☐	☐		
5. That the doctor is not prejudiced because of my age, gender, religion or cultural background	☐	☐	☐	☐		
6. That the doctor treats me as a person and not just as a medical problem	☐	☐	☐	☐		
7. That the doctor is respectful during physical examination and by not interrupting me	☐	☐	☐	☐		
8. That the doctor takes me seriously	☐	☐	☐	☐		
9. That the doctor understands me	☐	☐	☐	☐		
10. That the doctor asks me if I have any questions	☐	☐	☐	☐		
11. That the doctor asks if I have understood everything	☐	☐	☐	☐		
12. That the doctor knows when to refer me to a medical specialist	☐	☐	☐	☐		
13. That the doctor asks how I prefer to be treated	☐	☐	☐	☐		
14. From the above-mentioned 13 items, which one do you find the most important one?	Most important is item number: ___ (fill in)					

8. How important are the following to you? During the consultation with your GP	Not important	Somewhat important	Important	Very important	Ref. 23	QUAL
1. That the doctor avoids disturbances of the consultation by telephone calls, etc.	☐	☐	☐	☐		
2. That the doctor gives me additional information about my health problem, e.g. leaflets	☐	☐	☐	☐		
3. That the doctor informs me about reliable sources of information, e.g. websites	☐	☐	☐	☐		
4. That I tell the doctor what I want to discuss in this consultation	☐	☐	☐	☐		
5. That I am prepared to ask questions and take notes	☐	☐	☐	☐		
6. That I am honest and do not feel embarrassed to talk about my health problem	☐	☐	☐	☐		
7. That I am open about my use of other treatments, such as self-medication or alternative medicine	☐	☐	☐	☐		
8. That psychosocial issues (e.g. personal worries) can be discussed if needed	☐	☐	☐	☐		
9. From the above-mentioned 8 items, which one do you find the most important one?	Most important is item number: ___ (fill in)					

9. How important are the following to you? After the consultation with your GP	Not important	Somewhat important	Important	Very important	Ref. 23	QUAL
1. That the doctor gives me all the test results, even if they show no abnormalities	☐	☐	☐	☐		
2. That the doctor offers me telephone or email contact if I have further questions	☐	☐	☐	☐		
3. That the doctor gives me clear instructions on what to do when things go wrong	☐	☐	☐	☐		
4. That I adhere to the agreed treatment plan	☐	☐	☐	☐		
5. That I inform the doctor how the treatment works out	☐	☐	☐	☐		
6. That I can see another doctor if I think it is necessary	☐	☐	☐	☐		
7. From the above-mentioned 6 items, which one do you find the most important one?	Most important is item number: ___ (fill in)					

Finally, we would like to ask you some questions about your personal background

10. Are you male or female?	☐ Male ☐ Female	New	BACK
11. What is your year of birth? Please fill in:	Year of birth: 19__	New	BACK
12. Where were you born?	☐ In this country ☐ In another EU country ☐ In a European country outside the EU ☐ In North America, Australia or New Zealand ☐ In another country	New	BACK
13. Where was your mother born?	☐ In this country ☐ In another EU country ☐ In a European country outside the EU ☐ In North America, Australia or New Zealand ☐ In another country	New	BACK
14. Are there other adults in your household (including children older than 18)?	☐ Yes ☐ No	New	BACK
15. Are there any children (under 18) in your household?	☐ Yes ☐ No	New	BACK
16. How would you describe your current occupation or employment status? (more than one answer can be given)	☐ Employed (including civil service) ☐ Self-employed or family business ☐ Student ☐ Looking for a job (unemployed) ☐ Unable to work due to illness or disability ☐ Retired ☐ Mainly homemaker (including looking after children, etc.)	New	BACK
17. What is the highest level of education that you achieved?	☐ No qualifications obtained/pre-primary education or primary education or lower secondary education ☐ Upper secondary level of education ☐ Post-secondary, non-tertiary education or higher	Ref. 42	BACK
18. How well do you speak an official language of this country [fill in language(s)]?	☐ Fluently/native speaker level ☐ Sufficiently ☐ Moderately ☐ Poorly ☐ Not at all	New	BACK
19. Compared with the average income in this country, would you say your household's income is:	☐ Below average ☐ Around average ☐ Above average	Ref. 20, Q140, rephrased and fewer categories	BACK

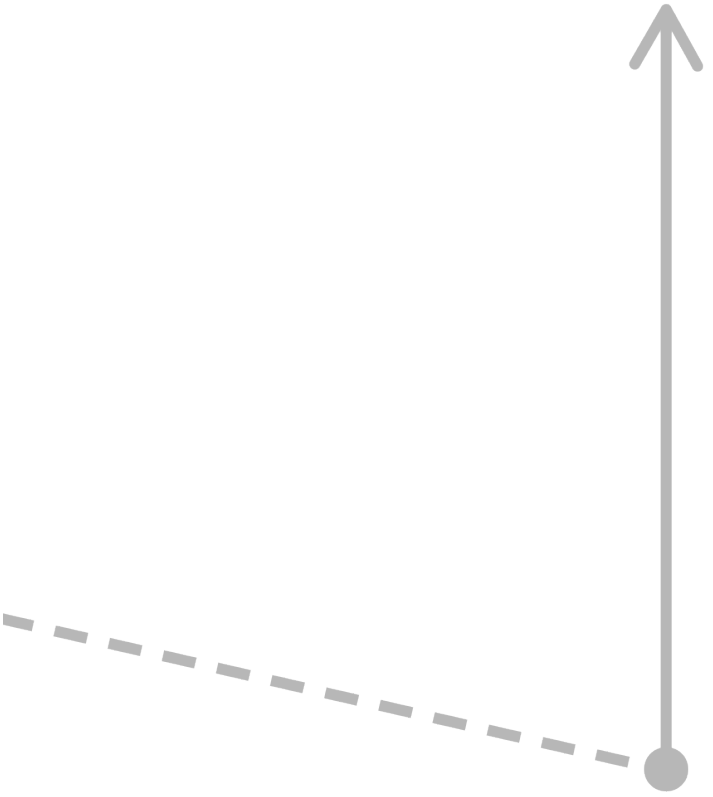
BACK, background; ACCS, accessibility; CONT, continuity; COOR, coordination; COMP, comprehensiveness; QUAL, quality; EQ (AC) and (TR), equity in access and treatment; AUTN, patient autonomy.

Appendix D: Practice questionnaire

Question	Response categories	Source(s)	Theme(s)
1. Total number of patients asked to participate	___ patients	New	Response rate
2. Number of patients who have participated	___ patients	New	Response rate
3. Opening hours are clearly indicated outside	☐ Yes ☐ No	Ref. 24	ACCS
4. Outside it is clearly indicated how to get out-of-hours care	☐ Yes ☐ No	Ref. 24	ACCS
5. The practice has parking space for disabled people	☐ Yes ☐ No	Ref. 24	EQ (AC)
6. Is the practice on the ground floor?	☐ Yes → continue to Question 8 ☐ No	Ref. 24	BACK
7. Is an elevator available for patients?	☐ Yes ☐ No	Ref. 24	EQ (AC)
8. How accessible is the practice for patients using a wheelchair or stroller?	☐ Very easy ☐ Easy ☐ Difficult ☐ Impossible to access	Ref. 24	EQ (AC)
9. Is a toilet available for patients with a disability?	☐ Yes ☐ No	Ref. 24	EQ (AC)
10. How clean does the waiting room look?	☐ Very clean ☐ Fairly clean ☐ Not clean	Ref. 24	QUAL
11. Can people in the waiting room hear what is being said at the reception desk?	☐ Yes ☐ No ☐ Not applicable (no reception desk)	New	QUAL
12. Can people in the waiting room hear or see what happens in the doctor's office?	☐ Yes ☐ No	New	QUAL

BACK, background; ACCS, accessibility; QUAL, quality; EQ (AC) and (TR), equity in access and treatment.

APPENDIX 2



Questionnaire used in Chapter 4.6

Emergency department questionnaire

1. Sex

□ Male
□ Female

2. Birth date

…../…../…….. (for example 01/01/1990)

3. What is your nationality?

□ Belgian
□ Other: ……

What is your country of birth?

□ Belgium
□ Other country: .....

What is the country of birth of your:

FATHER
□ Belgium
□ Other country: .....

MOTHER
□ Belgium
□ Other country: .....

4. How many people, including yourself, are currently part of the household to which you belong. By this we mean all people who live in your home, paying or not.

□ Adults: ...
□ Children: ...

5. You are now at the emergency department. Why have you chosen the emergency department? (you may tick multiple answers)

□ I do not have to wait long here
□ I did not know where else to go with this problem
□ I have already been here
□ I am satisfied with the care that is given here
□ I usually come to the emergency department with my (health) problems
□ My family / friends advised me go to the emergency department
□ I do not have to pay anything during my visit to the emergency department
□ The emergency department was closest to me
□ The emergency department provides the best care
□ Given my medical history ,the emergency department is the best choice for my problem
□ Given the seriousness of my problem, I think the emergency department can give me the best care
□ I have delayed care too long so my problem can only be solved in the emergency department
□ I think that additional studies will be necessary (e.g. X-ray, CAT scan, ultrasound, ...)
□ The emergency room was easily accessible to me (e.g., regular buses or trams)
□ I first called my doctor, but I could not reach him. Reason: ....
□ In my home country, it is customary to go to the emergency department with a (health) problem

□ In my home country, there are no GP's or family physicians and the emergency department is the only place where I can go with a (health) problem
□ Other:……

6.Do you have a regular GP or family physician?
□ Yes, I always go to the same doctor (or within the same general practice)
□ No, I sometimes go to another doctor

7. Have you in the past 12 months, appealed to a doctor or a GP cooperatives on guard duty of the doctors?
□ Yes
□ No
□ I do not know

8. What is your highest degree?

□ No diploma
□ Primary education
□ Lower secondary (1st, 2nd and 3rd secondary or special secondary education)
□ Upper secondary (4th, 5th, 6th and 7th secondary education)
□ Higher education (college and / or university)

9. Do you have a paying job at the moment?

□ Yes, I have a paying job
□ Yes, but suspended (e.g. pregnancy or sick leave)
□ No, I do not have a paying job
□ Retirement
□ Student
□ Other:……

10. To what extent do you feel that your current household income is enough to get by?

□ very easily
□ easily
□ Difficultly
□ Very difficultly

INFORMATION TO BE COMPLETED BY THE INTERVIEWER - HAIO	
Datum	……./……./……
ID-nummer	……
Diagnose	……