ASSESSING CHANGES IN SOCIAL DETERMINANTS OF HEALTH AND HEALTH INEQUALITY

KEHINDE OLUWASEUN OMOTOSO

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Abstract

This thesis broadly investigates the relative changes in socio-economic related health inequalities over the second decade of post-apartheid South Africa. This period is characterised by different policies and reforms, aimed at reducing socio-economic inequalities that pervaded all aspects of life before 1994. By extension, these policies and reforms have also been applied to the health care system. Specifically, policy interventions such as fiscal redistribution directed at key sectors, abolition of user fees for primary health care, and the ongoing discussions related to universal health coverage through yet-to-be-implemented national health insurance have targeted reductions in socio-economic related health inequality. However, evidence from the academic and policy-oriented literature suggests that not much has changed. Health inequality which is strongly linked to inequalities in its social determinants, persist, despite notable policies targeting socio-economic factors. Moreover, existing literature has not identified drivers of change, and, therefore, presents a narrow perspective of health inequality. Hence, it is important to analyse changes in social determinants of health and health inequality over the current post-apartheid period.

This thesis uses data from the nationally representative General Household Surveys (GHS), which started in 2002. After scrutinising the data for consistency and comparability across the years, the thesis profiles trends in health outcomes across a spectrum of socio-demographic factors, using the GHS data covering the years 2004 - 2014. The health variables considered are ill-health status, medical aid coverage, and preference for public or private health care. As there are few obvious patterns in the raw health variables' time series, the analysis, which is descriptive in nature, relies upon both parametric and non-parametric techniques to smooth the time series in order to outline a few general trends. It is found that medical aid coverage and the general population's preference for public health care decreased by 0.2% and 0.1%, per year, respectively, while reports of ill-health status increased by 0.4%, annually. Moreover, the probability that an individual, who is covered by a medical aid scheme, would utilize public health care decreased by about 44%.

Having established changes in the health indicators, the thesis further explores some key socio-economic drivers of these changes. Specifically, the thesis uses information collected on social determinants of health (SDH), and a variety of health indicators in the 2004 and 2014 GHS data, to explain how changes in the SDH have impacted health inequalities over that decade. Using the Oaxaca-Blinder decomposition of change in a concentration index, the thesis

finds that rising inequalities in ill-health are largely explained by changes in the composition of those residing in urban areas and in relatively richer provinces. Meanwhile, rising inequality in medical aid coverage and the utilisation of private health care are attributable to changes in educational attainment and racial composition. On the other hand, changing elasticities in SDH, rather than increasing inequalities, are found to explain a widening preference for private health care in the event of illness.

Finally, the thesis investigates socio-economic factors driving health inequality at a fairly disaggregated level, by examining the relative contributions of SDH to changes in gendered health differentials between 2005 and 2014. Using differences-in-decompositions, the thesis finds that the gender gap in health narrowed by approximately 2% between 2005 and 2014, and the narrowing of that gap can be attributed to changes in educational attainment and social grant receipt. Specifically, the relative increase in social grant receipt by females explains approximately 28% of the reduction, while the relative increase in the receipt of formal education by females explains about 1.11%.

Dedication

This Thesis is dedicated to God, the Almighty.

Declaration

I, Omotoso, Kehinde Oluwaseun, declare that this research is entirely my own, unaided work, and where necessary due credit has been given. This thesis is submitted in fulfillment of the requirements for the degree of Doctor of Philosophy at the University of Pretoria. It has not been submitted before for any degree or examination at any other university.

Omotoso, Kehinde Oluwaseun

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Chapter 1

Introduction

1.1 Theoretical and Conceptual Frameworks on Social Determinants of Health and Health Inequalities

Social (including economic) inequalities in health have long been documented and debated. Interest in studying social influences on health and health inequalities dates back to at least 19th century. Some of the pioneering researchers include Rudolf Virchow, Friedrich Engels and Salvador Allende. Rudolf reported on the role of poverty and political economy in causing an epidemic of plague in Upper Prussia, while Friedrich explored the connection between high mortality and poor living conditions of the working class in England. Salvador showed the role of social and political factors in generating health inequalities in populations (Antonovsky, 1967; Jayasinghe, 2015; Krieger et al., 2010; Kunst et al., 1998).

Since the pioneering research, several theories have been advanced to explain the generation of health inequalities from the social contexts (Solar and Irwin, 2010). Recent expansion of the theories on the influence of social factors on health and health inequality[1] includes the works of Rose (2001) on causes of morbidity in individuals, Lieberson (1985) theory of fundamental causes, developed by Link and Phelan (1995), and extended by Lutfey and Freese (2005). Most of the recent theories use the term social determinants of health inequalities (SDHI) to denote economic contexts, social norms and social structures that impact health outcomes.

In the academic and policy-oriented literature, various pathways have been put forward to

[1]In this thesis, the terms - inequality, disparity and inequity - were used interchangeably in many instances. These terms refer to differentials associated with socio-economic positions. This thesis uses the convention of referring to "inequalities in health", which commonly has the same meaning in the South Africa as the terms "inequities in health" and "disparities in health". That is, "inequalities" in the South African context - and increasingly also across Africa - carries the same connotations of unfairness and injustice as the term "inequities".

define and summarise theories of social inequalities in health. Some of these pathways include social causation, social selection/mobility and a life course perspective. Theories on life course perspective posit that an array of factors across the life span, for instance poor educational exposure in childhood, maternal malnutrition during pregnancy, determine inequality in morbidity and mortality trends observed over time (Beckfield and Krieger, 2009; Krieger, 2001). On the other hand, social selection theories postulate that health determines socio-economic position, and not the other way round. Thus, healthier individuals, compared to less healthier individuals, will tend to move towards better socio-economic positions, leading to inequalities in health (Bartley and Plewis, 1997; Manor et al., 2003; West, 1991). However, some studies conclude that health selection cannot be regarded as the predominant explanation for health inequalities (Marmot et al., 1997; Smith and Morris, 1994)

More pertinent to this thesis, social causation theories propound that a range of unevenly distributed material, psycho-social and behavioural factors give rise to inequalities in health. Material factors include varying income levels and investments across structures that are beneficial to the society. Psycho-social factors are the chronic stresses that arise from perceptions and experiences of personal status in an unequal society. Behavioural factors refer to lifestyles and attitudes that shape individual's health, for example, the higher rates of unhealthy diets or smoking observed in poorer groups that lead to differential rates of morbidity, diseases, mortality and general health status (Brunner, 2007; Brunner and Marmot, 2005; Davey Smith and Egger, 1996; Raphael, 2006).

In line with the social causation perspective, Phelan et al. (2010); Link and Phelan (1995); Link and Phelan (2010) and Lutfey and Freese (2005) propose that socio-economic factors are the fundamental causes of health inequalities. Their propositions are based on the fact that social cause of health inequalities has four essential features, which make it distinct in explaining health inequalities. First, it influences multiple health outcomes, meaning that it is not limited to only one health problem. Second, it affects these health outcomes through multiple factors. Third, it involves access to resources that can be used to avoid risks or to minimize the consequences of disease or health problems once it occurs. Finally, the association between a fundamental cause and health is reproduced over time via the replacement of intervening mechanisms. It is the persistent association of socio-economic status (SES) with overall health outcomes in the face of dramatic changes in mechanisms linking SES and health that led the authors to term socio-economic factors as "fundamental" causes of health inequalities.

According to the theory of fundamental causes, an important reason that SES is related to multiple health outcomes through multiple pathways that change over time is that individuals and groups deploy resources to avoid risks and adopt protective strategies. Key resources such as knowledge/education, money, power, prestige, and beneficial social connections and positions can be used to mitigate risk in a given circumstance. Consequently, fundamental causes affect health even when the profile of risk and protective factors changes radically. If the problem is a contagious illness such as cholera, for example, an individual with greater resources is better able to avoid areas where the disease is rampant, and highly resourced communities are better able to prohibit entry of infected persons. If the problem is heart disease, a person with greater resources is better able to maintain a heart-healthy lifestyle and get the best medical treatment available. Because these resources can be used in different ways in different situations, they are called flexible resources. It is their capacity to be used flexibly by individuals and groups that place resources such as education, knowledge, money, power, prestige, and beneficial social positions at the center of fundamental cause theory. Their flexible use suggests why SES gradients tend to reproduce themselves over time (Link and Phelan, 2010).

The flexible resources that are central to fundamental cause theory operate at the individual and contextual levels. At the individual level, flexible resources can be conceptualized as the "cause of causes" that shape individual health behaviors by influencing whether people know about, have access to, can afford, and receive social support for their efforts to engage in health enhancing or health-protective behaviors. In addition, resources shape access to broad contexts that vary dramatically in associated risk profiles and protective factors. For example, a person endowed with socio-economic resources can afford to live in a high SES neighborhood where neighbors are also of high status and where, collectively, enormous influence is exerted to ensure that crime, violence and pollution of all kinds are minimized, and that the best health-care facilities and other basic facilities are located nearby. Once a person has used SES-related resources to locate in an advantaged neighborhood, a host of health-enhancing circumstances comes along as a package. Similarly, a person who uses educational credentials to procure a high-status occupation inherits a package deal that is more likely to include excellent health benefits and less likely to involve in dangerous conditions and harmful exposures (Cockerham, 2005; Link and Phelan, 2010; Lutfey and Freese, 2005).

Relatedly, the Commission on Social Determinants of Health (CSDH), which was established by World Health Organisation (WHO) in March 2005 to support countries and global health

partners in addressing the social factors leading to ill health and health inequities, integrate these theories to re-conceptualise health inequalities (Commission on Social Determinants of Health, 2008*a*; Marmot, 2005; Solar and Irwin, 2010). The Commission describes SDHI to have a context, structural mechanisms and socio-economic positions of individuals. It assumes a crucial role for the context which includes social systems (e.g. education system, labour market), culture (e.g. racism and ethnicity) and political systems (e.g. structure of the state, redistributive policies). The structure of the state in relation to welfare and redistribution of wealth is recognised as a dominant institution.The context is viewed as a dynamic concept, having a historical past, a present and future trajectory. Structural mechanisms that are rooted in institutions and processes within the context generate stratifications in society according to socio-economic position, income or wealth, educational achievements and access, occupation, gender, race/ethnicity and other dimensions. These are inter-related dimensions and could act as proxies for each other. For example, in a heavily market-driven individualized society, incomes or wealth are good proxy indicators for socio-economic position. The socio-economic position in turn is a key stratifier in most contemporary societies and reflects a hierarchical system consisting of power, prestige and access to resources.

The Commission further posits that the SDHI operate through a group of intermediary determinants to influence health outcomes. The main groups of intermediary determinants of health are: material circumstances (e.g. quality of housing, exposure to pollution, financial means to purchase quality food and work environment); psychosocial circumstances (e.g. levels of stress and social support); behavioural factors (e.g. rates of tobacco and alcohol consumption, nutrition and physical activity) biological factors (e.g. genetic predisposition to diseases in different population groups) and the health system (e.g. access to quality care in populations). Increasingly, research evidence reports a widening range of material circumstance (such as availability of safe water and sanitation, agricultural policies and food security, access to health and social care services, unemployment, under-employment and working conditions, access to housing, the living environment, access to education and availability of transport) influencing health and health inequalities (Bambra et al., 2010; Commission on Social Determinants of Health, 2008*b*; Jayasinghe, 2015). Those holding higher positions in the social stratification hierarchies hold an advantageous position in accessing resources, information and environments that are more favourable to better health outcomes. In this thesis, the above outlined theories and concepts, specifically the social causation perspectives, critically shape the research focus

in terms of the research questions asked and the social determinants considered.

1.2 Empirical Literature on Social Determinants of Health and Health Inequality

Social factors are important determinants of health and health inequality (Link and Phelan, 2010; Wagstaff, 2000*a*; World Health Organization, 2013). Across the globe, people's life chances mostly depend on where they are born and raised, the colour of their skin, or the lack of opportunities afforded to their parents, which in turn, affects their health either directly or indirectly. In essence, the social conditions in which people live strongly influence their chances to be healthy. Social factors such as poverty, food insecurity, social exclusion and discrimination, poor housing, unhealthy early childhood conditions and low occupational status, amongst others, are argued to be the main factors that determine most diseases, deaths and health inequalities between and within countries (Adler et al., 2016; World Health Organization, 2005). In other words, the health of a population is, to a large extent, determined by social factors; such that, if the health of the population is to be improved, the set of social and economic arrangements might need to change (Commission on Social Determinants of Health, 2008*b*; Marmot, 2005).

Social determinants include but are not limited to gender, race, metropolitan status, ethnicity and geographical location or region suggesting differential access to resources and opportunities across different socio-economic groups within a society. Tackling inequality in the social determinants has come to be a key condition for achieving an acceptable level of health and health equity in a society (Marmot, 2005; Wagstaff, 2000*a*). Kanbur and Wagstaff (2016) opine that equality in social determinants and opportunities is a more relevant aspect of policy than inequalities in outcomes. Pickett and Wilkinson (2015) and Truesdale and Jencks (2016) also argue that greater inequality in social determinants and opportunity may lead to greater inequality in a society and, thus, exacerbate health inequality. Consequently, the extent to which socio-economic related health outcomes and inequalities are being tackled has long been of interest to health economists and policy makers.

More pertinently, there is a growing policy concern about disturbing socio-economic related health outcomes and inequalities in Africa, especially in sub-Saharan Africa. Despite the remarkable economic growth in the region since the mid-1990s (Fosu, 2017; Thorbecke, 2013; World Bank, 2016), recent evidence indicates that, while the observed growth has resulted in

substantial poverty reduction, it has been accompanied by a rise in inequality in income (Fosu, 2015), and in health in a number of countries (Herzer and Nunnenkamp, 2015). Chirowa et al. (2013) also suggest that several countries in sub-Saharan Africa are experiencing increasing socio-economic related gendered health differentials. Accordingly, there is a concern that socio-economic related health inequalities may be on the rise in sub-Saharan Africa (Sembene, 2015). Thus, this PhD thesis aims to broaden our understanding of socio-economic related health outcomes and inequalities within the context of a developing country, using South Africa as a case study.

South Africa is a good case study. First, she was a signatory to a number of international health and health-related commitments, which include the 1978 WHO Alma-Ata Declaration of "Health for All" (World Health Organization, 1978, 1981), the Abuja declaration on health (African Union, 2001; Malaria, Roll Back and World Health Organization, 2000) and the Millennium Development Goals (MDGs) - which metamorphosed into Sustainable Development Goals (SDGs), amongst others. Second, in recent times, the South African government has given much recognition to the role of socio-economic factors in tackling some of the health inequity challenges facing the country. In particular, the Negotiated Service Delivery Agreement between the Minister of Health and the President stressed the need to address the social determinants of health (SDH) (National Planning Commission, 2011; Rispel et al., 2013). Third, as a way of redressing the damaging impacts of apartheid, which was characterised by legislated inequality, the government made a number of commitments to the health of her citizens and equitable access to better health care service; this is explicitly stated in her Constitution, which gives her citizens the right to have access to health care services, including reproductive health care (see South Africa Constitution, 1996, Section 27(1)(a)). Fourth, South Africa has nationally representative data that provides information on a range of socio-economic factors and health indicators required for the type of analysis undertaken in this study.

More specifically, in the wake of democracy, the South African government embarked on a number of major reforms and policies in the different sectors of the economy, including re-structuring and re-engineering policy, in order to create a more coherent and unified national health system void of inequity. Many policies have also been directed towards tackling socio-economic inequalities, including gender inequality (Chopra et al., 2009; Kruger et al., 2012; Mbeki, 2001). These reforms and policies have been documented systematically (see Chopra et al., 2009; Dhai, 2011; Govender et al., 2013; Harrison, 2012; Ruff et al., 2011), and prioritised

in the South African government's development agenda; furthermore, an increasing share of general government expenditure is being allocated towards their implementation (Burger and Van der Berg, 2008; Christian, 2014). Undoubtedly, the post-apartheid reforms and policies have led to changes in the health sector and socio-economic outlook of the country. Yet, there remains a need to examine socio-economic related health inequality in order to strengthen the existing evidence base (Ataguba et al., 2015; Ndumbe-Eyoh and Moffatt, 2013), and, in particular, investigate the influence of changes in socio-economic outlook on health inequality.

Thus, drawing on nationally representative data from the South African General Household Surveys (GHS), this thesis analyses trends in health and changes in socio-economic related health inequality, at aggregate and disaggregate levels, over the second decade of post-apartheid South Africa, with a special focus on gender differentials in health. Basically, it explores socio-economic drivers of changes in health inequalities. Within the scope of this investigation, the thesis tries to answer three key questions. The first question is "what are the trends in health outcomes and health-related behaviour over the last decade (2004-2014)". The second question is "how have changes in the social determinants of health (SDH) impacted health inequalities over the same period?", and the third question is "which socio-economic factors contributed to narrowing gendered health differentials over time?". Answers to these questions are not readily available, though a number of studies have examined health and health inequality in South Africa. Meanwhile, answers to the questions might guide policy decisions on appropriate socioeconomic-related health interventions. To answer these questions, we use both parametric and non-parametric approaches on data covering the period 2004 to 2014. The motivation, contributions and review of related literature, for each of the research papers that make up the thesis, are further discussed.

1.3 Trends in Health Outcomes and Health-related Behaviour

1.3.1 Motivation and Contribution

Health indicators or outcomes are measures which provide relevant information on the population's health situation and health system characteristics, including responses at national, regional and global levels (World Health Organisation, 2015). They also provide information that allows for tracking progress and performance over time. Tracking progress is vital in maintaining momentum towards health-related goals, such as the SDGs, and in signaling impending

health challenges. It also helps in identifying areas with large disparities that might require more efforts or interventions.

Globally, disparities in health are evident. Global socio-economic-related gradients in health generally show that developing countries compare unfavorably with the developed countries. There are also observed differences in health within and between countries, and these differences have persisted over time (World Health Organization, 2016). These disparities in health present a great challenge to the world (Lee and Marmot, 2005; Marmot et al., 2008; Quinn and Kumar, 2014; Wilkinson and Marmot, 2003).

Furthermore, evidence has shown that population health can be directly influenced over time by demographic and socio-economic factors. A number of studies highlight the importance of education, socio-economic status, employment, housing, urbanisation, geography, residential location, age, race and gender, amongst others, in determining changes in health outcomes (Balaj, Huijts, McNamara, Stornes, Bambra and Eikemo, 2017; Braveman et al., 2010; Currie et al., 2009; Lee and Marmot, 2005; Link et al., 2017; Pampel et al., 2010; Singer et al., 2001; Truesdale and Jencks, 2016; Wilkinson and Marmot, 2003; Williams et al., 2010). Considering trends in health outcomes across a range of socio-economic factors can, thus, provide additional useful information on health. Such information can facilitate priority setting in health, especially in developing African countries where socio-economic factors account for large disparities in health (Gwatkin, 2017; Gwatkin et al., 2007). In the first chapter of this thesis, we focus on trends in key health indicators in South Africa.

Several studies (see Ataguba et al., 2011; Bradshaw, 2008; Burgard and Treiman, 2006; Christian, 2014; Gilson and McIntyre, 2007; Harris et al., 2011; Harrison, 2012; Koch, 2009; Nteta et al., 2010) have examined South Africa's health outcomes. However, little is known about the dynamics of those outcomes. Some important early contributions on health outcomes include Van Rensburg (2004), Gilson and McIntyre (2007), Kahn et al. (2007), Norman et al. (2007), Bradshaw (2008), Myer et al. (2008), Coovadia et al. (2009), Mayosi et al. (2009), Chopra et al. (2009) and Harrison (2009).

For instance, besides official government reports that highlight trends in health indicators, Bradshaw (2008) examines trends in the determinants of health status using different data sources, covering the years 1996 to 2007. She argues that extreme wealth inequalities and high levels of unemployment probably play an important role in poor health outcomes in South Africa. Koch (2009) uses General Households Surveys (GHS) covering the years 2002-2007 to

examine medical aid scheme coverage rates, and finds that coverage rates are quite low, and differ across age groups, population groups and gender. He reasons that despite government's effort to improve health outcomes, medical aid access for the previously disadvantaged population groups has not improved over the analysed time period. Harris et al.'s (2011) examination of the affordability, availability and acceptability of services, indicates that the greatest access barriers to health care persist among black Africans, poor, uninsured and rural respondents. On the other hand, Christian's (2014) investigation of the factors linked to access in the South African public health sector, using the 2002-2012 GHS data, reveals that equity has been achieved in terms of making public health care services more affordable, especially for the most vulnerable population groups in South Africa, though issues of acceptability and availability persist.

However, there are gaps in the preceding studies. Most of the studies use one or at most two indicators as measures of health, and such measures are not often considered across a broad spectrum of socio-demographic factors. Firstly, measuring health with only a few indicators may understate the health status of a population, particularly in a country such as South Africa, which contends with multiple health challenges (Benatar, 2013; Mayosi and Benatar, 2014). Secondly, some of the preceding analysis is outdated and does not provide information on current realities in population health and socio-demographic characteristics. Thirdly, inadequate coverage of the socio-demographic dynamics of health outcomes might undermine measurement of the effects of policies, which often target socio-demographic factors. Fourthly, considering the country's drive towards universal health coverage through National Health Insurance (NHI), a broader assessment of trends in key health indicators which can provide useful feedback to the successful implementation of the NHI programme, could be informative.

Specifically, conducting trend analyses of health outcomes allows for the observation of changes that have occurred over time. To a large extent, examining trends in a set of health related variables across a range of socio-demographic variables provides a basis for measuring achievement, or otherwise, of the concerted efforts in ensuring improved health and equitable access to better health care services. This has important implications for the proposed National Health Insurance (NHI) programme, and, by extension, on Universal Health Coverage (UHC). Moreover, if South Africa is to make progress towards the new Sustainable Development Goals (SDGs), deficiencies in health care-related areas of the SDGs need to be identified for appropriate health policy interventions. In summary, trend analyses of health indicators allow for measurement of the indirect effect of policies on health outcomes.

We therefore contribute to the existing literature by assessing trends in a number of health indicators. We also contribute to the literature by refining the methodological approach to analysing health trends in South Africa. Firstly, using more recent data, we update and extend the preceding analyses by assessing trends in a number of health indicators across a broad range of key socio-demographic factors. For instance, Koch (2009) uses 2002-2007 GHS data to examine trends in medical aid scheme, while Christian's (2014) analysis of the public health sector goes to 2012. Apart from considering more health indicators, than did previous authors, we are able to cover 2014 in our analyses. The thesis, thus, sheds additional light on recent changes in health, and presents more comprehensive socio-demographic dynamics of the trend profiles. We focus on the patterns and determinants on the demand-side: access to medical aid coverage, health status, health-seeking behaviour and preferences for the utilisation of public or private health care in the event of illness. Our analyses, which were undertaken differently from previous studies, also consider the peculiarity of the relationship between medical aid coverage status and choices related to public or private health care. Our intent is to draw out implications for the implementation of National Health Insurance (NHI). Secondly, we contribute to the existing literature by adopting an alternative methodological approach. Besides the commonly used parametric techniques such as the linear probability model (LPM), we also use non-parametric locally weighted scatter smoothing, namely lowess, which does not impose a functional form on the data, but, rather, allows the data to determine the shape of the relationship between variables (Cleveland, 1979).

In line with Koch (2009), we find declining medical aid coverage rates over time; in addition, we find reduced preference for the utilisation of public health care in the event of illness/injury. Using the non-parametric approach, we find that medical aid coverage increase steadily among young adults over the studied period, an age range that matches attachment to the labour force. Moreover, we find that preferences for public care are lowest for those aged near 60 years, and higher for ages above and below that. Although Christian (2014) indicates that equity has been achieved in terms of making public health care services more affordable, our findings suggest that South Africans are not enamoured by the public health care sector, even though they cannot afford the private sector. This is one of the issues that needs to be addressed for the successful implementation of the NHI. Thus, our evidence suggests that an in-depth conclusion about trends in health cannot be drawn on the basis of an assessment of a few health indicators alone, but, rather on more comprehensive health indicators.

1.3.2 Previous related literature

Analyses involving socioeconomic-related trends in health have been carried out across the world (Braveman and Tarimo, 2002; Jakovljevic and Getzen, 2016; Ogura and Jakovljevic, 2014; Reading and Wien, 2009), low, middle and high income countries (Jakovljevic and Getzen, 2016; Ogura and Jakovljevic, 2014), and vary from one country to another. According to Wagstaff (2000*a*) and Adler et al. (2016), demographic and socio-economic factors, which include education, employment, income, age and gender, amongst others, are important determinants of health. Additional empirical research also establishes the influence of demographic and socio-economic factors in the determination of health in developed and developing countries (Arcaya et al., 2015; Grossman, 1972, 2000; Marmot et al., 2008; Newman et al., 2015; Phelan et al., 2010; Wilkinson and Marmot, 2003).

1.3.2.1 Review of related studies on trends in health in the developed countries

From the developed countries' perspective, many studies have tried to establish socio-economic related trends in health, but findings have been mixed and inconclusive. For instance, a number of authors argue for and against persistent racial, ethnic and socio-economic disparities in health across a lifetime, with either increasing or decreasing economic and racial inequality, for example, in the United States (Braveman and Gottlieb, 2014; Dwyer-Lindgren et al., 2017; Harris et al., 2006; Keppel et al., 2002; Murray et al., 2013; National Center for Health Statistics, 2002; Williams and Sternthal, 2010).

Keppel et al. (2002) use 1990-1998 data to compare health status measures at national, state and local levels in the United States, and describe national trends in racial and ethnic-specific rates. They find that rates for most racial/ethnic groups improved, but conclude that while rates for health status indicators have improved, not all groups have benefited equally and substantial differences across racial/ethnic groups persist. Further, Murray et al. (2013) use 1990-2010 data to measure the burden of diseases, injuries and leading risk factors in the US, and compare these measurements with those of the 34 countries in the Organisation for Economic Co-operation and Development (OECD) countries. They report similar findings in favour of substantial progress in improving health over the analysed time period. However, they find that morbidity and chronic disability account for nearly half of the US health burden, and improvements in population health in the US have not kept pace with advances in population health in other wealthy nations.

Other studies that report progress over time in socio-economic related health in the US include Sommers et al. (2015), who find declines in the adjusted proportions of those who were uninsured, lacked a personal physician, lacked easy access to medicine, unable to afford care, reported fair/poor health and a higher percentage of days with activities limited by health. They also find that coverage changes were largest among minorities; the decrease in the uninsured rate was larger among Latino adults than white adults, while medicaid expansion was associated with significant reductions among low-income adults, lacking a personal physician and having difficulty accessing medicine. Contrary to Sommers et al. (2015), we find declining medical aid coverage rates and preference for the utilisation of public health care in the event of illness/injury, though the countries' contexts are somewhat incomparable. We also find medical aid coverage rates to be low among the black Africans, when compared with the other population groups.

On the other hand, Harris et al.'s (2006) examination of the longitudinal trends in multiple health indicators among racial/ethnic groups of adolescents, as they transition into adulthood, finds that health risk increased and access to health care decreased from the teen to adult years for most US race/ethnic groups. They remark that relative rankings on a diverse range of health indicators (and patterns of change over time) vary by sex and race/ethnicity, causing disparities to fluctuate over time. Furthermore, Dwyer-Lindgren et al.'s (2017) description of county-level trends in the prevalence of poor self-reported health, using Behavioral Risk Factor Surveillance System data (1995 and 2012), find substantial geographic disparities in poor self-reported health over time. Dwyer-Lindgren et al.'s (2017) finding is in line with our findings, as we also find considerable provincial and rural/urban differences in self-reported health over time.

Several studies also examine trends in health, and the influence of demographic and socio-economic factors in the determination of health over time in developed countries (Cott et al., 1999; Gilmore et al., 2002; Hu et al., 2016; Kozhimannil et al., 2012; Paul and Valtonen, 2016*b*; Põld et al., 2016; Reile et al., 2014). Evidence from Hu et al. (2016) shows declining trends in the prevalence of less-than-good self-assessed health (SAH) in many European countries between 1990 and 2010, particularly in Southern and Eastern Europe and the Baltic states, and that less-than-good SAH was more prevalent in lower educational and manual groups in all countries. Põld et al.'s (2016) findings also suggest that the prevalence of good self-rated health (SRH) increased significantly in Estonia, over the period 1996-2014, with a slight decrease over 2008–2010, and that it has a gender dimension. Until 2002, good SRH was slightly more preva-

lent among men, but after that period, it was more prevalent among women. Moreover, they find that good SRH was significantly associated with being younger, more educated and increased income opportunities and also with employment status among both men and women. Good SRH was more prevalent among Estonian women and less prevalent among single men. Their finding was in line with Reile et al. (2014), who find that the prevalence of less-than-good SRH increased slightly in Estonia during the recession period, 2008–2010. Our finding complements Põld et al. (2016) and Reile et al. (2014). Our study, of the trends in self-reported ill-health, likewise, shows substantial increases in self-reported ill-health during the same recession period. Furthermore, we find evidence that self-reported ill-health is significantly associated with being older, female, married, uneducated and unemployed. In general, our findings complement preceding studies by presenting evidence on the determinants, trends and socio-demographic dynamics in a number of health indicators, from a developing country perspective.

1.3.2.2 Review of related studies on trends in health in the developing countries

One cannot overemphasise the importance of understanding health indicator trends to inform national health policy, especially in developing countries with both high burdens of disease and inaccessible health care. Wagstaff (2000*a*) conceptualises the various routes through which health outcomes are determined. He also emphasises the influence of demographic and social factors on health, with special focus on developing countries. His empirical evidence establishes the significant contribution of socio-demographic factors to poor health outcomes in developing regions. This approach underpins much of the literature, as well as components of our analysis.

In Wagstaff et al.'s (2014) study of health and socio-economic indicators trends in developing countries, they use Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS), spanning 64 developing countries, over the period 1990–2011, to examine differential progress on health Millennium Development Goals (MDGs) between the poorer and better-off countries. Five health status indicators and seven socio-economic intervention indicators are tracked for all health Millennium Development Goals. The authors find that, on average, the relative difference in the Millennium Development Goal indicators has been falling. However, he finds the opposite to be true in a few countries, especially for child health indicators and some socio-economic intervention indicators. In line with Wagstaff et al. (2014), Masibo and Makoka's (2012) examination of the trends and determinants of under-nutrition among children in Kenya also finds a slow decline over the last three decades.

Victora et al. (2017) analyse trends in a composite coverage indicator (CCI) based on eight reproductive, maternal, newborn, and child health interventions in 209 national surveys in 64 developing countries, from 1994 to 2014. They find that health gains among poor populations were faster in lower-middle-income and upper-middle-income countries than in low-income countries, and annual coverage increases were more rapid in rural areas. In addition, Gwatkin (2017) examines trends in disparities in health service coverage in developing countries as a whole and in economically defined country sets. His main finding, which corroborates Victora et al. (2017), is that coverage disparities have been decreasing in the past 20 years, because of faster progress within poor and rural populations. His result is also in line with Wagstaff et al. (2014), whose empirical evidence supports relative gains in health and coverage in developing countries. In contrast to these studies, our analyses suggest a decrease (an increase) in preference for public health care (self-reported illness) over time.

Several other papers also present socio-economic related trends in health in developing countries (Bendavid, 2014; Cowling et al., 2014; Kamiya, 2010; Victora et al., 2012; Wollum et al., 2015). For instance, Cowling et al. (2014) assess the levels and trends in major social determinants of health (SDH) in India, from 1990-2011. They find progress in SDH, but high rates of poor SDH persistence in important areas: the majority of households in India use indoor biomass fuel and have unimproved sanitation, and over one-third of households with a child under the age of 3 years have undernourished children. Moreover, alarming rates of air pollution are observed, with particulate matter concentrations persistently above the critical level.

In South Africa, a number of studies have examined socio-economic related trends in health, and report the importance of socio-economic factors in determining trends in health over time. For instance, Bradshaw's (2008) finding suggests that wealth inequalities and high levels of unemployment play an important role in poor health outcomes over time in South Africa. Analysis by Koch (2009) finds that coverage rates are quite low, and differ across age groups, population groups and gender over the anaylsed time period. Further evidence by Christian (2014) shows that equity has been achieved in terms of making public health care services more affordable, especially for the most vulnerable population groups in South Africa. Other studies that report socio-economic related trends in health outcomes and health-related behaviour in South Africa include (see Ataguba et al., 2011; Burgard and Treiman, 2006; Gilson and McIntyre, 2007; Harris et al., 2011; Harrison, 2012; Nteta et al., 2010). As highlighted in the literature above, the emphasis has been on few health indicators, as measures of population health. In our

view, these analyses could be extended to cover more health indicators for better understanding of population health. This thesis, therefore, addresses this issue by profiling trends in a number of health indicators across a range of socio-demographic factors, using both parametric and non-parametric approaches. The analyses present more comprehensive dynamics of the health indicators, such that the effectiveness, or otherwise, of policies can be highlighted. While we acknowledge that there are other important health indicators we are unable to explore, due to data limitations, this thesis provides a more detailed, comprehensive and in-depth trend analysis of health indicators in South Africa, compared to the preceding literature.

1.4 Social Determinants of Health Inequalities

1.4.1 Motivation and Contribution

Social determinants are circumstances in which people are born, grow, live, work and age. To a large extent, these circumstances determine the kind of life that an individual lives, and they are shaped by the distribution of resources at global, national and local levels (Link and Phelan, 1995). Socio-economic factors are viewed as important determinants of health, and are mostly responsible for health inequities - the differences in health status observed within and between countries (Marmot et al., 2008). Evidence abounds that there are social gradients in health within and between countries, as life chances differ greatly depending on where people are born and raised, thus, necessitating the consideration of the links between socio-economic factors and health status (Adler et al., 2016; Bradshaw et al., 2000; Cockerham et al., 2017; Großschädl and Stronegger, 2013; Hajizadeh et al., 2016; Marmot, 2005; Novaković et al., 2014).

Socio-economic related health inequality is a global phenomenon experienced in low, middle and high income countries (Braveman and Tarimo, 2002; Jakovljevic and Getzen, 2016; Mackenbach et al., 2008; Ogura and Jakovljevic, 2014; Reading and Wien, 2009). Evidence has shown that some developed countries, including European countries, also experience socio-economic related health inequality which might be comparable to experiences in some developing regions (Hakura et al., 2016; Orach and Garimoi, 2009).

A number of studies on socio-economic inequalities in health highlight income, socio-economic status, education, urbanisation and housing, amongst others, as important factors that determine health inequity in most developed countries (Balaj, McNamara, Eikemo and Bambra, 2017; Mackenbach et al., 2008; Reus-Pons et al., 2017; Van Doorslaer and Koolman, 2004).

Mackenbach et al. (2008) suggest that the rates of poorer self-assessments of health were substantially higher in groups of lower socio-economic status, and that the magnitude of inequalities in SAH varies substantially among the 22 European countries considered. Moreover, Devaux (2015) finds that, in most OECD countries, people with higher incomes are more likely to consult a doctor than those with lower incomes, even with the same health care needs. Hu et al. (2016), in line with the preceding studies, also stress the significance of socio-economic factors in explaining health inequality over time. They find increasing relative inequalities in SAH, while absolute inequalities were mostly constant in the 17 European countries studied. They also find that almost no country consistently experienced a significant decline in either absolute or relative inequalities over time.

Health inequality and its social determinants have received considerable attention in South Africa (Alaba and Chola, 2014; Ataguba et al., 2011, 2015; Booysen, 2003; Bradshaw, 2008; Bradshaw et al., 2000; Charasse-Pouélé and Fournier, 2006; Chopra et al., 2009; Coovadia et al., 2009; Harris et al., 2011; Silal et al., 2014; Zere and McIntyre, 2003). In line with findings from developed countries, some of the preceding studies also find poor self-reported health to be higher among lower socio-economic groups (Alaba and Chola, 2014; Ataguba et al., 2011; Zere and McIntyre, 2003). For instance, Ataguba et al. (2011) find burdens of major categories of self-reported illness and disability to be greater among lower socio-economic groups. Likewise, Charasse-Pouélé and Fournier (2006) find a strong indirect racial effect in health inequalities. Moreover, Ataguba et al. (2015) find that social protection and employment, knowledge and education, housing and infrastructure contribute to disparities in good SAH.

However, reviews of the literature suggest that there is a gap in the earlier studies. A major gap is that the existing empirical literature mainly uses cross-sectional data, with the main focus on one-way decomposition, as the estimation strategy, to examine the contributions of socio-economic factors to health inequality at a given time. Moreover, they tend to focus only on a few health indicators. Firstly as noted earlier, using few indicators may paint a narrow picture of health inequalities and, thus, may underestimate overall health inequality. Secondly, a one-time assessment of health inequality may downplay the effects of health inequality-focused reforms, which the South African government has embarked upon since the emergence of democracy. One-way decomposition provides one dimensional assessment of health inequality, and cannot uncover time dynamics, which is vital for indirect assessment of the effectiveness, or otherwise, of prior policies and health interventions aimed at reducing socio-economic related health inequal-

ities. For instance, Ataguba et al. (2015) use cross-sectional data and one-way decomposition to explain the social factors that account for health disparities. As much as the analysis is relevant to understanding health inequalities in South Africa, it only provides information about health inequality at a given point in time. It does not uncover changes in health inequalities. In a country such as South Africa, where policy effort goes into redressing socio-economic related health inequalities, it is important to understand changes in health inequalities, and the extent to which such changes are attributable to changes in socio-economic factors. This can help in identifying key drivers of changes in socio-economic related health inequalities, as well as in more efficient allocation of scarce resources to further reduce health inequalities. Moreover, sectors that need further improvement or interventions can be highlighted. It can also serve as feedback during the process of reviewing policies and reforms directed at socio-economic factors, which are often targets of policy decisions.

We therefore contribute to the existing literature by refining the methodological approach. We use a two-way decomposition strategy, namely the Oaxaca-type decomposition of change in a concentration index (Wagstaff et al., 2003), which uncovers time dynamics in health inequality. We examine changes in socio-economic inequalities in a number of health indicators, and the effects of changes in the SDH on the health inequalities over time, using two cross-sectional surveys. When we use two cross-sectional surveys and two-way decomposition, we are able to find rising inequalities in ill-health and correlate them to changes in the composition of socio-economic factors, such as urban residence and in relatively richer provinces. In addition, we find that rising inequality in medical aid coverage and the preference for utilisation of private health care are attributable to changes in educational attainment and racial composition. Our evidence supports the use of a refined methodology, as opposed to a one-way decomposition, in order to get a broader assessment of the socio-economic factors driving health inequality over time. Furthermore, our evidence supports the view that changes in socio-economic health inequalities cannot be attributed to a single factor; rather, they are explained by a number of factors that need to be combined collectively, in order to further address health inequalities and attain global and national health-related goals, such as the Sustainable Development Goals (SDGs) and the NHI programme aimed at universal coverage.

1.4.2 Previous related literature

In recognition of the influence of socio-economic factors on health inequality, one of the major complementary policy thrusts of the WHO was to take action on social determinants of health. Such action is aimed at alleviating poverty, and improving the conditions in which people live and work (Marmot, 2005). In 2005, WHO set up an independent Commission on Social Determinants of Health. The commission's mission rests on the premise that health status should be of concern to all policy makers in different cognate sectors, and not just those in the health sector. Therefore, understanding the linkages among the different public policy domains is key to improving health and reducing health inequalities (Marmot et al., 2008).

The commission took a holistic view of social determinants as major factors influencing population health and health equity. This view was premised on the concept that poor health outcomes, the social gradient in health and health inequities across and within countries are caused by the unequal distribution of power, income, goods, services, and visible circumstances of people's lives relating to education, access to health care, work and leisure conditions, housing, communities, and their chances of leading a flourishing life (Commission on Social Determinants of Health, 2008*b*; Marmot et al., 2008). According to the Commission, the unequal distribution of health is the result of a combination of poor social policies and programmes, unjust economic and social arrangements and bad politics.

On social determinants and gender equity in health, the Commission recognises that gender inequities are pervasive in all societies. The health of a large number of girls and women are affected due to prejudices and male power: biased organisational structures and social arrangements, norms, values and cultural orientations. According to the Commission, progress has been uneven and many challenges remain, despite the fact that the position of women has improved substantially over the past century in many countries. Still in many developing countries, women earn less than men, even for equivalent work; girls and women lag behind in education and employment opportunities. Maternal mortality and morbidity remain high, and reproductive health services remain inequitably distributed within and between countries (Marmot et al., 2008). The intergenerational effects of gender inequity make the imperative to take action on the social determinants of health even stronger (Lee and Marmot, 2005; Marmot et al., 2007).

Overall, the commission advocates for closing the health gap in a generation based on three principles of action: improve the conditions of daily life (the conditions in which people are born,

grow, live, work and age); tackle the inequitable distribution of power, money, and resources (structural drivers of those conditions of daily life) globally, nationally and locally; measure, understand the problem and assess the results of action on the social determinants of health and, in addition to expanding the knowledge base, develop a workforce that is trained in the social determinants of health and raise public awareness about these determinants. In support of the WHO commission on social determinants of health, empirical evidence identifies socio-economic factors as the root of inequalities in health. For instance, Marmot (2005) opines that social determinants are relevant to analysing inequality in communicable and non-communicable diseases, across and within countries of the world.

On the issues of (in)equality and (in)equity in health, earlier work by Culyer and Wagstaff (1993) explores four definitions of equity in health care: equality of utilization, distribution according to need, equality of access, and equality of health. They argue that the definitions of 'need' in the literature are inadequate and propose a new definition. They also argue that, irrespective of how need and access are defined, the four definitions of equity are, in general, mutually incompatible. In contrast to previous authors (Mooney et al., 1991; Van Doorslaer and Wagstaff, 1992), they suggest that equality of health should be the dominant principle and that equity in health care should therefore entail distributing care in such a way as to get as close as is feasible to an equal distribution of health.

On the measurement of socio-economic inequalities in health, Wagstaff et al. (1991) offer a critical appraisal of the various methods employed to date to measure inequalities in health. They suggest that only two of these - the slope index of inequality and the concentration index - are likely to present an accurate picture of socio-economic inequalities in health. Kakwani et al. (1997) also clarify the relationship between two widely used indices of health inequality, namely the relative index of inequality (RII) and the concentration index (CI), and explain why these are superior to other indices used in the literature. The empirical strategy employed in this thesis borrows substantially from the concept of the concentration index, proposed by Wagstaff et al. (1991) and Kakwani et al. (1997), in order to investigate socio-economic inequality in a number of health indicators.

Further, Wagstaff (2000*a*) presents a conceptual framework for understanding the causes of poor-nonpoor inequalities in health outcomes, distinguishing between the effects of inequalities in the proximate determinants of health, and inequalities in the socio-economic or underlying determinants. He reviews what these determinants are, and how far inequalities in them appear

to explain inequalities in health outcomes. He argues that there remains more to be known in the field of equity, poverty and health outcomes, especially regarding evidence on health inequalities and health service inequities in the developing world. He further states that there is evidence on inequalities in the socio-economic or underlying determinants of health, but this evidence is scattered and does not lend itself to comparison between inequalities in, say, accessibility and inequalities in insurance coverage. From a developing country context, this thesis adds to the existing evidence base by examining socio-economic inequalities in a number of health indicators, which include medical insurance coverage, disability, health status, and choice of health care in the event of illness. It also provides evidence on the socio-economic factors explaining changes in health inequality over time.

1.4.2.1 Review of studies analysing social determinants of health inequality in the developed countries

The empirical body of literature on social determinants of health outcomes and inequalities is broad and ever emerging in both developed and developing countries. For instance, studies have shown that socio-economic inequalities in health persist, and in certain contexts have even risen in Europe over the last few decades, despite remarkable declines in morbidity and mortality rates. Such inequalities are usually explained by health behaviour and the conditions in which people work and live.

Van Doorslaer and Koolman (2004) provide evidence on the sources of differences in the degree of income-related inequalities in self-assessed health in 13 European Union (EU) member states. Their paper goes beyond earlier work by measuring health using an interval regression approach to compute concentration indices and by decomposing inequality into its determining factors. They find significant inequalities in health favouring the higher income groups in all countries, which are particularly high in Portugal, and to a lesser extent, in the UK and in Denmark. By contrast, they observe relatively low health inequality in the Netherlands, Germany, Italy, Belgium, Spain, Austria and Ireland. They also find a positive correlation between health inequality and income inequality, but the relationship is weaker than in previous research. Their decomposition analysis shows that the relative health and income position of non-working Europeans, like the retired and disabled, explains a great deal of the health inequality. They also document a substantial contribution of regional disparities to socio-economic health inequalities, primarily in the Southern European countries.

On a similar note, Van Doorslaer et al. (2000) compare horizontal equity in health care utilization in 10 European countries and the US, and present disaggregated results by various types of care. In all sampled countries, they find that lower-income groups are more intensive users of the health care system. After indirect standardization for need differences, they find little or no evidence of significant inequity in the delivery of health care, overall, though in half of the countries, significant pro-rich inequity emerges for physician contacts. They suggest that the physician result is likely due to higher use of medical specialist services by higher-income groups and higher use of general practitioner (GP) care among lower-income groups. Their findings appear to be fairly general and emerge in countries with very diverse characteristics regarding access and provider incentives. Their findings have been updated by Devaux (2015), who finds that inequities in health care service utilisation remain persistent in OECD countries.

Balaj, McNamara, Eikemo and Bambra (2017) use logistic regression models and decomposition analysis to measure health inequalities, and the independent and joint contributions of a comprehensive set of behavioural, occupational and living condition factors in explaining social inequalities in self-rated health (SRH) in Europe. In consonance with Devaux (2015) and Mackenbach et al. (2008), they also find absolute and relative inequalities in SRH in all the European countries studied, and considerable variation in the magnitude of socio-economic inequalities between countries. They find, in slight contrast to Hu et al. (2016), that occupational and living condition factors are the leading causes of inequalities across most of the countries, contributing both independently and jointly with behavioural factors. They highlight that the observed shared effects of the different factors to health inequalities point to the interdependent nature of occupational, behavioural and living condition factors. The authors, therefore, conclude that tackling health inequalities should be a concentred effort that goes beyond interventions focused on single factors. While the findings of this thesis are consistent with Balaj et al's findings and their conclusions, the employment factor was, however, not found to significantly contribute to the explanation of health inequality within the context of our study.

Shields and Shooshtari's (2001) examination of the determinants of self-perceived health in Canada finds that socio-economic and psycho-social factors were statistical correlates of health perceptions. They find distress, low self-esteem and low socio-economic status to be negatively associated with very good/excellent health. Recent studies (Fuller et al., 2016; Lofters et al., 2014) on how Canadians attribute income-related health inequalities agree; health inequalities arise from differences between the rich and the poor in terms of employment, social status,

income and food security. In addition, they find that there was substantial public support for policies to reduce poverty and increase funding for education and creating health promotion and disease prevention programmes, though support for these policies is different across social groups.

Cott et al. (1999) use multivariate logistic regression to identify the factors associated with the SRH of people with and without chronic health conditions or long term disability in Canada, and report similar findings. Illness-related variables were associated with poor health, but with smaller significant contributions from demographic and lifestyle factors. Similar to Shields and Shooshtari (2001), they also find that psychological resources, especially high self esteem, are associated with better health in those with chronic conditions or disability. In this thesis, empirical evidence supporting negative social gradients in health was also found.

Using concentration curves and indexes derived from comparable survey data from the 2002-2003 Joint Canada-US Survey of Health, McGrail et al. (2009) estimate income-related inequalities in SRH in the the United States and Canada, and the extent to which they are associated with individual-level risk factors and health care system characteristics. The authors find that the distribution of income accounted for close to half of income-related health inequalities in both the United States and Canada. They however find that health care system factors such as unmet need, health insurance status and risk factors, like physical inactivity and obesity, contributed more to income-related health inequality in the United States than in Canada. They conclude that individual-level health risk factors and health care system characteristics have similar associations with health status in both countries, but both are more prevalent and more concentrated among lower-income groups in the United States than in Canada. This finding contrasts with updated evidence from Prus (2011), who shows that risk and health care access factors play a relatively minor role in linking social structural factors to health, though his findings also demonstrate the importance of social determinants in determining health in both countries. We build on these studies by employing a change in concentration index, as opposed to a concentration index, to explore changes in socio-economic related health inequalities in a developing country context. We focus on socio-economic drivers of changes over time, as opposed to a given time period.

In addition, Park and Lee (2013) compare self-rated health and its determinants between Japanese and South Koreans, using a cross-sectional design on 2,496 and 1,576 adults (aged greater or equal to 20 years) in Japan and Korea, respectively. The authors use logistic regression

to identify significant factors for self-rated health in the two nations. Their results indicate that Japan has lower and less-varying self-rated health than Korea. Their evidence confirms traditional findings that socio-economic status has positive effects on self-rated health, while chronic disease, overweight/obesity and smoking have negative effects on self-rated health. They also find that middle-aged Japanese have lower self-rated health than younger Japanese living with a spouse has a negative impact on self-related health in both young Japanese and Koreans. Mental factors (i.e. happiness, hopelessness and mental health problems) have a greater impact on self-rated health in Japan than in Korea, whereas the reverse is true for physical health problems. We also explore social determinants of health inequality, and in line with Park and Lee (2013), find that being married has a negative impact on SRH. On the contrary, we find that middle-aged adults have higher SRH than the other age groups. Unfortunately, we could not consider psychological and mental factors, because there was no data in the surveys.

Some other recent studies on socio-economic related health outcomes and inequalities in developed countries include (Braveman et al., 2010; Großschädl and Stronegger, 2013; Hajizadeh et al., 2016; Hu et al., 2016; Mackenbach, 2011; Mackenbach et al., 2015; Maheswaran et al., 2015; Pförtner and Elgar, 2016; Reus-Pons et al., 2017; Shen and Listl, 2017). Hu et al. (2016) provide a comprehensive overview of trends in socio-economic inequalities in SAH in Europe between 1990 and 2010. The authors observe declining trends in the prevalence of less-than-good SAH in many countries, particularly in Southern and Eastern Europe and the Baltic states. In all the countries, less-than-good SAH was more prevalent in lower educational and manual workers' groups. They also document that absolute inequalities in SAH were mostly constant, whereas relative inequalities increased for all the countries together. Further, they find that almost no country consistently experience a significant decline in either absolute or relative inequalities. Moreover, Braveman et al. (2010) examine socio-economic disparities across multiple health indicators and socio-economic groups in the United States. Their finding confirms those of previous studies (Adler and Rehkopf, 2008; Kunst et al., 2005), which show the existence of negative social gradients in health. The authors show that gradient patterns are seen often among non-Hispanic Blacks and Whites, but are less consistent among Hispanics. They conclude that health in the United States is often, though not invariably, patterned strongly along both socio-economic and racial/ethnic lines, suggesting links between hierarchies of social advantage and health.

In addition, Pförtner and Elgar's (2016) assessment of the trend of inequalities in self-rated

health in Germany shows a steady increase in poor SRH over the 10-year period from 2001 to 2011. They also observe a quadratic (inverted U-shaped) trend in material deprivation in the standards of living, which rose from 2001 to 2005, and then declined in 2011. A similar but non-significant trend was found in relative and absolute inequalities in SRH by material deprivation, which increased from 2001 to 2005 and then declined. Moreover, analysis by Hajizadeh et al. (2016) find that education- and income-related health inequalities were present in all five regions of Canada. Their results further suggest that education-related inequalities in health increased among women over time. In contrast, we find that the relative increase over time in the receipt of formal education by women explains narrowed gendered health differential.

1.4.2.2 Review of studies analysing social determinants of health inequality in the developing countries

Empirical studies on socio-economic related health inequality in developing countries are generally scant. Using 2002–04 World Health Survey data to examine socio-economic related health inequalities in 41 low- and middle-income countries (LMICs), Hosseinpoor, Bergen, Mendis, Harper, Verdes, Kunst and Chatterji (2012) find that wealth and education-related health inequalities were more pronounced in the low-income country group than in the middle-income country group. Both wealth and education were inversely associated with illness and diseases. Their study, however, suggests that chronic diseases are not necessarily diseases of the wealthy, finding unequal distributions across socio-economic groups in LMIC groups. Complementary studies on socio-economic related health inequalities in LMICs include Hosseinpoor, Bergen, Kunst, Harper, Guthold, Rekve, d'Espaignet, Naidoo and Chatterji (2012), Levesque et al. (2013), Boutayeb et al. (2013) & Vellakkal et al. (2015, 2013).

Using concentration curves and concentration indices, Wagstaff (2000*b*) compares inequality in mortality distributions among infants and children aged under five years in Brazil, Côte d'Ivoire, Ghana, Nepal, Nicaragua, Pakistan, the Philippines, South Africa and VietNam. His results suggest that, for the most part, inequalities in infant and under-five mortality favour the better-off, and that these inequalities vary between countries. Moreover, Van Doorslaer et al.'s (2001*a*) and Wagstaff et al.'s (2003) assessment of changes in child malnutrition inequality over time in Vietnam, show that inequalities in height-for-age in 1993 and 1998 are largely attributed to inequalities in household consumption and by unobserved influences at the community level. They also find that an increase in such inequalities is accounted for largely by

changes in those two influences. In the case of household consumption, rising inequalities play a part; more important have been the inequality-increasing effects of rising average consumption and the increased protective effect of consumption on nutritional status. In the case of unobserved community-level influences, rising inequality and general improvements are approximately equally important in accounting for rising inequality in malnutrition. In line with this study, we add to the existing literature by analysing changes in socio-economic related health inequality over a recent time period in a developing country context. We find changes in educational attainment, residential and racial compositions to play an important role in explaining rising inequalities in health.

Moreover, Paul and Valtonen (2016*b*) examine health inequalities in Russia and estimate the association of demography (gender and age) and SES (working status, income, geography of residence, living standard, wealth possession, and durable asset-holding) with perceived health over the period 1994–2012, using nationally representative datasets. The authors apply a random effects GLS model to examine the association of individual characteristics and individual heterogeneity in explaining self-perceived health status. In addition, they estimate a regression-based concentration index and decompose it into the determinants of health inequalities. Their results show that self-perceived health differences between the better-off and the worse-off reduced over the 18-year period. Their measure of health inequality (concentration index) indicates a change for better health for the better-off Russians; being employed matters in perceiving better health status among Russians in 2012. They conclude that self-perceived health differences in the Russian Federation have changed over time, and the differences are attributable to both changes in the distribution of the determinants of health, as well as changes in the association between the determinants of health and self-perceived health status.

Similarly, Paul and Valtonen (2016*a*) assess and quantify the magnitude of health inequalities ascribed to socio-economic strata from 1994 to 2013 in the Russian Federation. A balanced sample of 1,496 adult individuals extracted from the 1994 wave of the Russian Longitudinal Monitoring Survey (RLMS) is followed for stated self-perceived health status until 2013. A socio-economic strata index is constructed with a set of variables (adult equivalent household income, ownership of assets and living conditions) by applying principal component analysis (PCA). The authors use a regression-based CI to measure differences in self-perceived health status. They find that by 2013, the mean standardized self-perceived health status improved when compared to 1994. The absolute CI for non-standardized self-perceived health status

reduced from 1994 to 2013. This thesis complements Paul and Valtonen (2016*a*), estimating the change in decomposition of a concentration index, which takes into account dynamic changes in health over time, in contrast to a year-on-year analysis.

Other related studies that use the concentration curve and index to explore socio-economic health inequalities in developing countries include (Adeyanju et al., 2017; Huda et al., 2017; Xu and Xie, 2016; Yang and Kanavos, 2012; Zere et al., 2007). Using CIs, Yang and Kanavos (2012) empirically assess the magnitude of rural/urban disparities in income-related adult health status in China. They also use decomposition methods to unravel the determinants of inequalities and their variations across urban and rural populations. They find that the poor are less likely to report their health status as excellent or good. Such inequality is more pronounced for the urban population than for the rural population. Their decomposition results suggest that, for the urban population, a large portion of the inequalities are driven by non-demographic factors, among which, income, job status and education are the most important. For the rural population, they find income and education to have a prominent influence on inequality. Their findings suggest that policies targeting the poor, especially the urban poor, are needed to reduce health inequality.

Furthermore, Xu and Xie's (2016) re-examination of the associations between three sets of SES - human capital, material conditions, and political capital - and self-rated health among Chinese adults, finds significantly positive associations for education, family income, wealth, and political capital with self-rated health. Szwarcwald et al.'s (2005) analysis of the socio-demographic determinants of good self-rated health in Brazil, also finds persistent socio-economic health inequalities; good self-rated health is skewed to the better-off, rather than the poor. Updated evidence (De Souza Braga et al., 2016) suggests that persistent socio-economic health inequalities in Brazil might be attributed to the continuously unequal resource distribution among groups with different educational levels. In agreement with De Souza Braga et al. (2016), our analysis also suggests that higher education contributes significantly to improved socio-economic health inequalities over time.

Huda et al. (2017) report that stunting increased in Bangladesh, between 2004 and 2014. They find household economic status, maternal and paternal education, health-seeking behavior of the mothers, sanitation, fertility, and maternal stature to be the major contributors to the disparity in stunting prevalence. Moreover, Hangoma et al.'s (2017) investigation of changes in socio-economic inequality in stunting and fever in Zambia in 2007 and 2014, finds that

while average rates of stunting reduced in 2014, socio-economic inequality in stunting increased significantly; inequality in fever incidence also increased significantly, but average rates of fever did not reduce. The increase in the inequality of the determinants accounted for the largest part of the increase in inequality of stunting, while the increase in the effect of determinants explains a sizeable part of the increase. The determinants with the greatest total contribution (change in CI plus change in effect) to the increase in inequality of stunting were mother's height and weight, wealth, birth order, facility delivery, duration of breastfeeding and maternal education. For fever, almost all of the increase in inequality was accounted for by the increase in the effect of determinants of fever, while the distribution of determinants mattered less. The determinants with the greatest total contribution to the increase in inequality of fever were wealth, maternal education, birth order and breastfeeding duration. This thesis complements this study by examining changes in aggregated socio-economic related health inequalities in South Africa, using nationally representative surveys.

Zere et al. (2007) assess trends in inequities in selected indicators of health status and health service utilization in Malawi, and find that in most of the selected indicators there are pro-rich inequities and that they have been widening during the period under consideration. Furthermore, the authors observe vertical inequities in the use of interventions (treatment of diarrhoea, ARI among under-five children), in that the non-poor who experience less burden from these diseases receive more of the treatment/interventions, whereas the poor who have a greater proportion of the disease burden use less of the interventions. They also observe that the publicly-provided services for some of the selected interventions (e.g. child delivery) benefit the non-poor more than the poor. In contrast, Adeyanju et al. (2017) find that while inequalities in maternal care increased, inequalities in child care have declined over time in Nigeria.

Several studies confirm the influence of socio-economic factors in the determination of health outcomes and inequalities in South Africa (Alaba and Chola, 2014; Ataguba et al., 2011; Ataguba and Alaba, 2012; Ataguba et al., 2015; Booysen, 2003; Bradshaw, 2008; Burgard and Treiman, 2006; Burger et al., 2012; Charasse-Pouélé and Fournier, 2006; Coovadia et al., 2009; Gilbert and Soskolne, 2003; Gilson and McIntyre, 2007; Goudge et al., 2009; Harris et al., 2011; Kon and Lackan, 2008; Mayosi et al., 2012; Silal et al., 2014; Van Rensburg and Fourie, 1994; Zere and McIntyre, 2003). Van Rensburg and Fourie (1994) contextualise the complex problem of structural inequality in South African health care. They argue that socio-economic conditions, racial divisions and geographical location are the main determinants of inequality in the provision,

allocation and distribution of health care. They further contend that the prevailing inequalities are attributed to a wide range of underlying causes, including the absence of a central, binding health policy, the prominent role of apartheid and white domination, the free market and the medical profession, as well as the unique socio-cultural set-up of the country. They propose the urgent need for deliberate strategies to equalise the prevailing disparities and discrepancies. Ataguba and Alaba (2012) also suggest that success in tackling inequalities in health will be achieved in part through a cohesive intersectoral approach that addresses 'the causes of the causes'.

Booysen (2002) suggests that the public/private divide in health care persists, as do inequalities in health, especially in reproductive and maternal health. He posits that progress has not been equal across all provinces, and inequalities are consistently worse in Kwazulu-Natal, Mpumalanga, the Eastern Cape and Gauteng, than in other provinces. Moreover, Booysen (2003) provides evidence of substantial intra-urban health disparities, with inequality being worse in smaller urban settlements, as opposed to larger ones. He emphasises the important role the decentralisation of selected health services to local government is likely to play in addressing these inequalities, and the lack of service delivery at this level.

Gilbert and Soskolne's (2003) analysis of the relationship between health and a range of social factors in a specific social context of a relatively deprived community of Soweto, also reveals a clear relationship between health and a range of socio-economic indicators of inequalities. They find that health is significantly associated with a positive perception about the living environment and access to social resources. Their paper presents an interesting scenario, which, while reaffirming the already established connection between social differentials and health, also sheds light on a different social context and specific relationships with regard to health.

Harris et al. (2011) explore affordability, availability, and acceptability of services in South Africa through a nationally representative household survey, covering utilization, health status, reasons for delaying care, perceptions and experiences of services, and health-care expenditure. The authors find that socio-economic status, race, insurance status, and urban-rural location were associated with access to care, with black Africans, poor, uninsured and rural respondents, experiencing greatest barriers. Similarly, Kon and Lackan (2008) investigate ethnic disparities in obtaining medical care among the four major ethnic groups in post-apartheid South Africa, and find disparities not only in health, but in education, income, and basic public health infrastructures. They also find that socio-demographic characteristics and perceptions regarding

democracy, markets, and civil society were similar for blacks and coloureds and for whites and Asians. They conclude that fourteen years after the end of apartheid, blacks and coloureds in South Africa are still underserved and disadvantaged compared with their white and Asian counterparts, especially regarding health care.

In a related study, Gilson and McIntyre (2007) find that despite policy efforts, inequities in access and utilization between socio-economic groups remain. They identify the underlying challenges as worsening community perceptions of the quality of publicly provided care and the influence of insurance status on utilization patterns. They, however, suggest that further and more detailed evaluation of household-level policy impacts requires improvements in both the quality and detail of South African survey data, while enhancing consistency in survey design over time would also be beneficial. On the other hand, Burger et al.'s (2012) investigation of access to health services in South Africa finds that, between 1993 and 2008, there were improvements in physical access to public health facilities - as measured by reduced travel time. Our finding, which is similar to (Gilson and McIntyre, 2007), suggests that those with medical aid coverage are less likely to use public health care, and generally, South Africans are not necessarily enamoured by the public health care sector, even though they cannot afford the private sector.

Using a decomposition technique, Charasse-Pouélé and Fournier (2006) explore the sources of self-rated health status inequalities among South Africans, and find a strong indirect racial effect in health inequalities, in favor of whites. However, their analysis shows that the issue of direct racial discrimination on health is more complex and closely linked with that of economic inequality and discrimination. Their results, thus, suggest the necessity not only to open access, for Africans, to the more sophisticated sector of health care, but also to provide them with the economic opportunity to use it. In addition, Ataguba et al. (2011) demonstrate the existence of socio-economic gradients in self-reported ill-health in South Africa. They find that the burden of the major categories of ill-health and disability is greater among lower than higher socio-economic groups. Zere and McIntyre's (2003) assessment of the magnitude of inequalities in under-five child malnutrition using decomposition techniques, also finds considerable pro-rich inequalities in the distribution of stunting and underweight, though wasting does not manifest gradients related to socio-economic position. Among white children, they observe no inequities in all three forms of malnutrition. They find highest pro-rich inequalities in stunting and underweight among coloured children, and those children residing in metropolitan areas.

Other related studies that use decomposition technique to explain the contributions of socio-economic factors to health inequalities in South Africa include Alaba and Chola (2014), who examine the socio-economic inequalities in obesity among South African adults, and find that women are more obese than men. They also find that rich men are more likely to be obese than their poorer counterparts. Women, on the other hand, have similar obesity patterns, regardless of socio-economic status. The results of the decomposition analysis suggest that wealth contribute positively and significantly to socio-economic inequality in obesity among females. In the case of males, educational attainment and wealth contributed more to socio-economic inequalities in obesity. Furthermore, Ataguba et al. (2015) provide evidence on the relative contribution of different SDH to health inequality, and find that social protection and employment, knowledge and education, and housing and infrastructure contribute significantly to the disparities in good SAH. However, they find the contribution of income and poverty to be negligible. They recommend that tackling health inequalities might require an increased government commitment in terms of budgetary allocations to key sectors (i.e. employment, social protection, education, housing, and other appropriate infrastructure).

1.5 Gender Inequalities in Health

1.5.1 Motivation and Contribution

Gendered health inequality is argued to be a consequence of inequalities between men and women in many societies, and it is higher in sub-Saharan Africa than elsewhere (Chirowa et al., 2013; Hakura et al., 2016; Jayachandran, 2015). Gendered health inequality in sub-Saharan Africa has been socially attributed to gender bias in the distribution of resources, health care and socio-economic factors, amongst others (Okojie, 1994; Sen, 1999). Sen (1999) identifies lack of work outside the home, lack of education and lack of participation in household distribution of resources, as factors driving high gendered health inequalities in the developing countries. Okojie (1994) also promotes improvement in socio-economic status of women if gendered health inequalities are to be narrowed. Furthermore, Eshetu and Woldesenbet (2011) show that improving social determinants of health (SDH) turned out, in the review of Millennium Development Goals (MDGs), to be a major challenge in reducing gendered health inequality in Africa. According to the United Nations, gendered health disparity persists in most African countries (United Nations Development Programme, 2015).

Many studies have investigated socio-economic related gendered health inequality in developing countries (Boerma et al., 2016; Hosseinpoor, Williams, Amin, De Carvalho, Beard, Boerma, Kowal, Naidoo and Chatterji, 2012; Ntuli et al., 2016; Singh et al., 2013; Singh-Manoux et al., 2008). However, the existing empirical literature has applied static analysis to gendered health inequality and has often led to inconclusive results and debate among researchers. This debate leads us to seek an alternative strategy, one that focuses on estimating dynamic changes in gendered health differentials. Thus, this thesis aims at increasing our understanding of changes in socio-economic related gendered health inequality in a developing country context, using South African nationally representative surveys.

Earlier studies have primarily analysed health inequality at a fairly aggregated level in South Africa. A number of empirical studies (see Ataguba et al., 2011, 2015; Bradshaw, 2008; Burgard and Treiman, 2006; Christian, 2014; Gilson and McIntyre, 2007; Govender and Penn-Kekana, 2008; Harris et al., 2011; Harrison, 2012; Koch, 2009; Nteta et al., 2010; Omotoso and Koch, 2017) have examined issues of aggregate inequality in health, while only few empirical studies have been carried out on disaggregate level (Alaba and Chola, 2014; Cois and Day, 2015; Cois and Ehrlich, 2014; Myer et al., 2008; Wabiri and Taffa, 2013).

In particular, analysis of gendered health inequality is scarce in the literature (Cornell, 2013; Govender and Penn-Kekana, 2008; Kruger et al., 2012; Ntuli et al., 2016; Pillay and Kriel, 2006; Reddy et al., 2009; Stern et al., 2015). For instance, Ntuli et al. (2016) examine gender disparity in health, using the 2003 South African Demographic and Health Survey (SADHS). They show that the gendered health gap is largely driven by a relatively higher prevalence of health conditions among women. However, there are gaps in the preceding studies. Firstly, the link between socio-economic factors and gendered health inequality remains largely unexplored. It is important to consider this link, given the government's efforts, since the dawn of democracy, to reduce socio-economic related gender inequality in all aspects of life, and especially in health. Moreover, socio-economic related gendered health inequality has been, and is currently, at the core of global policy, including the UN Millennium Development Goals (MDGs), now Sustainable Development Goals (SDGs); South Africa is a signatory.

Secondly, the previous studies have not identified drivers of change in gendered health inequality. Hence, little is currently known about gendered health differentials and its socio-economic drivers, which are often targets of policies and reforms. Thirdly, the existing empirical literature mainly analyses gendered health differentials from a static viewpoint, while the main

empirical focus has been on decomposition to examine the role of health conditions on gendered health differentials at a given time. Estimating gendered health inequality from a static point of view does not uncover time dynamics in gendered health differential and may play down the effects of policies. Hence, dynamic assessment of gendered health differentials might lead to additional insight. It can also have significant implications for designing and implementing appropriate health interventions aimed at closing gendered health disparities.

Thus, our empirical contribution is three-fold. Firstly, we contribute to the existing literature by refining the methodological approach. Compared to the existing evidence, which is mostly based on static estimation, our evidence is based on dynamic estimation. Methodologically, we difference two separate Blinder-Oaxaca decompositions, which are also differences; thus, there is similarity between our differences-in-decompositions and differences-in-differences. Because the standard decomposition partitions the gender gap (in any year) into differences in both observed and unobserved factors, the differences-in-decompositions method partitions the changes in the gender gap (across those two years) into changes in both observed and unobserved factors. We examine relative changes in gendered health differentials, and their socio-economic drivers using two cross-sectional surveys between 2005 and 2014. Secondly, compared to other literature, we are able to include "unconditional social assistance", which captures one of the major policy thrusts aimed at reducing socio-economic and gender-related inequalities in South Africa. Thirdly, we provide evidence on the degree of gender inequality in health over the studied time period, which updates the previous literature. We further extend the analysis to examine the relative importance of the factors driving gendered health differentials. We find that the gender gap in health differentials narrowed over time. Our further investigation also reveals that the narrowing of the gender gap is mainly attributable to changes in educational attainment and social grant receipt, which are in favour of females relative to males.

1.5.2 Previous related literature

Though evidence on gendered health inequality is mixed and debatable, gender disparity in health can trigger other socio-economic inequalities, which can hinder economic development. Such inequalities relate to education attainment, labour force participation, productivity and income, for example. To a large extent, these undermine women's contribution to economic growth (Bloom and Canning, 2000; Ntuli et al., 2016; Wilkie et al., 2009).

In the literature, two contrasting views dominate the debate on gendered health differentials.

One view espouses the notion that females suffer poorer health than males, and that gendered health differentials associated with demographic and socio-economic factors, persist. Another view argues for the contrary. Studies on the former category dominate the literature. These studies, for example, have consistently found higher rates of morbidity among females than males (Boerma et al., 2016; Govender and Penn-Kekana, 2008; Hosseinpoor, Williams, Amin, De Carvalho, Beard, Boerma, Kowal, Naidoo and Chatterji, 2012; Malmusi et al., 2014; Ntuli et al., 2016; Singh et al., 2013; Singh-Manoux et al., 2008). This thesis contributes to a growing literature on gendered health differentials in a developing country context.

Boerma et al. (2016) examine the association between country gaps in self-reported health between the sexes with societal and other background characteristics, using World Health Surveys 2002–04 on respondents 18 years and over, from 59 countries. They find that women reported significantly poorer health than men on all self-reported health indicators. Their analysis further suggests that a mix of biological factors and societal gender inequalities are contributing factors to the gender gap in self-reported measures of health. They also find that the main factors affecting the size of the gender gap in self-reported health were the female-male gaps in the prevalence of chronic conditions, especially arthritis and depression and gender characteristics of the society. The authors conclude that large female-male differences in self-reported health and functioning, equivalent to a decade of growing older, consistently occurred in all regions of the world, irrespective of differences in societal factors.

Similarly, Hosseinpoor, Williams, Amin, De Carvalho, Beard, Boerma, Kowal, Naidoo and Chatterji (2012) investigate the social determinants of self-reported health in women and men, and male-female differences in health, employing multivariate linear regressions. Further, they use Blinder-Oaxaca decomposition to partition the inequality in health between women and men into explained and unexplained components. They find that women's health was significantly lower than men's. In the pooled analysis, they find that 30% of the inequality was explained: of which almost 75% came from employment, education and marital status. Moreover, they find that the differential effects of being in paid employment increased inequality. When they compare countries in Africa and Europe, their result indicates that the explained component was largely attributed to the social determinants in the African countries, and to women's longevity in the European countries; being in paid employment had a greater positive effect on the health of males in both regions. They conclude that ways in which age and the social determinants contribute to the poorer health status of women, compared with men, vary between groups of

countries. Their study highlights the need for action to address social structures, institutional discrimination and harmful gender norms and roles that differently influence health with ageing. We complement and build on these findings by exploring the contributions of social determinants to changes in gendered health differentials in a specific African country context. We find that education and receipt of social assistance play an important role in narrowing the gender gap in health over time.

Using a universally agreed definition of disability based on the International Classification of Functioning, Disability and Health, Hosseinpoor, Williams, Jann, Kowal, Officer, Posarac and Chatterji (2012) examine how, apart from age, social and economic factors contribute to disability differences between older men and women. World Health Survey data were analyzed from 57 countries drawn from all income groups defined by the World Bank. They compute disability prevalence for males and females by socio-demographic factors, while multiple logistic regression was used to estimate the adjusted effects of each social determinant on disability for males and females. They also use a variant of Blinder-Oaxaca decomposition to partition the measured inequality in disability between males and females into the "explained" and "unexplained" parts. They find that lower levels of education and economic status were associated with disability in women and men. Approximately 45% of the sex inequality in disability was attributed to differences in the distribution of socio-demographic factors, while nearly 55% of the inequality results from differences in the effects of the determinants. The authors conclude that there is an urgent need for data and methodologies that can identify how social, biological and other factors separately contribute to the health decrements facing men and women as they age. Although we are not directly able to offer evidence related to their suggestion, we assess dynamic changes, as opposed to static analysis, in gendered health inequalities. We also find education to explain narrowed gendered health differentials over time.

Borrell et al. (2014) review empirical papers that assessed the effect of gender equality policies on gender inequalities in health or on women's health, using between-country (or administrative units within a country) comparisons. They conduct a literature search covering the period from 1970 to 2012, using several bibliographical databases. Their review partially supports the hypothesis that Nordic social democratic welfare regimes and dual-earner family models best promote women's health. On the other hand, Williams et al.'s (2013) examination of the associations between SES and changes in the general health and mental health of a cohort of Australian women progressing in years from 45–50 to 59–64, shows that, after adjusting

for the effects of time and possible confounders, the general (mental) health of the cohort of mid-aged women declined (increased) over time; higher SES women reported better health than lower SES women, and SES significantly modified the effects of time on both general and mental health in favor of higher SES women. Their study contributes to the current understanding of how socio-economic and demographic factors, health behaviors and time impact on changes in the general and mental health of women. While our data did not allow for analysis on mental health, in line with Williams et al. (2013), we also contribute to the current understanding of how socio-economic and demographic factors influence changes in gendered health differentials in South Africa.

In a study on gender-based inequalities in health, Denton et al. (2004) examine the extent to which gender-based inequalities in health reflect the different social experiences and conditions of Canadian men's and women's lives. The study addresses four specific questions: (1) Are there gender differences in mental and physical health? (2) What is the relative importance of the structural, behavioural and psychosocial determinants of health? (3) Are the gender differences in health attributable to the differing structural (socio-economic, age, social support, family arrangement) context in which women and men live, and to their differential exposure to lifestyle (smoking, drinking, exercise, diet) and psychosocial (critical life events, stress, psychological resources) factors? (4) Are gender differences in health also attributable to gender differences in vulnerability to these structural, behavioural and psychosocial determinants of health?. Their multivariate analyses of gender differences in health (measured by self-rated health, functional health, chronic illness and distress) show that social structural and psychosocial determinants of health are generally more important for women, while behavioural determinants are generally more important for men. Gender differences in exposure to these forces contribute to inequalities in health between men and women, however, statistically significant inequalities remain after controlling for exposure. Gender-based health inequalities are further explained by differential vulnerabilities to social forces between men and women. Their findings suggest the value of models that include a wide range of health and health-determinant variables, and affirm the importance of looking more closely at gender differences in health. We contribute to the literature by employing a model, which is similar to differences-in-differences approach, to capture changes over time in gendered health differentials and its social determinants.

Malmusi et al. (2014) explore whether the unequal gender distribution of roles and resources can account for inequalities in male/female self-rated health (SRH), across social classes, in a

Southern European population. The study adopts a cross-sectional design and Poisson regression models were used to calculate the fair/poor SRH prevalence ratio (PR) by gender and to estimate the contribution of variables assessing several dimensions of living conditions as the reduction in the PR after their inclusion in the model. Analyses were stratified by social class (non-manual and manual). Their results show that SRH was poorer for women among both non-manual and manual social classes. The authors suggest that gender inequalities in individual income appear to contribute largely to women's poorer health. Individual income may indicate the availability of economic resources, but also the history of access to the labour market and potentially the degree of independence and power within the household. They further suggest that policies to facilitate women's labour market participation, to close the gender pay gap, or to raise non-contributory pensions may be helpful to improve women's health. Unfortunately, our analysis does not find labour market participation to significantly contribute to gender differences in SRH. However, we find that education contribute to narrowed gendered health differentials over time.

Employing data from Turkey and the United States, Soytas and Kose (2014) analyse determinants of gender differences in self-reported health status. They estimate ordered logit models to quantify the effects of factors that prove important in SAH outcomes. While their findings on the relationship between socio-economic status indicators and SAH level match earlier findings, a significant gender gap remains even with controls for chronic illnesses. Põld et al.'s (2016) analysis of the associations between SRH and socio-economic position (SEP) among adults in Estonia in 1996–2014, finds that good SRH was significantly associated with being younger, educated, increased income and employment opportunities among both men and women. However, they find that good SRH was more prevalent among Estonian women and less prevalent among single men. In contrast, a similar study by Singh-Manoux et al. (2008) finds morbidity to be consistently higher among males than females.

Other related studies that infer similar conclusions about gender differences in health include (Cowling et al., 2014; Gilmore et al., 2002; Ng et al., 2010; Razzaque et al., 2010; Singh et al., 2013; Szwarcwald et al., 2005). Gilmore et al. (2002) find that women are at an increased risk of poor self-rated health compared with men, and identify socio-economic factors, including poor material situation, and psychosocial factors including low control over life, as the determinants. Szwarcwald et al. (2005) also find incomplete education and material hardship as factors that contribute most to the deterioration of health perception among females in Brazil.

According to Singh et al. (2013), poor self-rated health was more common among women than men, and higher among Muslims, Scheduled Castes, and women residing in rural areas in India. On the contrary, Ng et al. (2010) report that older men have better self-reported health than older women in Africa and Asia. Their analysis suggests that differences in household socio-economic levels, age, education levels, marital status and living arrangements explain a considerable proportion of the gaps in health observed between men and women in South Africa and Kenya, than in Bangladesh. Their finding is similar to Razzaque et al. (2010), who document that health was better for males than females in Bangladesh, and health deteriorates with increasing age. Their findings also suggest that married individuals or those in partnerships had generally better health than those who were single. Better health was also associated with higher levels of education and asset score. On the other hand, Ntuli et al.'s (2016) investigation of gender disparity in health in South Africa, using the South African Demographic and Health Survey of 2003, find that South African women are more likely to suffer from poor health than men. They also show that the health gap is largely driven by a relatively higher prevalence of health conditions among women, rather than by the severity of the conditions that they face. Their results further reveal that the gender health gap exhibits little variation across age groups but persists in old age.

This thesis extends and updates existing evidence on health and health inequality, using recent nationally representative data and refined techniques. Specifically, it provides an in-depth analysis of changes in aggregated and disaggregated socio-economic health inequalities over the second decade of post-apartheid South Africa. From a developing country context, the thesis complements the growing literature on health inequality and fills the hitherto overlooked aspect of disaggregated health inequality.

1.6 Summary

In summary, the thesis contributes to the existing literature in several ways. Firstly, the thesis presents an updated, more dynamic and comprehensive assessment of South African trend profiles for key health indicators across a broad spectrum of socio-demographic variables. By so doing, the thesis extends the existing evidence base. Secondly, the thesis uses a refined methodological approach to uncover time dynamics in health inequality, by assessing changes in socio-economic inequalities in a number of health indicators, and the effects of changes in the SDH on the health inequalities over the second decade of post-apartheid South Africa. Thirdly,

using the methodology of antecedent studies in labour economics, the thesis analyses dynamics in gendered health differentials, and also assesses the contribution of observed characteristics in explaining those differentials. The methodology allows for the estimation of the influence of changes in social determinants on changes in gendered health differentials over time, and thus, allows for the correlation of some post-apartheid health policies, indirectly, with either a widening or narrowing of gendered health differentials.

Data was sourced from the nationally representative SAGHS, covering the years 2004-2014. Demographic and socio-economic variables considered include age, race, gender, province, rural/urban locale, education, labour market participation, housing and access to social grants. Both academic and policy-oriented literature in both developed and developing countries has shown that socio-economic factors are important in determining health and health inequality, for instance, more years of schooling is usually associated with better health outcomes (see Brunello et al., 2016; Fletcher, 2015). Thus, this informs the inclusion of some of the socio-economic variables considered in our analysis.

Moreover, socio-economic variables such as education, social grants, employment and housing were not just included in the analysis because of evidence from the literature or data availability, but were included to capture the realities of changes in the socio-economic outlook of the country. For instance, since the emergence of democracy in South Africa, policy effort has gone into redressing all forms of socio-economic related inequalities, creating a more equitable national system, and improving access to education, social grants, employment, housing and health care, especially for the previously disadvantaged groups. Over the post-apartheid period, there has been a relative increase in receipt of formal education and social grants by black Africans, for example (Patel, 2012; Schiel et al., 2016). In particular, the non-contributory old age pension and child grant have a strong racial dimension, with a considerable proportion of black Africans and coloureds as beneficiaries. Thus, understanding the impact of changes in social determinants on health and health inequality sheds light indirectly on the overall intersectoral performance of targeted sectors aimed at improving health and health equity. Key social determinants such as education, employment and housing can be manipulated by policy to improve equality of access to economic opportunities, which may lead to improved health outcomes, equalities and spillover positively on health (Marmot, 2005; Safaei, 2015).

The thesis uses parametric regressions (linear probability and logit models) and non-parametric analysis (lowess) to estimate trends in key health indicators across a range of socio-demographic

factors. Moreover, the thesis uses a decomposition of change in a concentration index and differences-in-decomposition techniques to examine the extent to which changes in aggregate and gender-level health inequalities, respectively, can be attributed to changes in social determinants.

There are several findings. It is found that there are declining trends in medical aid coverage and the general population's preference for the utilisation of public health care, while reports of ill-health status increase slightly over time. Similarly, there is a decrease over time in the probability that an individual, who is covered by a medical aid scheme, would prefer to utilize public health care in the event of illness. These results are consistent with previous findings (Christian, 2014; Harris et al., 2011). Differences across socio-demographic variables are also noted. For instance, females, compared to males, are more likely to prefer to utilise public health care, when ill. Utilization of health care also varies across the provinces; utilisation of private health care is higher in relatively richer provinces. The decline in the membership of medical aid schemes is strongest in the lower tail of the age distribution, and educational attainment is highly correlated with membership. The thesis also finds supporting evidence for the relevance of educational attainment and racial differences in explaining rising inequalities in medical aid coverage and utilisation of private heath care. Further findings also suggest that changes in health status inequality is driven by changes in the composition of those residing in urban areas and in relatively richer provinces.

Furthermore, findings reveal that the gender differential in health narrowed over time. The narrowing of that gap is attributable to changes in educational attainment and social grant receipt. Specifically, there has been a relative increase in receipt of formal education and social grants by South African females. The educational system of the country has also changed drastically, since the emergence of democracy. There has been improvement in the distribution of educational attainment, because of education policies and reforms including a 'return to school' policy for girls who fall pregnant while in school, the establishment of the Gender Equity Unit and the Gender Equity Directorate Act, the Girls Education Movement (GEM) and 'Techno-Girl Programme', amongst others (Moletsane, 2010). These programmes and policies are aimed at increasing females' average schooling participation and gaining gender parity in education.

From a policy perspective, the results highlight the need for further inter-sectoral policies that can improve the conditions in which people live and, thus, reduce socio-economic related health inequality in South Africa. Moreover, improvements in gender equality, as it relates

to health, might be furthered by policies addressing inequality in educational attainment and social protection. These policies might play a decisive role in further reducing gendered health differentials in the short run, as well as the long run.

Chapter 2

South African Trends in Health Outcomes and Health-related Behaviour: Evidence from Repeated Cross-Sectional Surveys

[1]

2.1 Introduction

The importance of measuring health outcomes and associated health-related behaviour for monitoring health care system performance is well-established (see Bradshaw, 2008; Bradshaw et al., 2000; Coovadia et al., 2009; Culyer and Wagstaff, 1993; Mackenbach et al., 2008). Health policies and reforms serve as significant and potent tools for improving health outcomes and health-related behaviour. In many cases, these policies are specifically targeted to improve sanitation and other social determinants of health, reduce the burden of disease, improve equitable access to basic health services and/or ensure universal health care coverage in an attempt to guarantee financial risk protection in health service utilisation. In order to understand which areas to target or which policies have been beneficial, proper and timely assessment of key health outcomes have the potential to underpin goal-setting and policy direction (see Kozhimannil et al., 2012; Rathod et al., 2014), and may represent valuable feedback for policymakers. In this research,

[1] A revised version of this chapter was peer-reviewed and published in Development Southern Africa. The article can be accessed from http://www.tandfonline.com/doi/abs/10.1080/0376835X.2017.1360175

we provide a dynamic assessment of key health outcomes in South Africa, with the primary purpose of indirectly assessing health sector performance. We also relate that performance to policy objectives over the time period to determine the level of concordance between broad outcomes and stated objectives.

South Africa is committed to the health of her citizens and equitable access to better health care services (Booysen, 2003). This right to health is rooted in the South Africa's Constitution, which specifies that 'everyone has the right to have access to health care services, including reproductive health care' (see South Africa Constitution, 1996, Section 27(1)(a)). Since 1994, which marked the end of Apartheid, the South African government has embarked on a number of health care system reforms, including restructuring and re-engineering policy to redress some of the damaging impacts of Apartheid, and creating a more coherent and unified national health system. These reforms and policies have been documented systematically (see Chopra et al., 2009; Dhai, 2011; Govender et al., 2013; Harrison, 2012; Ruff et al., 2011), and prioritised in the South African government's development agenda; furthermore, an increasing share of general government expenditure is being allocated towards their implementation (Christian, 2014).

While it is obvious the South African government aims to improve health outcomes and achieve other health goals, such as equitable provision and financing, focusing on the availability and affordability of health care misses other vital issues that are relevant when describing the performance of the system. For example, from 1997 to 2006, mortality increased, although it has been declining since 2006 (Statistics South Africa, 2014*b*). Relatedly, the burden of disease associated with AIDS and TB, along with a persistently high fatality rate from injury, has been increasing. In other words, health outcomes in the country are poor, relative to total health expenditure (Bradshaw et al., 2003; Harrison, 2012). Within the context of affordability, even though some studies suggest that free primary health care, introduced in both 1994 and 1996, increased registration and facility utilisation (see Bayat and Cleaton-Jones, 2003; Harrison, 2012; McCoy and Khosa, 1996), more recent research suggests the policy did not translate as directly into increased utilisation when confronted by need, i.e., following illness or injury, (see Brink and Koch, 2015; Koch and Racine, 2016). Over time, the initial successes documented by McCoy and Khosa (1996) and Bayat and Cleaton-Jones (2003), amongst others, dissipated, given the resources available in the system (Harrison, 2012). Thus, it remains unclear, even, whether improved affordability has resulted in the improvements expected.

In many instances, policymakers are more concerned over availability and affordability than

the more relevant question, which is whether or not users prefer to utilise such publicly-provided services in the event of illness, a concern that arises Brink and Koch's (2015) and Koch and Racine's (2016) analysis. Given policymaker concerns, the demand-side health issues are largely pushed aside, noticeably absent from policy feedback and are, therefore, insufficiently researched (see Christian, 2014; McIntyre et al., 2009; Thiede et al., 2007). According to Christian (2014), this is particularly true with regard to the access dimension of the health care system. Although a number of studies (see Ataguba et al., 2011; Bradshaw, 2008; Burgard and Treiman, 2006; Christian, 2014; Gilson and McIntyre, 2007; Harris et al., 2011; Harrison, 2012; Koch, 2009; Nteta et al., 2010) have examined South Africa's health care system, little is known about demand-side behaviour, and even less is known about the dynamics of that behaviour. Bradshaw (2008) examine trends in the determinants of health status using data sources, ranging from 1996 to 2007. She finds that extreme wealth inequalities and high levels of unemployment probably play an important role in poor health outcomes in South Africa. In a similar vein, Koch (2009) examined medical aid scheme coverage rates using General Households Surveys (GHS) covering the years 2002 to 2007. He finds that coverage rates are quite low, and differ across age groups, population groups and gender over the anaylsed time period. On the other hand, Christian (2014) investigation of the factors linked to access in the South African public health sector, using the GHS data from 2002 to 2012, revealed that although issues of acceptability and availability persist, equity has been achieved in terms of making public health care services more affordable, especially for the most vulnerable population groups of South African society. Our work, which is similar to these preceding studies, is undertaken differently in that we cover a variety of health indicators namely health status, medical aid access and access to health care services, simultaneously. Moreover, more recent data is available. Therefore, an examination of the trends and determinants could shed additional light. Hence, our focus in this study is on the patterns and determinants of the demand-side issues associated with access to medical aid coverage, health status, health-seeking behaviour, as well as preference for the utilisation of public health care facility in the event of illness. In our analysis, we give some consideration for the peculiarity of the relationship between medical aid coverage status and choice of either public or private health care facility.

Examining trends in a set of health related variables across a range of socio-demographic variables, to some extent, provides a basis for measuring achievement, or otherwise, of the afore-mentioned goals of ensuring improved health and equitable access to better health care services.

Moreover, if South Africa is to make progress towards the new Sustainable Development Goals (SDGs) and universal health care, deficiencies in the health care-related areas of the SDGs need to be identified for appropriate health policy interventions. In this study, particular attention is paid to trends and dynamics that are observed in health status (measured by ill-health), health treatment-seeking behaviour (measured by 'stated preferences' for public health facilities, rather than 'revealed preferences') and health insurance (measured by medical aid scheme coverage); post-Apartheid health reforms and policies serve as the backdrop to these dynamics, although it is not possible to uncover the causal relationship between any one policy and the health trends that are observed and described, below.

2.2 The data and methods

Data from the GHS were analyzed using Stata 14 (StataCorp, 2015). We do not focus on causality at this stage; rather, we focus on the patterns within the data over the surveys in an effort to uncover stylised facts that might be revealed. Empirical estimates include simple percentages, some graphed for ease of reference, along with parametric (logit) and nonparametric regression (lowess). Both the logit and lowess were used to examine medical aid coverage, ill-health status and preference for public health facility utilisation, which are all dichotomous variables. In the logit regression model, an additional set of parametric estimates included interaction terms, allowing for socio-demographic differentiation across the years. For the analysis, sample weights were used to reflect the survey methodology, and these weights were adjusted to account for pooling 13 years of data.

2.2.1 Methods

The graphical illustrations were based on Cleveland's (1979) non-parametric locally weighted scatter plot smoothing, known as lowess (or Loess). Lowess does not impose a functional form on the data; rather, it allows the data to determine the shape of the relationship between two variables Ntuli et al. (2016). Consider an unspecified empirical relationship, as in (2.1).

$$H_i = f\left(x_i\right) + \upsilon_i \tag{2.1}$$

In the typical analysis, υ_i is assumed to be uncorrelated with the variable of interest, x_i and the function f is to be estimated. It is estimated from weighted linear models in neighbourhoods

of x_i, with weights w_i.

$$w_{ij} = \frac{c_i}{\lambda} d\left(\frac{x_i - x_j}{\lambda}\right) \tag{2.2}$$

The constant c_i normalises the weights to sum to one, λ is a bandwidth, and d is a function that treats observations farther away as being less important. In this analysis, d is the tricube function.

$$d_t = \begin{cases} \left(1 - t^3\right)^3 & \text{if } t \in [0,1] \\ 0 & \text{otherwise} \end{cases}$$

For the analysis H represents the health variables (ill-health, medical aid coverage and health care preference), for selected years and socio-demographic subsets, and x is age; we graphically illustrate the estimated relationship. We specify a constant bandwidth of 0.8, implying that 80% of the sample was used to smooth each point.

Due to the binary nature of the dependent health variables of interest, the parametric estimation was based on a logit model which is appropriately weighted to the population and robust to heteroskedasticity.

$$H_i = L\left(\alpha T + \beta X_i^{'}\right) + \upsilon_i \qquad T = \{2014 - year\} \qquad year = \{2004, 2005, ..., 2014\} \tag{2.3}$$

In (2.3), in addition to the variables already noted, X denotes all controls, including age, T denotes the trend in the health variables and L is the functional notation for the standard logistic distribution. The marginal effects for the health variables are reported in Table 2.2. In further analyses, we use year dummies, rather than the trend variable T. Those results are presented in Table A.2.2 in the appendix.

2.2.2 Data Source

The data used in this analysis was sourced from General Household Surveys (GHSs). The GHSs are repeated cross-sectional household surveys collected annually by the national statistical agency, Statistics South Africa (StatsSA), with new samples drawn each year (Statistics South Africa, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012*b*, 2013, 2014*a*)[2].

[2]The GHS datasets are publicly available and could be accessed from `https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/526/get_microdata`

The annual survey collects a range of demographic and socio-economic information on households and individuals across the country's nine provinces. Survey questions relate to housing services, social services, socio-demographic information, labour markets, and household tourism activities. Most pertinent to this analysis, there is a short series of health-related questions covering illness, injury, categories of disease/illness, health care treatment-seeking behaviour, the level of satisfaction with health facilities and access to medical aid coverage, amongst others.

Each year, the sample includes approximately 30,000 households, and that sample follows a multi-stage stratified design, such that, each sample is representative at both the national and provincial levels within any year; population weights are available in the surveys for both households and individuals. However, combining the data across the years does require care, due to differences in the underlying sample frame. For the 2002 to 2011 GHS datasets, demarcations for the 2001 census served as the basis for sampling design and enumeration areas, although there was a need to adjust due to provincial boundary changes in 2006 and 2011. The 2012-2014 GHS datasets incorporate the 2011 census. A two-stage weighting procedure was applied to the GHS datasets. Weighting and benchmarking were also adjusted for the provincial boundaries that came into effect in 2006 and 2011, making the data from GHS 2002 to GHS 2014 comparable[3]. To account for the different survey designs among the datasets used in this paper, we use the adjusted survey weights provided by StatsSA, but modify them for use across multiple surveys[4]

As suggested earlier, this study utilized thirteen sequential survey waves (2002-2014)[5]. Information collected in the GHS that is consistent across all the surveys and relevant for the analysis includes: age; gender; race (African Black, Coloured, Asian/Indian and White); marital status (married, widow/widower, divorced/separated and single); household expenditure (in five quintiles);[6] employment status; highest level of education completed (no schooling, less than diploma, diploma/certificate, university degree, and postgraduate degree); province; urban/rural setting; illness/injury status; categories of disease for the ill; health facilities utilisation/preference; disability and access to medical aid coverage.

[3]For details on the derivation of the GHS weights and other adjustments made in the datasets, see respective survey metadata files and technical notes' sections of the statistical release - https://www.datafirst.uct.ac.za/dataportal/index.php/catalog

[4]The resultant pooled survey weights were adjusted by dividing the pooled weight by a common factor $1/k$ (k = # of datasets pooled) - see (Thomas and Wannell, 2009) for more details)

[5]The datasets were cleaned by excluding "don't know's", as well as other unspecified responses in variables relevant for our analysis

[6]Expenditure category values (R0 - R399, R400 - R799, R800 - R1199, R1200 - R1799, R1800 - R2499, R2500 - R4999, R5000 - R9999, R10000 or more per month) did not change over time in the surveys; thus, these are nominal. We used the quintiles values, rather than reported values for the analysis, which allows for the values to be interpreted as relative expenditure in any year. Intertemporal bracket creep, unfortunately, would incorporate both real gains and inflation.

In the surveys, health status is based on whether or not the respondent suffered from any illness or injury during the past month. Illness was further investigated by asking those who reported to have suffered from an illness to specify what type of illness or disease they suffered; they were able to select from a set of binary-coded categories of diseases. In the same vein, medical aid coverage status was measured by asking respondents whether they were currently covered by a medical aid or benefit scheme or other private health insurance at the time of the survey. Those answering in the affirmative are classified as medically insured, while those answering in the negative were categorized as uninsured.

Furthermore, in some years (2002-2008), respondents were asked if they sought treatment or consulted a health worker, e.g., a nurse, doctor or traditional healer, as a result of the illness. If treatment was sought, further probing occurred, as respondents were asked where the consultation took place; whether in private or public health facilities. Since this line of questioning was not consistent across the surveys, a different indicator of health facility 'choice' is examined, instead. Specifically, respondents (from 2004-2014) were asked if they would seek care in either a public or private health facility in times of illness. In this research, we refer to the responses received as a 'preference' for public or private care, even though it does not represent revealed preferences.[7] Given that this latter query was available for more years, our analysis focuses on these 'preferences'. In addition to questions about health facility usage or preference, there are a number of questions related to illness and disability.[8] However, neither disabilities nor illnesses are incorporated in the following analysis. A number of other questions were also asked in these surveys that are related to health outcomes. For example, reasons for not consulting any health worker, if ill during the past month, were also requested in early surveys.

Despite consistency in the phrasing of many questions across the surveys, the potential for inconsistency in responses still exists. For example, surveyors could emphasise different sets of questions or responses in any survey or household; furthermore, surveyors or data capturers could miscode responses. Errors could also arise because of misunderstanding of the survey

[7] In reality, attendance decisions are affected by availability and cost, as well as views on quality; thus, responses do not represent actual preferences over the ownership of the health facility.

[8] For disability, a binary-response question was asked. Is the respondent limited in his/her daily activities, at home, at work or at school, because of a long-term physical, sensory, hearing, intellectual, or psychological condition, lasting six months or more? To further confirm the extent of the disability, respondents were requested to list the difficulties by answering a series of binary – yes/no – questions related to the difficulties encountered that have lasted for at least 6 months. Similar queries were in place regarding the type of illness suffered by the respondent.

questions, or uncertainty about other household members[9] or even deliberate distortion of responses (Baltagi, 2008). As long as the errors are randomly distributed over time and within surveys, the effects on what is reported below should be minimal; however, non-random errors, such as deliberate distortion or selective non-response, could lead to over (or under) reporting of certain events, which could yield higher (or lower) trends than actually occurred. Although it is not possible to address such concerns, we take cognizance of them during the analysis.

2.2.3 Data Summary

To get some idea of the variables in the data, before undertaking the analysis, we report summary statistics for the main variables. These are presented in Table 2.1, and cover the years 2002-2014. These are not separated by year, although such information can be requested from the authors. The main outcome variables, though, are presented across the years in Table A.1.1, and illustrated in Figure 2.1.

As can be seen in Figure 2.1, there are observable differences in medical aid coverage, ill-health and treatment-seeking behaviour, although there is no obvious increasing or decreasing pattern in any of these variables. Instead, there are peaks and valleys. Reported illness peaked in 2009, as did treatment-seeking, while medical aid coverage peaked in 2013. On the other hand, reported illness and treatment-seeking was lowest in 2013, the same year that medical aid coverage was highest, while the trough in medical aid coverage occurred in 2005. Generally, health care treatment-seeking behaviour is lower than reported illness, while treatment-seeking and medical aid cover do not obviously mirror each other, which does suggest that access to treatment is not, at least entirely, determined by private third-party payers. This might imply that Primay Health Care aimed at increasing access is, to some extent, effective, such that more people, especially young children and pregnant women, are able to gain access to health care services without necessarily belonging to a medical aid scheme.

Despite these peaks and troughs, we observe an overall improvement in health, as a smaller proportion of the population is reported ill in 2014 than in 2002. It is possible that the increase in ill-health between 2007 and 2010 are associated with the roll-out of ARVs – although the prevalence of HIV/AIDS may not have changed much in that time period, access to ARVs could have increased testing and the number of people reporting illness. Moreover, the increase could be linked with the emergence of drug-resistant TB in 2006 and the increased number of TB

[9]It should be understood that the surveys are completed by a responsible adult household member who is available, rather than by everyone.

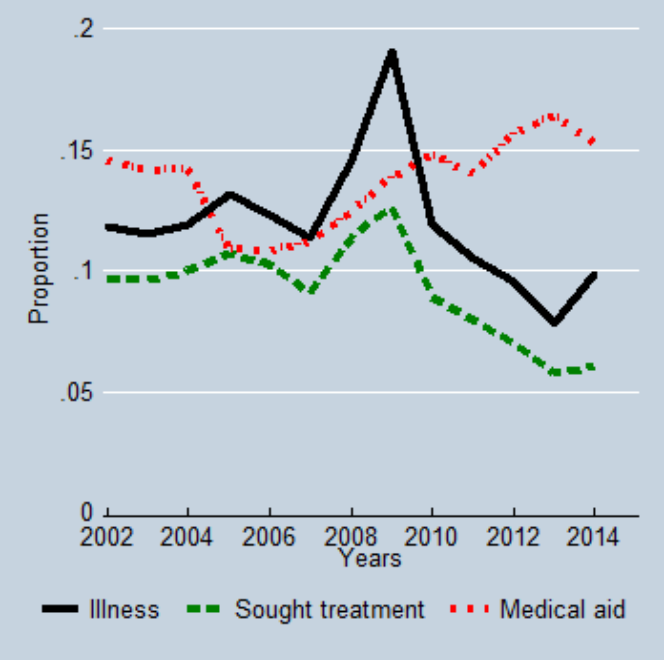


Figure 2.1: Trends in our key health-related variables in South Africa, GHS 2002-2014. The key variables are: medical aid coverage, reported illness and seeking treatment when ill. Proportions of these outcomes are illustrated for each year of the GHS.

patients that sought treatment in 2009 (Churchyard et al., 2014). The decline from 2010, on the other hand, is at least in part, associated with the launch of the initiative to re-engineer Primary Health Care in 2010. As noted earlier, this re-engineering extended to chronic non-communicable diseases, and required Primary Health Care to assume a stronger preventive role in the health sector. With respect to medical aid coverage, the reversal of the drop in coverage up to 2005 can be attributed to the introduction of the Government Employees Medical scheme (GEMS), which extended coverage to previously uninsured government employees starting in 2005 (see Govender et al., 2013).

Table 2.1 presents sub-sample proportions across a wide-range of categorical variables. The sub-samples are those reported ill or injured in the last 30 days, those having medical aid coverage and those who would (prefer to) use a public health facility, if they were ill.[10]

[10]In the early years of the GHS, respondents would be asked questions focused more on revealed preferences. Specifically, if an individual reported an illness/injury, they would be asked if care was sought for the illness/injury. In those years, the number observed utilising public health facilities would necessarily be lower than the number reported ill. In 2004, the focus changed to scenario preferences – what would they do if they were ill/injured – and, therefore, the relative number of observations switched across the sub-samples. In subsequent analysis, we limit our attention to the years 2004-2014.

Table 2.1: Descriptive statistics, data from the 2002-2014 General Household Surveys.

	Ill-health status		*Public health facility*		*Medical aid coverage*	
Variables	Obs.	%	Obs.	%	Obs.	%
Age						
Less than 6 years	19,125	12.6	108,833	12.8	16,113	9.3
6-17 years	24,549	16.1	228,846	26.9	37,878	21.7
18-30 years	24,412	16	202,263	23.8	29,794	17.1
31-45 years	30,095	19.8	141,501	16.6	44,102	25.3
46-64 years	35,551	23.3	117,746	13.8	36,249	20.8
65 years +	18,609	12.2	51,585	6.1	10,042	5.8
Race						
African/Black	120,939	79.4	739,353	86.9	83,508	47.9
Coloured	16,889	11.1	91,810	10.8	24,477	14.1
Indian/Asian	3,039	2	9,777	1.1	9,519	5.5
White	11,474	7.5	9,834	1.2	56,674	32.5
Gender						
Male	63,498	41.7	394,036	46.3	84,332	48.4
Female	88,843	58.3	456,738	53.7	89,846	51.6
Marital Status						
Married	48,969	32.2	185,726	21.8	78,090	44.9
Widow/Widower	16,954	11.1	50,764	6	6,308	3.6
Divorced or Separated	5,171	3.4	14,882	1.8	4,243	2.4
Single	81,185	53.3	598,924	70.4	85,424	49.1
Education						
No Schooling	36,181	24	172,926	20.5	17,932	10.4
Less than Diploma	105,539	69.9	651,719	77.4	11,3194	65.6
Diploma/Certificate	5,641	3.7	13,333	1.6	21,924	12.7
Honours/Degree	3,090	2	3,798	0.5	16,555	9.6
Postgraduate	553	0.4	289	0.001	2,848	1.7
Employment status						
Employed	31,924	21	132,623	15.6	66,525	38.2
Not Employed	120, 417	79	71,8151	84.4	107,653	61.8
Metropolitan status						
Rural	61,742	40.5	433,448	50.9	27,767	15.9
Urban	90,599	59.5	417,326	49.1	146,411	84.1
Household expenditure						
Quantile 1	17,398	40.4	77,669	51.1	3,084	5.8
Quantile 2	6,651	15.5	28,696	18.9	2,837	5.3
Quantile 3	9,633	22.4	33,097	21.8	12,286	23.0
Quantile 4	9,362	21.7	12,552	8.3	35,203	65.9
Medical aid coverage						
Covered	26,406	17.31	30,051	3.55	174,178	13.68
Not covered	126,182	82.69	817,444	96.45	1,098,833	86.32

Descriptive statistics for three sub-samples (those reported ill in the 30 days prior to the survey, those having medical aid coverage and those with a 'preference' for public health care, when ill) taken from the pooled GHS data 2002-2014. Percentages are reported within each sub-sample. All observation numbers, except for expenditure, which is based on households, are presented at the individual-level

Given the structure of the sub-samples, relative comparisons are not particularly insightful. Instead, the descriptive statistics provide some information regarding the relative proportions within a sub-sample. Therefore, we point out only a few within sub-sample comparisons. In particular, we see that the populace is relatively uneducated, is not working and is not covered by a medical aid scheme; however, we should keep in mind that our sub-samples include children who are currently in school, and, therefore, have not completed their schooling and are not working. Relatively speaking, within the ill-health status outcome, there are more observations

(the data is not weighted here) in the 46-64 years of age bracket, African/blacks, female, single individuals, less educated, unemployed, urban dwellers, poorer individuals and not covered with medical aid. Within the public health facility 'preferred' sub-sample, the relative proportions of observations mirror what was seen for ill-health, except that we observe relatively more children in the age bracket 6-17 years and rural residents. Finally, with respect to medical aid coverage, it is highest amongst those in prime working age, 31-45 years, while and is primarily an urban phenomenon. The stylised fact that relatively few of those covered are employed presumably derives from policies that cover children and spouses.

2.3 A Description of the Trends

We continue with the analysis, breaking down the trends in our three primary outcome variables across a number of socio-economic categories.

2.3.1 Ill-health

One of the key components of population health, in our view, is reported illness. Thus, we begin our analysis with this component; see Figure 2.2.

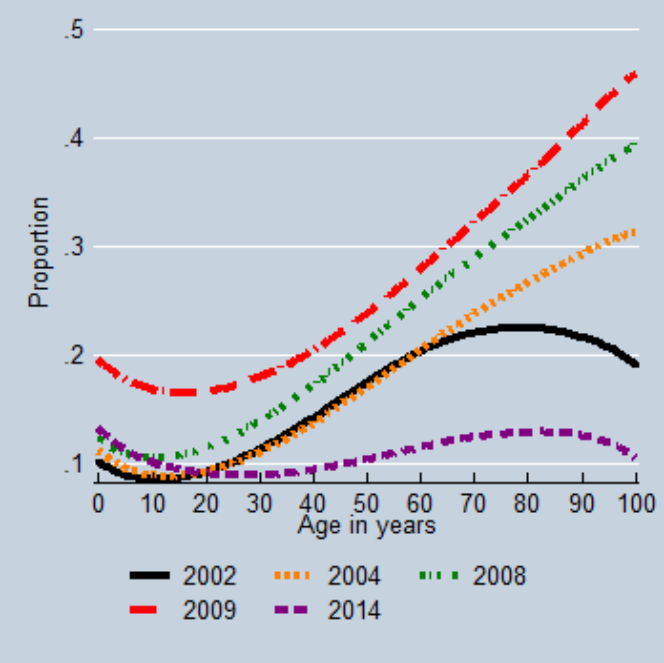
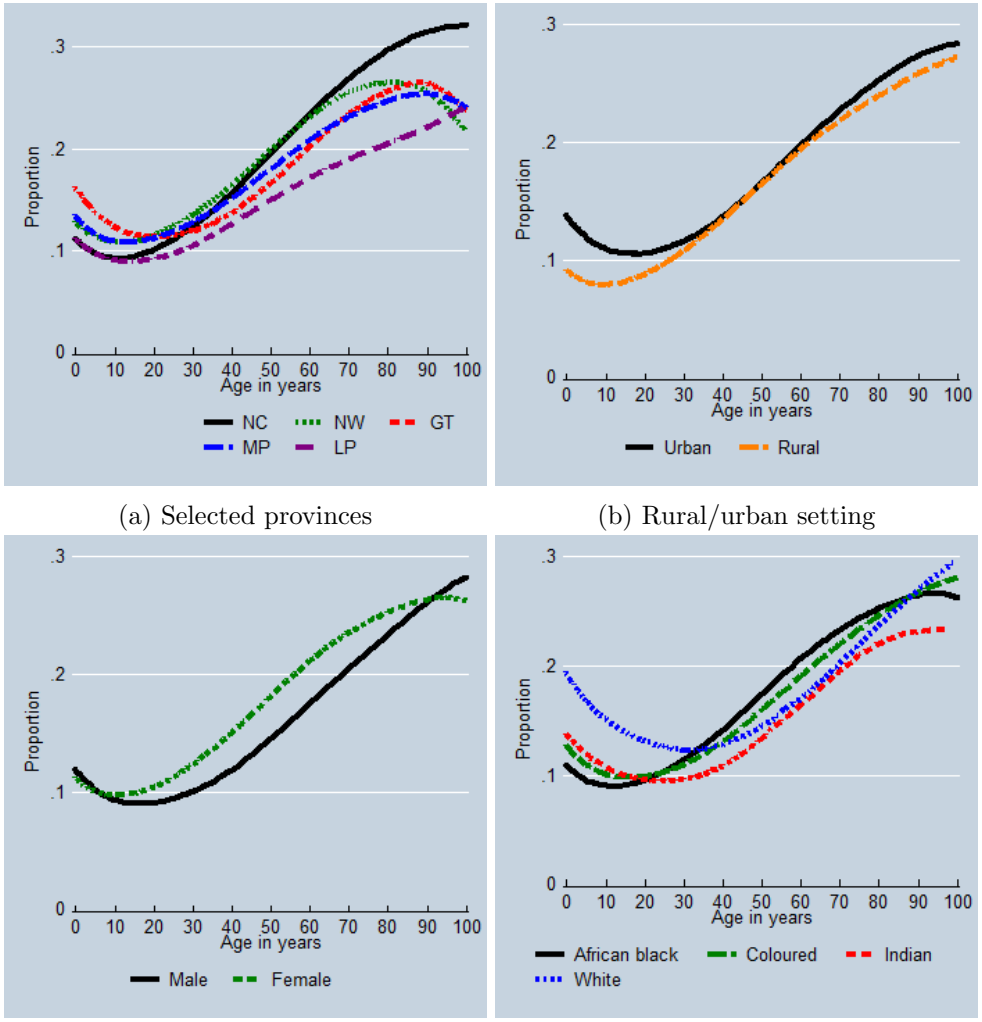


Figure 2.2: The age distribution of ill-health in South Africa for selected years from the GHS 2002-2014. Proportions are for those reporting being ill in the 30 days prior to the survey at any age. The illustrations are taken from lowess nonparametric regressions of illness on age in each year; thus, the pattern is smoothed.

We consider ill-health across the survey years, although illustrating only some of the years in order to keep the illustrations readable. Our initial focus is on illness by age. For the most part, the pattern is as expected; there is a notable $U-$shape to the age pattern of illness with a trough occurring between ages 10 and 20, although there is an unexpected inverse U-shape with a peak near 80 years of age in two of the illustrated surveys. As there are few observations in these age groups, this pattern may not necessarily reflect the true age distribution of illness at these ages. The results also mirror those from Figure 2.1, where self-reported ill-health was highest in 2009 and lowest in 2014.



(a) Selected provinces

(b) Rural/urban setting

(c) Gender

(d) Race

Figure 2.3: The age distribution of ill-health in South Africa for selected socio-demographic characteristics from the GHS 2002-2014. Proportions are for those reporting being ill in the 30 days prior to the survey at any age. The illustrations are taken from lowess nonparametric regressions of illness on age in each year; thus, the pattern is smoothed.

The aforementioned age distribution of illness is also compared across a range of socio-demographic characteristics. Figure 2.3 presents the age-illness profile from the pooled sample,

rather than comparing across years. There are four panels in the figure. The top-left panel looks at differences by province, while the top-right illustrates the urban/rural divide in ill-health. In the bottom-left panel, male/female differences are illustrated, while racial differences are presented in the bottom-right panel.

At the youngest ages, the proportion reporting ill-health is highest in Gauteng compared to other provinces, higher in urban areas than rural areas and highest amongst the white population group. In the middle of the age range, women are more likely to report ill-health than men, although there are few obvious differences across provinces, races or the urban/rural split. For the elderly, again, there are few differences, although reported ill-health is higher in the Northern Cape than in other provinces. Regardless of socio-demographic split, the overall U-shape pattern for age and illness reported in Figure 2.2 is repeated.

2.3.2 Health facility preference

Given South Africa's health sector history (see Coovadia et al., 2009), as well as the differences in usage reported in previous research, it is no surprise that public health care is more likely to be 'preferred' to private health care (see Gilson and McIntyre, 2007), keeping in mind that these preferences are not revealed preferences.

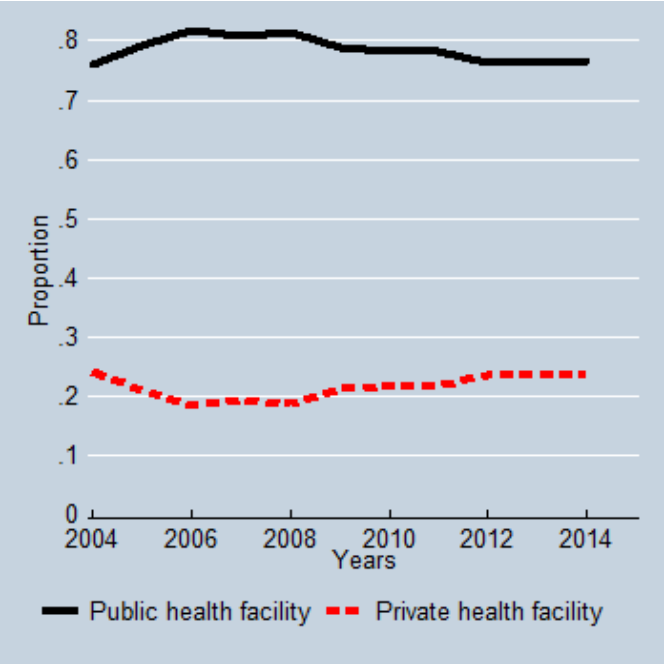
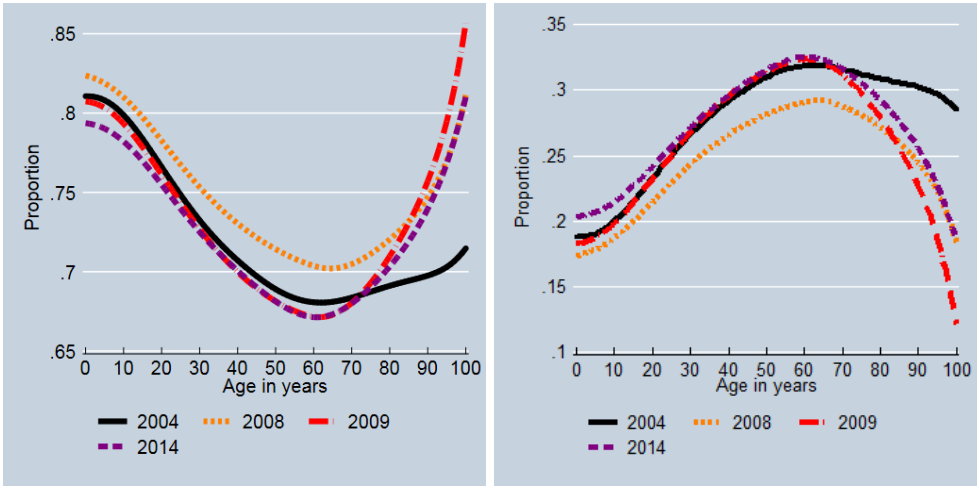


Figure 2.4: Preferences for private and public health care, if ill, in South Africa. Data sources from the GHS 2004-2014. Proportions are for those who utilise either public or private health care facility in the event of illness.

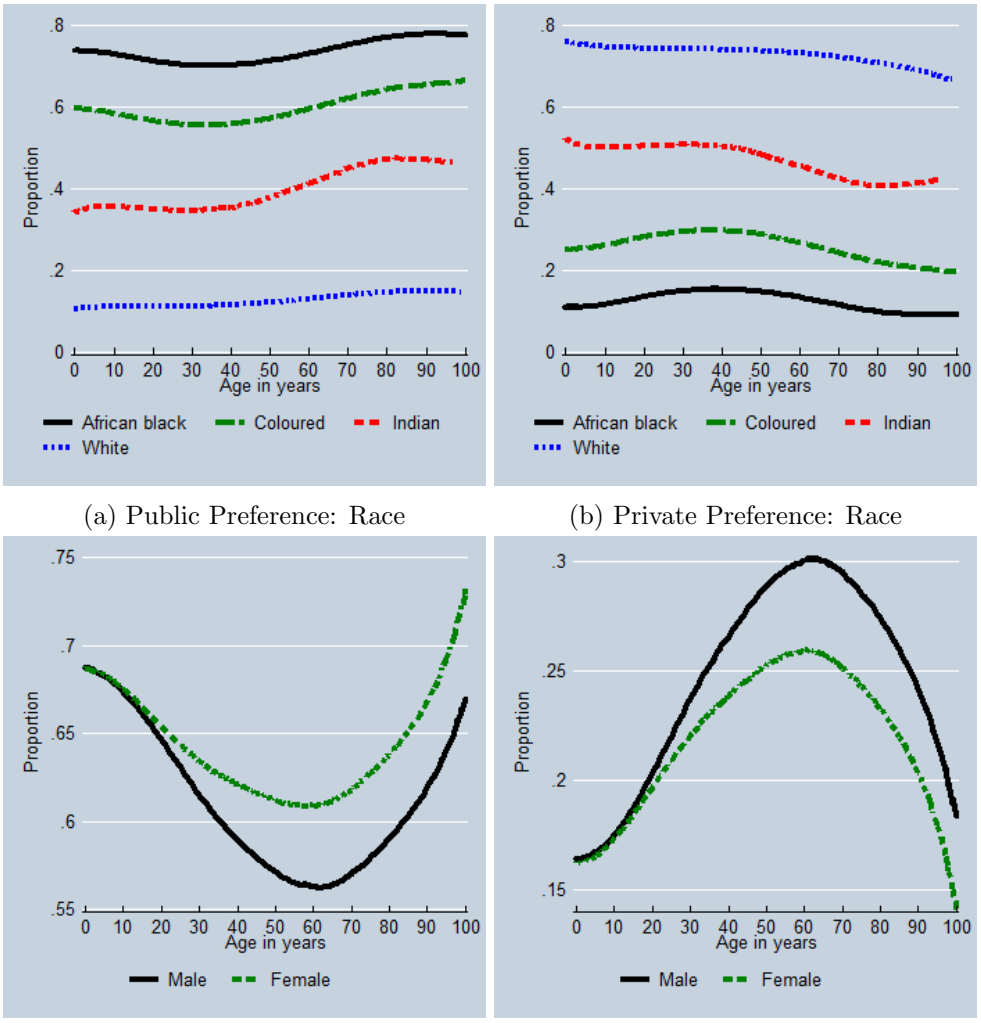
However, from 2006, there has been a steady increase in the preference for private health care, possibly attributable to the introduction of GEMS. See Figure 2.4 for details. Preferences are further broken down by age, across different surveys; we do not illustrate all survey years, in order to keep the illustrations presentable.



(a) Public health facility (b) Private health facility

Figure 2.5: The age distribution of public and private health care facility utilisation in South Africa for selected years from the GHS 2004-2014. Proportions are for those who utilised either public or private health care facility at any age. The illustrations are taken from lowess nonparametric regressions of each of public and private health care facility on age in each year; thus, the pattern is smoothed.

Figure 2.5 presents these preferences; the left panel contains public care preferences, while the right panel focuses on the private sector. As should be the case, the two panels are mirror images. However, what was not expected was the rather distinct differences by age, even though public care preferences remain the norm. A preference for public care is lowest (highest) for those aged near 60 years, and is higher (lower) for ages above and below that. The $U-$shape (inverse $U-$shape) depicted suggests that those near the end of their working lives either place relatively greater trust in the private sector to cope with the illnesses they expect to encounter or have greater access to the private health care sector. Interestingly, the peaks and troughs seem to coincide approximately with the average life expectancy in South Africa.



(a) Public Preference: Race

(b) Private Preference: Race

(c) Public Preference: Gender

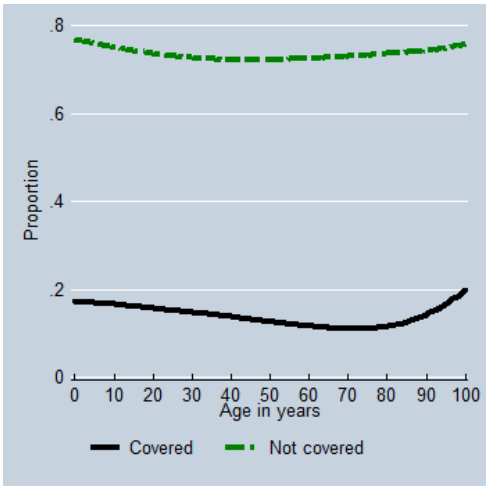
(d) Private Preference: Gender

Figure 2.6: Preferences for private and public health care, if ill, in South Africa. The illustrations are separate for race (top-left and top-right) and gender (bottom-left and bottom-right). Proportions are for the racial groups and gender (male/female) at any age. The illustrations are taken from lowess nonparametric regressions of the above variables on age in each year; thus, the patterns are smoothed.

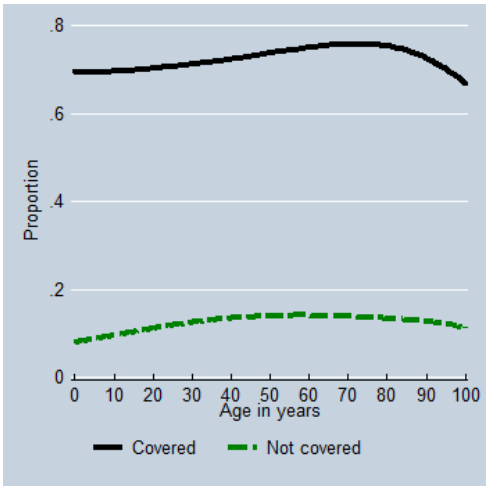
When comparisons are made across race and gender, we uncover both similarities and differences with respect to the location analysis; see Figure 2.6 for the comparisons. Firstly, the age-based $U-$shape to public and private care preferences are easily observed for men and women, while the troughs (peaks) occur at an age near 60. Secondly, amongst males, there is a relatively strong preference for the private sector, partly because they have greater access to medical aid schemes. Thirdly, however, the pattern is not as easily observed across race groups. Although the U remains, the peaks (troughs) do not occur near age 60 for non-white population groups. Instead, for African blacks and coloureds, they are closer to age 40, which is also in line with their access to medical aid coverage.

In addition to looking across the surveys, we examine differences in preferences for a range of socio-economic controls. Figures 2.7 and 2.6 contain differences across province, urban and rural locale, race, gender and access to medical aid coverage. When observed across provinces, access to medical aid coverage and urban/rural settings, see Figure 2.7, the $U-$shape is most obvious among those covered by a medical aid scheme, those residing in urban settings, where private health facilities are mostly located, as well as in Gauteng, which is the richest and most urban province in the country. Furthermore, private health care facilities are most preferred amongst those covered by medical aid , urban residents and those living in Gauteng.[11]. As we will see below, these age differences in preferences closely follow the pattern of medical aid coverage by age.

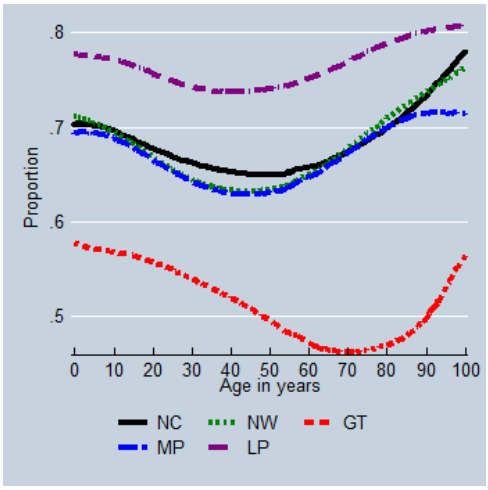
[11] A similar pattern would be observed for the Western Cape Province, which is relatively rich, and, like Gauteng, is well-endowed with private health care facilities.



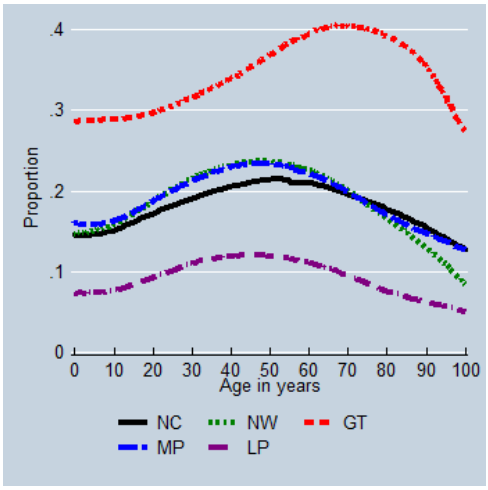
(a) Public Prefrence: Medical Aid Scheme Member



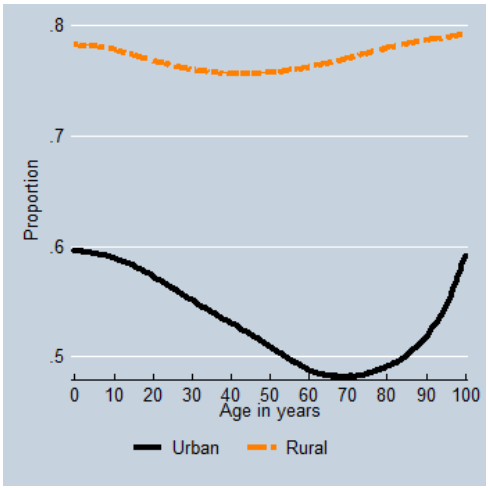
(b) Private Preference: Medical Aid Scheme Member



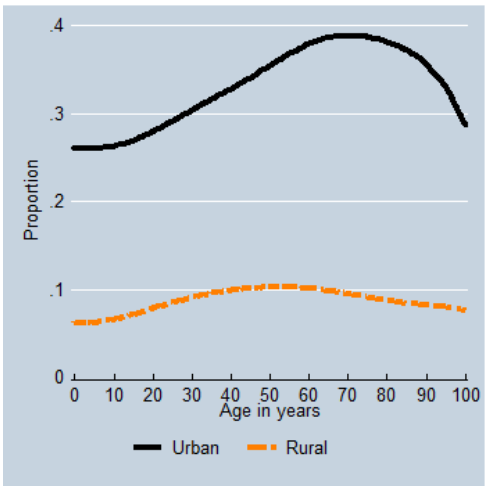
(c) Public Preference: Selected Provinces



(d) Private Preference: Selected Provinces



(e) Public Preference: Rural/Urban Locale



(f) Private Preference: Rural/Urban Locale

Figure 2.7: Preferences for private and public health care, if ill, in South Africa. The illustrations are separate for medical aid coverage (top-left and top-right), province (middle-left and middle-right) and rural/urban locale (bottom-left and bottom-right). Proportions are for those covered with medical aid, those in selected provinces, and rural/urban locale respectively, at any age. The illustrations are taken from lowess nonparametric regressions of the above variables on age in each year; thus, the patterns are smoothed.

2.3.3 Medical aid coverage

As shown in Figure 2.8, the age distribution of medical scheme coverage across the surveys is quite stable. Coverage peaks around the age of 60 in each of the survey years illustrated, and is lowest for the oldest individuals. As expected, given Figure 2.1, coverage is relatively higher in 2014 than it was in 2002. There is a noticeable inverted $U-$shape to the age distribution of medical aid coverage. Medical aid coverage increased steadily among young adults over the study periods, a time period that matches attachment to the labour force.

A comparison of the age distribution of medical aid coverage across socio-demographic variables was also illustrated; see Figure 2.9. Since Gauteng is the richest province in the country and contains a greater proportion of formally employed adults, medical coverage is highest there.

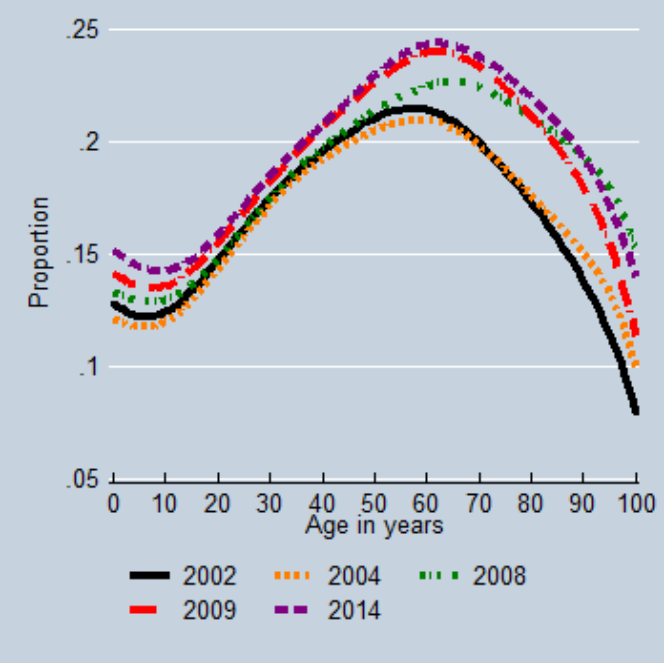
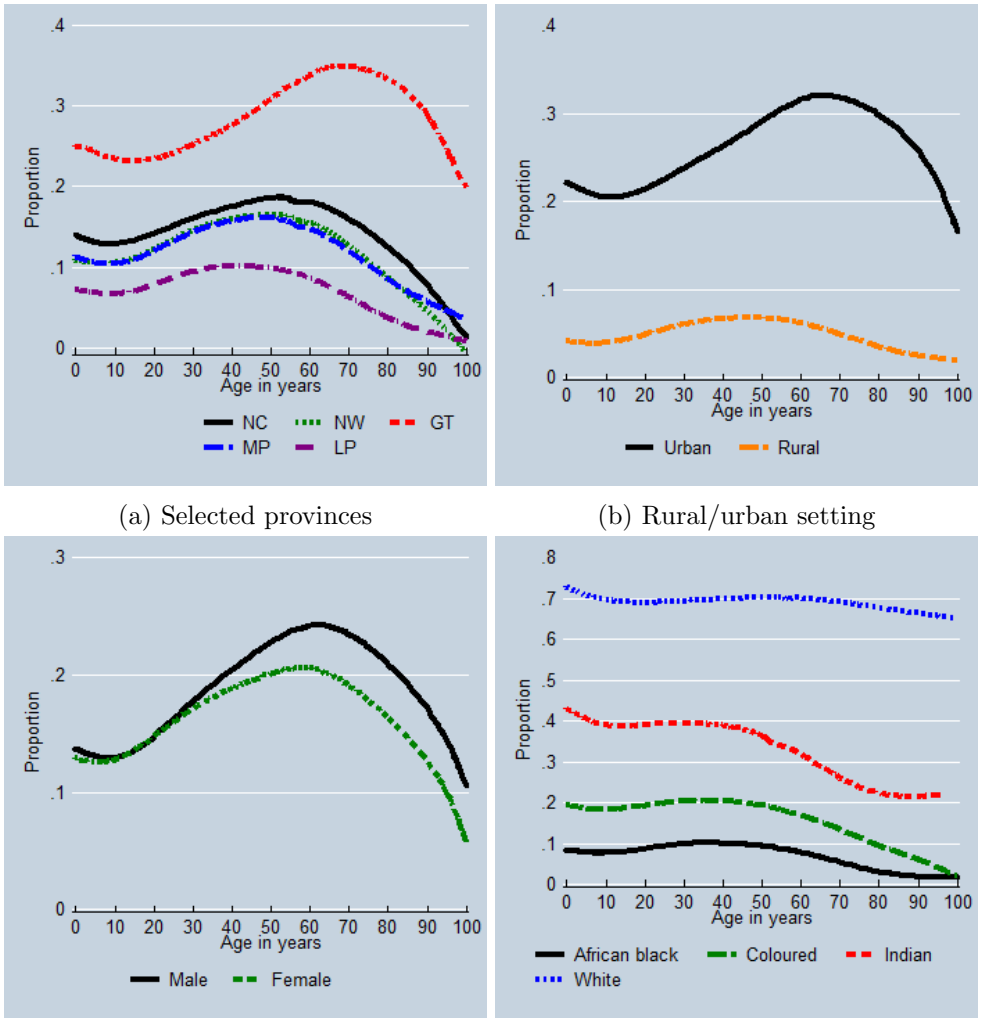


Figure 2.8: The age distribution of medical aid insurance in South Africa for selected years from the GHS 2002-2014. Proportions are for those who reported having medical aid coverage as at the date of the survey at any age. The illustrations are taken from lowess nonparametric regressions of medical aid coverage status on age in each year; thus, the pattern is smoothed.

For similar reasons, urbanites, men and white South Africans are more likely to have access to a medical aid scheme than their counterparts. As was the case, generally, within each survey, medical aid coverage peaks around the age of 60 across location, as well as for men and women. However, the peak occurs at lower ages within the African black and coloured populations in South Africa, while coverage appears highest amongst the young in the Indian population.



(a) Selected provinces

(b) Rural/urban setting

(c) Gender

(d) Race

Figure 2.9: The age distribution of medical aid insurance in South Africa from the GHS 2002-2014. The distribution is separated by province, rural/urban locale, gender and race group. Proportions are for those who reported having medical aid coverage as at the date of the survey. The illustrations are taken from lowess nonparametric regressions of medical aid coverage status on age in each year; thus, the pattern is smoothed.

2.4 Estimating the Trends

As the preceding descriptive analysis suggests, there are potential socio-economic differences in key health variables, and those may not have been consistent over time. However, that analysis was fairly limited, in that it was primarily bivariate or, at most, trivariate. For that reason, the previous analysis was extended to account for multiple control variables at once. Specifically, we examined the determinants of our three health outcome measures, controlling for age, race, gender, marital status and location; the latter of which was interacted with the rural/urban control to allow for differences between urban and rural individuals within and across provinces.

Table 2.2: Marginal Effects of the Explanatory Variables on the Health Variables - Ill-health status, Public health facility and Medical aid coverage

	Ill-health status	***Public health facility***	***Medical aid coverage***
Variables	Model I-A	Model I-B	Model I-C
Trend (2004-2014)	0.004^{***}	-0.001^{***}	-0.002^{***}
	(0.000)	(0.000)	(0.000)
Age	0.000^{**}	0.002^{***}	-0.006^{***}
	(0.000)	(0.000)	(0.000)
Age-squared	0.000^{***}	-0.000^{***}	0.000^{***}
	(0.000)	(0.000)	(0.000)
Race (African/Black)	0.001	0.473^{***}	-0.479^{***}
	(0.002)	(0.004)	(0.003)
Gender (female=1)	0.018^{***}	0.009^{***}	0.004^{***}
	(0.001)	(0.001)	(0.001)
Marital status (married)	0.009^{***}	-0.026^{***}	0.081^{***}
	(0.001)	(0.002)	(0.002)
Education (Honours/degree)	-0.039^{***}	-0.303^{***}	0.494^{***}
	(0.003)	(0.009)	(0.007)
Employment status (employed=1)	-0.004^{***}	-0.056^{***}	0.049^{***}
	(0.001)	(0.002)	(0.001)
Metropolitan status (urban=1)	0.014^{***}	-0.114^{***}	0.113^{***}
	(0.001)	(0.002)	(0.001)
Type of dwelling (formal=1)	-0.003^{***}		
	(0.001)		
Medical aid (coverage=1)		-0.440^{***}	
		(0.002)	
Observation	1,064,453	1,064,453	1,064,453
Adjusted R^2	0.03	0.36	0.29

Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: This table contains marginal effects for ill-health, preference of public health facility utilisation, and medical aid coverage. The marginal effects are separate for ill-health (left), preference of public health facility utilisation (middle), and medical aid coverage (right). Marginal effect is a measure of the instantaneous effect that a change in an explanatory variable has on the predicted probability of the outcome variable (in this case, our outcome variables are ill-health, preference of public health facility utilisation, and medical aid coverage), when the other covariates are held constant.

Estimation was based on logit, and the marginal effects from the logit are included in Table 2.2.[12]. Recall, the primary purpose of the analysis was to determine if there are any discernible trends in health outcomes in South Africa. According to the results, reports of ill-health rose over time, while access to medical aid coverage and the general population's preference for choosing a public health care facility (if they were ill) fell. The probability of reporting illness increased by about 0.4% per year. On the other hand, the probability of preferring public health care in the event of illness, as well as being a member of a medical aid scheme, are decreasing over the time period. The decreases are around 0.1% and 0.2% per year, respectively. All of these trends are statistically significant.

With respect to ill-health, we find that females are 1.8% more likely to report an illness or injury than males. Furthermore, those who are single are less likely to report an illness; they are the reference group, while married individuals report illness 0.9% more often. Those residing in urban areas report illness 1.4% more often than those residing in rural areas. Compared to those residing in traditional dwellings, those who live in formal dwellings are 0.3% less likely to report an illness. than those who live in traditional dwellings. We also find that the formally educatare are 3.9% less likely to report an illness than those with no formal education. Finally, according to the age polynomial in the analysis, there is evidence of a $U-$shape in ill-health reports, once these additional controls have been included.

Preferences for the use of a public health facility in the event of an illness reveal relatively similar patterns, but with generally larger magnitudes. We find that medical aid coverage is associated with a 44% lower probability of preferring to utilise public health care in the event of illness; there are also large race and educational differences, many of which can be tied to the pattern of income and wealth in the country. African blacks are 47.3% more likely to prefer to a public health facility for medical treatment, compared to the white population, while married people (2.6%) are less likely to prefer a public health facility than single individuals. Females, compared to males, are 0.9% more likely to prefer to utilise public health care when ill. Furthermore, preferences for the employed are 5.6% lower than the unemployed, when it comes to potentially seeking care at a public facility, when ill. When considering education, there is a 30.3% lower preference for utilising public health care amongst the formally educated,

[12]The actual regression estimates are presented in Table A.2.2. Estimation was weighted to the population in each year.

compared to those not formally educated. Finally, pereferences in urban area are in favour of private facilities, as those in urban areas have an 11.4% lower probability of stating a willingness to seek medical treatment at a public health care facility, in times of illness.

As implied by the earlier analysis, medical aid coverage mirrors public health care preferences, at least partly due to the ability to pay for private health care through third party payees. African blacks have nearly a 50% lower coverage probability than Whites, while married individual coverage rates are 8.1% higher than for singles. Men have higher coverage rates than women, by approximately 0.4%. The probability of coverage is also higher amongst urbanites, the employed, and the formally educated. Urban area coverage is higher by 11.3%, while the employed have a 4.9% higher probability of being covered; for the formally educated, the probability is nearly 50% higher than it is for the uneducated.

2.5 Discussion and Conclusion

The preceding analysis has taken data from the General Household Surveys covering the years 2002-2014. The data has been pooled together, weighted to the population, and used for an analysis of key health variables in South Africa: ill-health, preferences for public care (loosely defined) and medical aid coverage. The analysis is primarily descriptive in nature, although one could argue that the control variables are primarily exogenous, with the exception of location. For that reason, we have not included variables such as income, which could both affect health and be affected by health.

Although the primary purpose of the analysis was to estimate trends in our key variables, a number of additional controls were included in the analysis, and are found to be statistically significant determinants of health, health care preferences and access to medical aid schemes (or health insurance) in South Africa. Strong evidence of a time trend was uncovered in the analysis, with ill-health increasing, on average, by 0.4% per year, while preferences for public health facilities and medical aid coverage has fallen by 0.1% and 0.2% annually respectively. The decrease in medical aid coverage is somewhat surprising given the implementation of the Government Employees Medical Scheme, whih did open-up medical aid covereage to a much larger set of formally employed individuals in the country. However, the decrease could also relate to the fact that primary health care sector has been re-engineered (and improved), while the direct costs of accessing primary health care have decreased due in part to user fee policy

changes in 1994 and 1996. Although the decrease in coverage does signal the need to think carefully about health care financing, especially when one also keeps in mind the observed decrease in public health care preferences. These two trends - which operate together in this analysis - suggest that South Africans are not enamoured by the public health sector, even though they cannot afford the private sector. Thus, any implementation of a National Health Insurance (NHI) Scheme needs to address both the declining medical aid coverage rates and the reduced preference for the provision of health care by the public sector.

More worryingly, despite policies that have been targeted to the poor – primarily children, female, non-white and those living in rural areas – the overall picture does not suggest much change over the time period. It is these people we find to be ill, preferring to use the public sector and not having access to medical aid schemes. However, we note that further analysis within these and other sub-groups of the population are warranted. Our results, which are in line with other studies (see Bradshaw, 2008; Bradshaw et al., 2000), suggest the need for more policy engagement with respect to health in South Africa. While Primary Health Care reforms and other policies have impacted outcomes, further strengthening the promotive component of health care will likely lead to further improvements in health. Since access to appropriate health care services is fundamental to the choices that are made with respect to health facility in the event of illness or injury, and it is a feature of the constitution – "everyone has the right to have access to health care services, including reproductive health care" (see South Africa Constitution, 1996, Section 27(1)(a)) – ensuring access remains a policy priority.

Although the preceding analysis has not attempted to account for funding made available for public health and healthcare in the areas where respondents live in the year of the survey, it is likely that preferences for public sector health care delivery are related to improved regional funding or the ability of local management to adequately marshal the available resources for the benefit of the local populace. Thus, we infer that policymakers should continue to strive for adequate funding and appropriate monitoring of health care services for improved quality and service delivery.

Chapter 3

Social Determinants of Health Inequalities in South Africa: A Decomposition Analysis

3.1 Introduction

In the last two decades, since the emergence of democracy in South Africa, considerable effort has gone into redressing the damaging impacts of Apartheid, which was characterised by legislated inequality. Specifically, the South African government has embarked on a variety of policies and reforms to reverse the discriminatory practices that pervaded all aspects of life before 1994 (Mayosi and Benatar, 2014). Policy interventions have targeted reductions in socio-economic inequalities in various capacities, and, by extension, these policies have also applied to the health care system: abolition of user fees at the primary health care (PHC) level in 1994, fiscal redistribution targeted at health, education, social protection sectors, extension of PHC policy to all users in relatively poorer households in 1996, introduction of Government Employees Medicalaid Schemes (GEMS) in 2006, and ongoing discussions related to universal health care coverage through a yet-to-be-fully-implemented national health insurance (NHI), among others. However, evidence suggests that not much has really changed. In particular, health inequalities, which are strongly linked to the social determinants of health (SDH), persist. Hence, addressing health inequality entails an appropriate understanding and tackling of the SDH.

In South Africa, health inequality and its social determinants have received considerable attention in the literature (Alaba and Chola, 2014; Ataguba et al., 2011, 2015; Booysen, 2003;

Bradshaw, 2008; Bradshaw et al., 2000; Charasse-Pouélé and Fournier, 2006; Chopra et al., 2009; Coovadia et al., 2009; Harris et al., 2011; Silal et al., 2014; Zere and McIntyre, 2003). Some of the preceding studies find poor self-reported health to be higher among lower socio-economic groups (Alaba and Chola, 2014; Ataguba et al., 2011; Zere and McIntyre, 2003). For instance, Ataguba et al. (2011) find burdens of major categories of self-reported illness and disability to be greater among lower socio-economic groups. Likewise, Charasse-Pouélé and Fournier (2006) find a strong indirect racial effect in health inequalities. Moreover, Ataguba et al. (2015) show that social protection and employment, knowledge and education, housing and infrastructure contribute to disparities in good SAH.

However, reviews of the literature suggest that there is a gap in the earlier studies. The existing empirical literature mainly uses cross-sectional data, with the main focus on one-way decomposition to examine the contributions of socio-economic factors to health inequality at a given time. Moreover, they tend to focus on a few health indicators. Firstly, using a few indicators does not paint a comprehensive picture of health inequalities and, thus, may underestimate overall health inequality, which is still rife in South Africa's health system. Secondly, a one-time assessment of health inequality may downplay the effects of health inequality-focused reforms, as it does not uncover dynamics that are vital for indirect assessment of the effectiveness, or otherwise, of prior policies and health interventions aimed at reducing socio-economic related health inequalities. For instance, Ataguba et al. (2015) use cross-sectional data and one-way decomposition to explain the social factors that account for health disparities. As much as the analysis is relevant to understanding health inequalities in South Africa, the analysis only provides information about health inequality at a given point in time. It cannot uncover changes in health inequalities. In a country such as South Africa, working to redress socio-economic related health inequalities, it is important to understand those changes, and the extent to which they can be attributed to changes in socio-economic factors. Doing so can help in identifying key drivers of changes and more efficient resource allocations to further reduce health inequalities. Moreover, sectors that need further improvement or interventions can be highlighted. It can also serve as feedback during the process of reviewing policies and reforms directed at socio-economic factors, which are often targets of policy decisions.

To consider these dynamic aspects, we make use of existing methodological developments in the literature to extend previous analyses (Ataguba et al., 2011) and Ataguba et al. (2015), which we discuss below. The information used in our analysis was sourced from the 2004 and

2014 General Household Surveys (GHSs) data. Specifically, our empirical strategy adopts the concentration index regression model, and Oaxaca-type decomposition of change in the concentration index (Oaxaca, 1973; Wagstaff et al., 2003). The concentration index was employed to uncover the relative change in health inequalities over the studied period, linking those changes to changes in the SDH. The decomposition of change in the concentration index explains how changes in health inequalities over time are attributable to changes in their social determinants. The method not only allows us to explain how changes in health inequalities can be linked to changes in inequality in the SDH, but also to changes in their elasticities[1] over time. We were able to apply this method because relevant information required for the analysis are available in the datasets[2] The initial year marks the recommendation for the implementation of National Health Insurance in South Africa (Govender et al., 2013) and coincides with the 10 year anniversary of the end of Apartheid, while the latter marks an additional decade down the line, therefore, the analysis allows us to correlate health policies from the second decade post-apartheid, indirectly, with either a widening or narrowing of health inequality over time.

Although the decomposition method employed in this study has been used elsewhere (see Van Doorslaer et al., 2001*b*; Wagstaff et al., 2003), we are not aware of it being applied to examine health inequality in the South African context. By applying this method, other dimensions to inequality in SDH that drive changes in health inequalities are unraveled. Given South Africa's history of Apartheid and the efforts made so far in reducing health inequality, by identifying main sectors driving changes in health inequalities, the findings would be of policy relevance in priority setting, and thus, in more efficient allocation of resources to further reduce health inequalities.

Our results suggest that rising inequalities in ill-health are largely explained by changes in the composition of those residing in urban areas and in relatively richer provinces. Meanwhile, rising inequality in medical aid coverage and the utilisation of private health care are attributable to changes in educational attainment and racial composition. On the other hand, changing elasticities in SDH, rather than increasing inequalities, are found to explain a widening preference for private health care in the event of illness.

[1]Elasticity refers to the responsiveness of a dependent variable, e.g health, with respect to its determinants i.e. how health inequality changes with respect to a change in social determinant, say income or education

[2]We apply the method to a variety of health indicators which include ill-health, disability and medical aid coverage, as well as preference for the utilisation of public or private health care, to examine how changes in social determinants explain changes in their inequalities.

3.2 Methodology

3.2.1 Data source

Data used in this analysis was sourced from two waves of South African General Household Surveys (GHSs); one from 2004 (Statistics South Africa, 2004) and another from 2014 (Statistics South Africa, 2014*a*). Although GHS data exist for 2002 and 2003, the 2004 survey was chosen because 2004 marks the beginning of the second decade of democracy, while 2014 represents the end. More importantly, the structure of questions relevant to our analysis became consistent from 2004; the health data pertinent to our analysis were missing in the 2002 and 2003 surveys. The GHSs are repeated cross-sectional household surveys collected annually by the national statistical agency, Statistics South Africa (StatsSA), with new samples drawn each year. Each year, the sample includes approximately 30,000 households, and that sample follows a multi-stage stratified design, such that, each sample is representative at both the national and provincial levels within any year. The surveys collect a range of demographic and socio-economic information on households and individuals across the country's nine provinces. Survey questions relate to housing services, social services, socio-demographic information, labour markets, health and health care information, and household tourism activities. Population weights are available in the surveys for both households and individuals. To account for the different survey designs among the datasets used in this paper, we use the adjusted survey weights[3] provided by StatsSA.

3.2.2 Variables definition and measurement

Health data include a short series of questions covering illnesses or injuries during the past 30 days prior to the survey, categories of disease/illness, dysfunctional disability lasting six months or more, categories of disabilities, whether an individual had access to medical aid coverage and the type of health care facility (public or private) where care would be sought in the event of illness. For a holistic outlook on health inequality, information related to health and health care in the two surveys are considered in our analysis.

Health is measured by ill-health and disability. In the surveys, ill-health status is based on whether or not the respondent suffered from any illness or injury during the past month. In

[3]The data and adjusted weights are available at `https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/526/get_microdata`. Following (Moriarity, 2010; Moriarity and Parsons, 2008), we divide the adjusted weights by the number of survey years being pooled (in this case, two) in order to obtain the weights for the pooled analyses. Weighted estimates are reported, subsequently.

the same vein, disability was measured by asking the respondent whether he/she is limited in his/her daily activities, at home, at work or at school, because of a long-term physical, sensory, hearing, intellectual, or psychological condition, lasting six months or more. Even though the GHS has some limitations, in that it does not contain explicit information on self assessed health, quality of health care and household income, we use the information on ill-health/injury which has been identified to be an important predictor of morbidity or mortality, especially in developing countries (Burgard and Treiman, 2006; Pillay-van Wyk and Bradshaw, 2017).

Health insurance coverage was measured by asking respondents whether they were currently covered by a medical aid or benefit scheme or other private health insurance at the time of the survey. Those who answered in the affirmative are classified as medically insured, while those who responded in the negative were categorized as uninsured. Furthermore, respondents were asked what they would do, and which health facility they would use if they were to become ill and decide to seek medical help. We refer to responses as their preferences, even though they are stated preferences, rather than revealed preferences.

Social determinants of health included in our analysis are based on WHO identified domains that influence pro-equity progress towards universal health care. Some of the domains include income and poverty, knowledge and education, housing and infrastructure, social protection, gender norms, and other individual/household factors (Ataguba et al., 2015). Information collected in the GHS that is in line with the WHO identified domains on SDH, consistent in both surveys, and, therefore used in our analysis includes: employment status; social grant recipient status; highest level of education completed (no schooling, less than diploma, diploma/certificate, university degree, and postgraduate degree); province and urban/rural setting; age; gender; race (black Africans, coloured, Asian/Indian and white), marital status (married, widow/widower, divorced/separated and single), and social grants/assistance receipt status.

Moreover, socio-economic variables such as education, social grants and employment were not just included in the analysis on the basis of WHO identified domains or data availability, but were included to capture the realities of changes in the socio-economic outlook of the country. For instance, since the emergence of democracy in South Africa, policy redressing all forms of socio-economic related inequalities were enacted, creating a more equitable national system. These policies improved access to education, social grants, employment, housing and health care, especially for the previously disadvantaged groups. Over the post-apartheid period, there has been a relative increase in receipt of formal education and social grants by black Africans,

for example (Patel, 2012; Schiel et al., 2016). In particular, the non-contributory old age pension and child grant have a strong racial dimension, with a considerable proportion of black Africans and coloureds as beneficiaries.

The GHS includes information on the ownership of household assets and services. We use the information to construct a wealth index, which serves as a proxy for our measure of socio-economic status. A wealth index was constructed in each of the survey years using the method of factor analysis (FA)[4] on a set of seven variables measuring relative wealth; source of drinking water, presence of electricity, land line/cellular phone, television set, radio, refrigerator and car[5]. Thus, we are limited to wealth-related questions that were considered in both surveys[6].

3.3 Theoretical and Empirical Methods of Estimating Health Inequality

3.3.1 Estimating a concentration index

As suggested earlier, we use the concentration index (CI) and decomposition of change in the concentration index for the analysis. The concentration index is employed because it presents an accurate picture of socio-economic inequalities in health, and has been used in a number of related studies (Erreygers, 2009; Kakwani et al., 1997; Mackenbach and Kunst, 1997; Mackenbach et al., 2008; O'Donnell et al., 2008; Solmi et al., 2015; Wagstaff et al., 1991).

For empirical estimation, the standard concentration index is defined as twice the covariance between our health variable (H), e.g ill-health, and the ranking of socio-economic status (S) divided by the mean of the health variable, μ (Kakwani et al., 1997; Wagstaff, 2005; Wagstaff et al., 1991):

$$CI = \frac{2}{\mu} cov(H, S) \tag{3.1}$$

It can also be written as :

$$CI = \frac{2}{n\mu}\left[\sum_{i=1}^{n} H_i S_i\right] - 1 \tag{3.2}$$

[4]Factor analysis (FA) is a multivariate statistical technique used to reduce the number of variables in a data set into a smaller number of 'dimensions' (see Vyas and Kumaranayake, 2006).

[5]The components of the asset indices for the two time periods are reported in Table B.1.1.

[6]Ideally, the most accurate calculation of changes in wealth index is obtained when detailed information relating to prices, brands, year of purchase and durability of assets, amongst others, is available. Since such detailed information is lacking in the surveys, we use the available information on ownership of assets to calculate wealth index in each year.

Where μ is the mean of H_i; S_i is the fractional rank of the ith individual in the socio-economic groupings; CI is the concentration index which is the measure of relative inequality, such that doubling the health variable leaves CI unchanged. CI takes a value of zero when a health variable takes the same value among all individuals irrespective of their socio-economic status; CI is negative when a health variable is more concentrated among the poor than the better-off, and vice versa.

For ease of computation and generation of standard errors, from which statistical inferences can be made, the CI is specified as a regression:

$$2\sigma_s^2\left(\frac{H_i}{\mu}\right) = \alpha + \beta S_i + \sum_j \beta_j X_{ji} + \upsilon_i \tag{3.3}$$

where σ_s^2 is the variance of the fractional rank; α is the intercept; β is an estimate of the CI; β_j are the parameter vectors of the determinants X_j; and υ_i is the error term.

3.3.2 Decomposing a change in concentration index

Wagstaff et al. (2003) show that the concentration index of a health variable can be decomposed into the contributions of individual factors to its inequality, where each contribution is the product of the sensitivity of the health variable with respect to that factor and the degree of inequality in that factor.

Given a linear relationship between a health variable of interest, H, and the contributions of the j determinants, X_j:

$$H = \alpha + \sum\nolimits_j \beta_j X_j + \upsilon \tag{3.4}$$

where β_j are the parameters' coefficients of X_j, and υ is the error term. By substituting (3.4) into (3.2), the overall concentration index (CI) can be rewritten as a linear combination of the concentration indices of the determinants, plus an error term, as expressed :

$$C = \sum\nolimits_j \left(\frac{\beta_j \bar{X}_j}{\mu}\right) C_j + \frac{GC_\upsilon}{\mu} \tag{3.5}$$

where μ is the mean of health variable, H; $\bar{X}_j$ is the mean of each j determinant; C_j is the concentration index for the jth determinants, calculated from (3.2) by replacing the health variable (H_i) with the determinant (X_j) (defined analogously to C); GC_υ is the generalised

concentration index for the error term (υ), and C is made up of two components (3.5). The first is the explained component, which is equal to a weighted sum of the concentration indices of the j regressors, where the weight is simply the elasticity of H with respect to X_j $\left(\eta_j = \beta_j \frac{\bar{X}_j}{\mu}\right)$. The second is the unexplained component, captured by the last term, $\frac{GC_\upsilon}{\mu}$; it is the inequality in health that cannot be explained by systematic variation across income groups in the X_j.

As opposed to the cross-sectional decomposition stated above, Wagstaff et al. (2003) further propose decomposing health inequalities over time, i.e unraveling causes of changes in health inequalities over time, by applying the Oaxaca-type decomposition (Oaxaca, 1973), which allows one to estimate how far changes in inequality in a health variable can be attributed to changes in inequality in its determinants or elasticities. Applying the decomposition to (3.5) gives the following:

$$\Delta C = \sum_j \eta_{jt} \left(C_{jt} - C_{jt-1}\right) + \sum_j C_{jt-1} \left(\eta_{jt} - \eta_{jt-1}\right) + \Delta \left(\frac{GC_{\upsilon t}}{\mu_t}\right) \tag{3.6}$$

where t refers to time period and Δ denotes first differences. In (3.6), we weight the difference in concentration indices by the second period elasticity and weight the difference in elasticities by the first period concentration index. An alternative to (3.6) would be to weight the difference in concentration indices by the first period elasticity and weight the difference in elasticities by the second period concentration index as expressed in (3.7):

$$\Delta C = \sum_j \eta_{jt-1} \left(C_{jt} - C_{jt-1}\right) + \sum_j C_j \left(\eta_{jt} - \eta_{jt-1}\right) + \Delta \left(\frac{GC_{\upsilon t}}{\mu_t}\right) \tag{3.7}$$

As indicated earlier, this decomposition allows one to decompose the change in SES-related inequality in a health variable into changes in inequality in its determinants, on one hand, and changes in the elasticities of the health variable with respect to these determinants, on the other hand. Our empirical estimation follows this approach in explaining changes in SES-related inequalities in health over time. Estimates were based on linear probability models (LPMs), which are appropriately weighted[7] to the population and robust to heteroskedasticity. LPMs were employed due to the binary nature of the dependent health variables of interest.

Although decomposing the change in a concentration index can be done with either panel or cross-section data, the latter are used in our analysis. One key assumption underlying the

[7] As suggested earlier, we obtain the weights for the pooled analyses by dividing the adjusted weights by the number of survey years being pooled (Moriarity, 2010; Moriarity and Parsons, 2008). The weights were applied as required. Thus, weighted estimates are reported.

method is that there must be a consistent measure of socio-economic status, and population must be observed at least in two different points in time. In our analysis, the measure of socio-economic status is the wealth index, while we apply the method using two different time periods; 2004 and 2014. Data were analysed using Stata 14 (StataCorp, 2015).

3.4 Results

3.4.1 Data summary

Table 3.1 presents the data summaries, differentiated by survey year. Compared with the 2004 survey, the 2014 survey contained fewer individuals within the age bracket 6-30 years, females, single individuals, widowed, divorced, coloured and white but more African/blacks, married, and individuals above 30 years of age. Notably, the 2014 survey had more educated individuals with less than diploma certificates, diploma certificates and honours degree; with fewer people having no formal education. In 2014, the data is less rural and fewer individuals are living in Eastern Cape, Northern Cape, Free State, KwazuluNatal, and Limpopo, while more individuals are living in the relatively richer provinces of Western Cape and Gauteng. Moreover, more individuals in 2014 are beneficiaries of social grants, while unemployed individuals are fewer in 2004 than in 2014. The results further suggest that both surveys contained the same number of individuals who are Indians, who hold a postgraduate degree, live in the Northwest and Mpumalanga provinces in 2004 and 2014.

The estimates of some of the health variables of interest are as one would expect. Compared with 2004, the 2014 estimates of the measures of health suggest an improvement, as fewer individuals reported ill-health, though there is a slight increase in disability reports. More individuals have medical aid coverage in 2014 than in 2004. However, fewer individuals prefer to utilise public health care when ill, while more individuals would prefer private health care in 2014.

Table 3.1: Descriptive statistics (Mean and standard errors) of the dependent and independent variables, GHS 2004 and 2014

Variable	2004		2014	
6 - 17 yrs	0.257	(0.002)	0.227	(0.002)
18 - 30 yrs	0.249	(0.002)	0.242	(0.002)
31 - 45 yrs	0.194	(0.002)	0.215	(0.002)
46 - 64 yrs	0.127	(0.001)	0.146	(0.001)
65 yrs +	0.043	(0.001)	0.053	(0.001)
Male	0.483	(0.002)	0.488	(0.002)
Female	0.517	(0.002)	0.512	(0.002)
Black Africans	0.783	(0.002)	0.800	(0.002)
Coloured	0.091	(0.001)	0.090	(0.001)
Indian	0.025	(0.001)	0.025	(0.001)
White	0.101	(0.001)	0.085	(0.001)
Married	0.272	(0.002)	0.276	(0.002)
Widowed	0.047	(0.001)	0.046	(0.001)
Divorced	0.021	(0.001)	0.017	(0.001)
Single	0.661	(0.002)	0.660	(0.002)
No schooling	0.195	(0.002)	0.149	(0.001)
Less than diploma	0.740	(0.002)	0.746	(0.002)
Diploma/certificate	0.036	(0.001)	0.041	(0.001)
Honours degree	0.020	(0.001)	0.035	(0.001)
Postgraduate	0.004	(0.000)	0.004	(0.000)
Unemployed	0.692	(0.002)	0.694	(0.002)
Rural	0.437	(0.002)	0.362	(0.002)
Western Cape	0.107	(0.001)	0.114	(0.001)
Eastern Cape	0.135	(0.001)	0.124	(0.001)
Northern Cape	0.023	(0.000)	0.022	(0.000)
Free state	0.058	(0.001)	0.051	(0.001)
KwazuluNatal	0.202	(0.002)	0.197	(0.002)
Northwest	0.068	(0.001)	0.068	(0.001)
Gauteng	0.224	(0.002)	0.242	(0.002)
Mpumalanga	0.078	(0.001)	0.078	(0.001)
Limpopo	0.106	(0.001)	0.104	(0.001)
Grant recipients	0.098	(0.001)	0.290	(0.002)
Illness	0.113	(0.001)	0.097	(0.001)
Disability	0.026	(0.001)	0.031	(0.001)
Medical aid coverage	0.156	(0.002)	0.179	(0.002)
Public health facility	0.751	(0.002)	0.734	(0.002)
Private health facility	0.248	(0.002)	0.262	(0.002)
Observations	97,036		92, 445	

Estimates are weighted to the population using the sample weights.
Standard errors in parentheses

To get a picture of the inequality in the distributions of the health variables across SES quintiles, we plot concentration curves, which show the shares of the health variables accounted for by the cumulative proportions of individuals in the population; ranked from the poorest to the richest. In Figures 3.1 and 3.2, we depict concentration curves comparing the health variables between the two survey years (2004 & 2014).

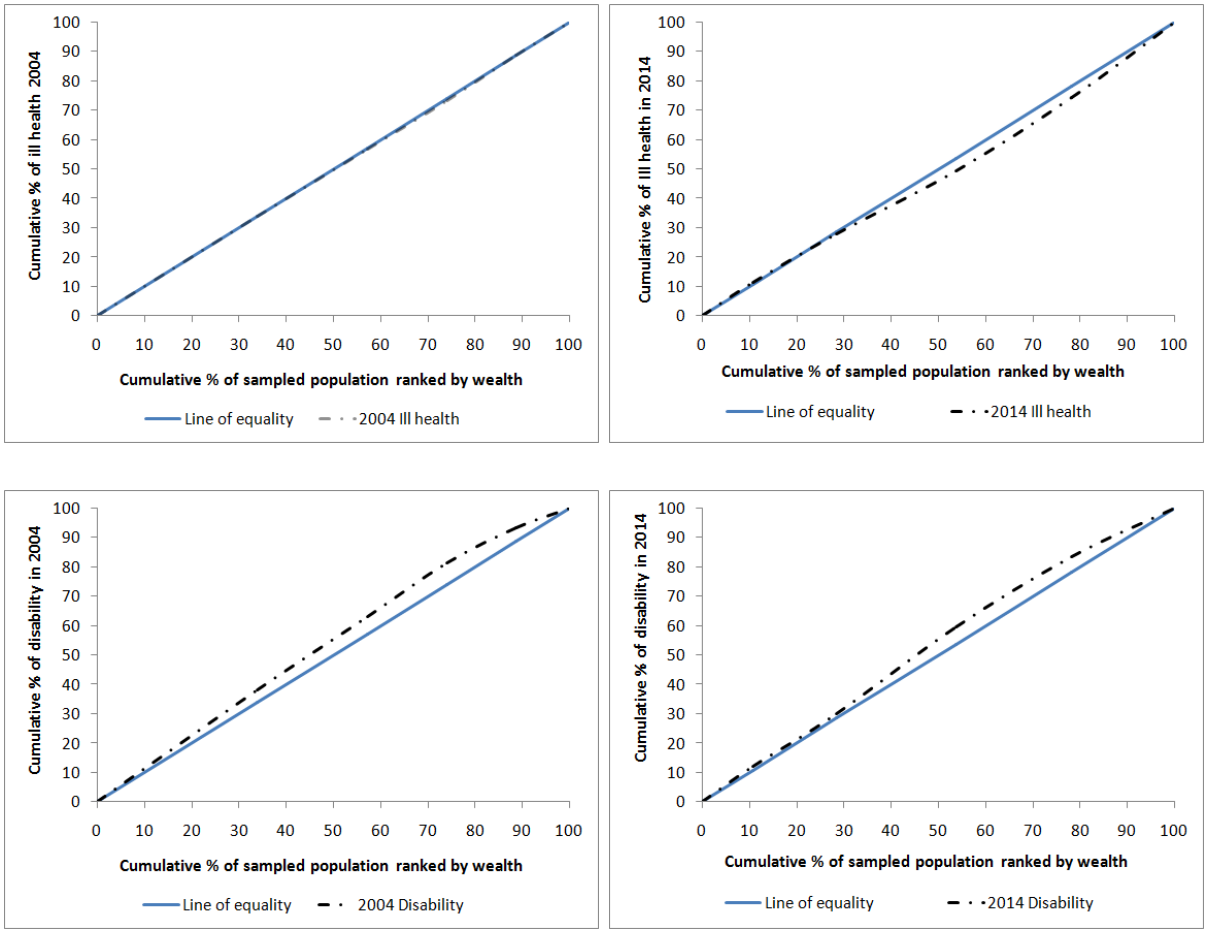


Figure 3.1: The concentration curves for the health variables, South Africa, GHS 2004 and 2014. The top-left panel shows the concentration curve for 2004 ill-health, while the top-right panel depicts the 2014 ill-health concentration curve. In the bottom-left panel, 2004 disability concentration curve is illustrated, while the bottom-right panel graphs the concentration curve for 2014 disability.

There are four panels in each of the figures. In Figure 3.1, the top-left panel shows the concentration curve for 2004 ill-health, while the top-right depicts the 2014 ill-health concentration curve. In the bottom-left panel, 2004 disability concentration curve is illustrated, while the concentration curve for 2014 disability is presented in the bottom-right panel. The top-left panel, in Figure 3.2, shows the concentration curve for 2004 medical aid coverage, while the

top-right depicts the 2014 medical aid coverage concentration curve. In the bottom-left panel, 2004 utilisation of public and private health care concentration curves are illustrated, while the concentration curves for 2014 utilisation of public and private health care are presented in the bottom-right panel.

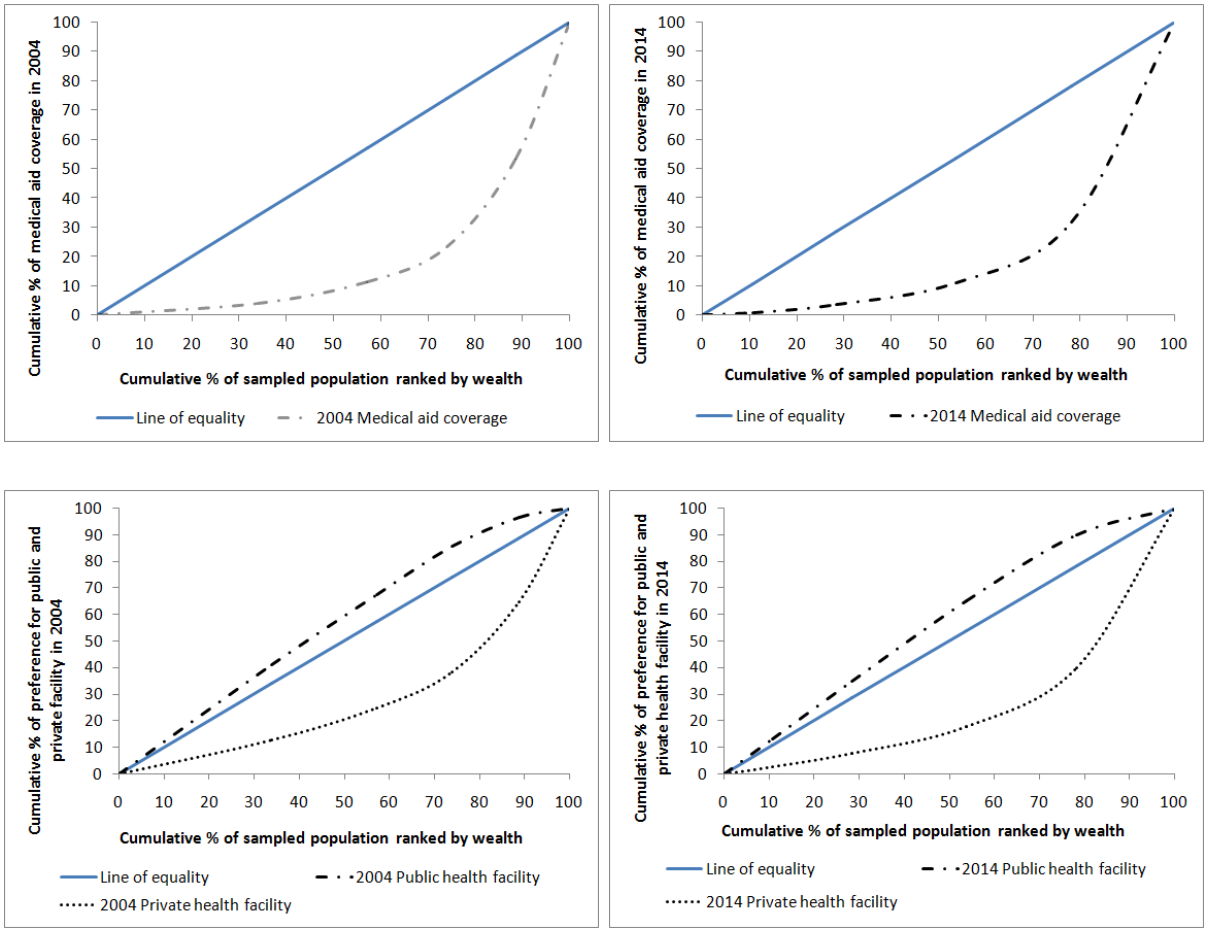


Figure 3.2: The concentration curves for the health variables, South Africa, GHS 2004 and 2014. The top-left panel shows the concentration curves for 2004 medical aid coverage, while the top-right panel depict the 2014 medical aid coverage concentration curves. In the bottom-left panel, utilisation of public and private health care concentration curves are illustrated, while the bottom-right panel graphs the concentration curves for 2014 utilisation of public and private health care.

We observe that the 2004 ill-health concentration curve lies on the line of equality, while the 2014 concentration curve lies on the line of equality at the bottom quintile, then moves outwards and lies below the line of equality at the top quintile. Intuitively, this connotes that inequality in ill-health is ambiguously equally distributed among the poor and the better-off in 2004. On the other hand, ill-health in 2014 is to the disadvantage of the better-off off at the

top quintile, while it is equally distributed between the poor and the better-off at the lower quintile. In contrast, the 2004 and 2014 concentration curves for disability lie everywhere above the lines of equality, though the 2014 concentration curve appears to tilt slightly inwards at the top quintile. While it is clear that inequality in disability is to the disadvantage of the poor in 2004 and 2014, the inward movement in 2014 at the top quintile suggests a reduced incidence of disability. The implication is that inequality in disability was unambiguously greater in 2004 than in 2014.

It is evident that the 2004 and 2014 medical aid coverage concentration curves lie everywhere below the lines of equality. Thus, inequality in medical aid coverage existed in each year; it widened and unequivocally favoured the better-off. Meanwhile, the 2004 and 2014 concentration curves for public health care preference lie everywhere above the lines of equality, with no clear changes in the curve over time. This implies that public health care facility utilisation is more concentrated among the poor than the better-off in each year. On the contrary, the two concentration curves for private health care preference lie everywhere below the line of equality, with the 2014 concentration curve lying everywhere below that of the 2004 concentration curve, thus, inequality in preferences for private health care facility utilisation existed in both years in favour of the better-off, and it is widening.

3.4.2 Results of Concentration Indices for the Health Variables in 2004 and 2014

Table 3.2 presents the concentration indices for the health variables in 2004 and 2014 (estimates are from (3.3)). The results show the relative change in health inequalities over the time periods, linking those changes to changes in the SDH. After controlling for the social determinants, the results suggest that ill-health and preference for public health care are concentrated among the poor in each year and there is an appreciable widening in inequality between 2004 and 2014; however, the results for ill-health are not significant at conventional levels. On the contrary, disability, medical aid coverage and preferences for private health care are more concentrated among the better off than the poor in both years. However, the result for disability is not statistically significant at conventional levels in 2004.

In addition, we find that, in both 2004 and 2014, reported ill-health is less concentrated among the relatively poor adults (both males and females) within the age group 31-45 years, those with an honours degree, and those residing in the Western Cape, when compared with their

respective reference categories. On the other hand, relatively better-off married individuals, urban residents and those living in the Gauteng province are associated with a high likelihood of reported illness. Moreover, we find reported illness to be less concentrated among the relatively poor black Africans and social grant recipients in 2014, than in 2004.

Table 3.2: Concentration Indices and Social Determinants for the Health Variables in 2004 and 2014, GHS South Africa

	Ill-health status		Medical aid coverage		Disability		Public facility		Private facility	
	2004	2014	2004	2014	2004	2014	2004	2014	2004	2014
CI	−0.000	−0.011	0.278^{+}	0.284^{+}	0.009	0.027*	−0.050^{+}	−0.057^{+}	0.149^{+}	0.157^{+}
	(0.009)	(0.010)	(0.006)	(0.005)	(0.018)	(0.014)	(0.001)	(0.002)	(0.004)	(0.004)
Male*31-45 yrs	−0.125^{+}	−0.067^{+}	−0.005	−0.105^{+}	0.387^{+}	−0.273^{+}	0.004	0.009^{+}	−0.012	−0.026^{+}
	(0.019)	(0.017)	(0.012)	(0.009)	(0.046)	(0.041)	(0.003)	(0.002)	(0.008)	(0.006)
Female*31-45 yrs	−0.108^{+}	−0.033*	0.019**	−0.101^{+}	0.198^{+}	−0.311^{+}	0.010^{+}	0.012^{+}	−0.031^{+}	−0.033^{+}
	(0.019)	(0.017)	(0.011)	(0.009)	(0.044)	(0.039)	(0.002)	(0.002)	(0.007)	(0.006)
African/Black	0.008	−0.054^{+}	−0.447^{+}	−0.366^{+}	−0.069^{+}	−0.036*	0.060^{+}	0.053^{+}	−0.181^{+}	−0.147^{+}
	(0.010)	(0.011)	(0.008)	(0.007)	(0.015)	(0.015)	(0.002)	(0.002)	(0.005)	(0.004)
Married	0.011**	0.012**	0.057^{+}	0.071^{+}	−0.201^{+}	−0.060^{+}	−0.007^{+}	−0.007^{+}	0.021^{+}	0.020^{+}
	(0.007)	(0.007)	(0.005)	(0.004)	(0.016)	(0.009)	(0.001)	(0.001)	(0.003)	(0.003)
Honours/degree	−0.020	−0.037*	0.318^{+}	0.300^{+}	−0.417^{+}	−0.396^{+}	−0.022^{+}	−0.029^{+}	0.068^{+}	0.079^{+}
	(0.020)	(0.018)	(0.018)	(0.011)	(0.031)	(0.037)	(0.003)	(0.002)	(0.010)	(0.007)
Employment status	−0.004	0.004	0.082^{+}	0.064^{+}	−0.232^{+}	−0.078^{+}	−0.014^{+}	−0.010^{+}	0.043^{+}	0.028^{+}
	(0.005)	(0.006)	(0.004)	(0.003)	(0.010)	(0.008)	(0.001)	(0.001)	(0.002)	(0.002)
Western Cape	−0.041^{+}	−0.023*	−0.028^{+}	−0.024^{+}	0.082^{+}	0.039*	−0.021^{+}	−0.005^{+}	0.063^{+}	0.017^{+}
	(0.010)	(0.009)	(0.007)	(0.006)	(0.024)	(0.017)	(0.001)	(0.002)	(0.004)	(0.004)
Gauteng	0.007	0.051^{+}	0.012*	0.009**	0.038*	0.014	−0.013^{+}	−0.005^{+}	0.040^{+}	0.016^{+}
	(0.009)	(0.009)	(0.005)	(0.005)	(0.015)	(0.014)	(0.001)	(0.001)	(0.004)	(0.004)
Urban	0.012*	0.039^{+}	0.029^{+}	0.000	−0.002	0.009	−0.002^{+}	−0.006^{+}	0.006^{+}	0.017^{+}
	(0.005)	(0.005)	(0.003)	(0.003)	(0.010)	(0.009)	(0.001)	(0.001)	(0.002)	(0.002)
Grant recipients	0.088^{+}	−0.008	−0.044^{+}	−0.163^{+}	0.567^{+}	0.270^{+}	0.008^{+}	0.021^{+}	−0.023^{+}	−0.057^{+}
	(0.008)	(0.007)	(0.004)	(0.004)	(0.028)	(0.014)	(0.001)	(0.001)	(0.003)	(0.003)
Chronic ailment				0.020^{+}				0.003^{+}		−0.010^{+}
				(0.004)				(0.001)		(0.003)
Illness							−0.009^{+}	−0.010^{+}	0.027^{+}	0.030^{+}
							(0.001)	(0.001)	(0.003)	(0.003)
Disability							0.004*	−0.002	−0.011*	0.004
							(0.002)	(0.001)	(0.006)	(0.004)
Medical aid coverage							−0.088^{+}	−0.105^{+}	0.268^{+}	0.294^{+}
							(0.001)	(0.001)	(0.004)	(0.004)
Constant	0.288^{+}	0.260^{+}	0.331^{+}	0.370^{+}	0.442^{+}	0.780^{+}	0.168^{+}	0.173^{+}	0.165^{+}	0.147^{+}
	(0.022)	(0.021)	(0.014)	(0.012)	(0.053)	(0.050)	(0.003)	(0.003)	(0.010)	(0.007)
R^2	0.036	0.016	0.379	0.400	0.071	0.047	0.405	0.486	0.406	0.490

Standard errors in parentheses. ** $p < 0.10$, * $p < 0.05$, $^{+}$ $p < 0.01$. Estimates are based on (3.3), and weighted to the population using the sample weights. Number of observations for 2004 and 2014 are 96,532 and 90,153 respectively.

With respect to medical aid coverage, we find that better-off married individuals, those with an honours degree, those employed, those residing in Gauteng province and in urban areas, compared to their reference categories, are more likely to be covered by medical aid in 2004 and 2014. Meanwhile, relatively poor black Africans are less likely to have medical aid coverage in both years, when compared to the white population group, the reference category. We also observe that the better-off suffering from chronic diseases are more likely to have medical aid coverage and preference for the utilisation of public health care in 2014. Furthermore, we find that poor social grant recipients are more likely to suffer from disability, less likely to have medical aid coverage, and prefer to utilise public health care when ill.

Moreover, relatively better-off young males and females, especially females in their reproductive ages, are more likely to prefer to utilise public health care in both time periods than their older counterparts. In a similar manner, black Africans and social grant recipients would prefer to utilise public health care in both time periods. On the other hand, the relatively poor married individuals, educated, employed, those residing in relatively richer provinces, urban areas and those who have medical aid coverage are less likely to prefer to utilise public health care. As expected, the results of preference for the utilisation of private health care appear to be opposite mirrors of that of preference for public health care utilisation.

3.4.3 Decomposition result

In Table 3.3[8], we present the Oaxaca decomposition[9] result which shows the extent to which inequalities in the health indicators over time are due to changes in inequality in their social determinants and changes in their elasticities with respect to the social determinants. We observe that changes in inequalities in the determinants and changes in elasticities reinforce one another. In tandem with other studies (Ataguba et al., 2011, 2015; Zere and McIntyre, 2003), we find a pro-rich inequality in ill-health. However, when we use the Oaxaca-type decomposition of change in the concentration index, we find some interesting results on the influence of changing inequalities and elasticities in explaining changes in the health variables over time. With respect to ill-health, we find that changing inequalities among the racial groups, metropolitan status, and across the provinces are the key factors driving changes in ill-health inequality over time.

[8]The decomposition results for the two time periods are reported in Table B.2.2.

[9]The decomposition results for the inequality in the health variables, along with their associated standard errors are reported in Table B.3.3 in the appendix.

Table 3.3: Oaxaca-type decomposition of change in the health inequalities, 2004-2014

	Ill-health status		Medical aid coverage		Disability		Public facility		Private facility	
	$\Delta C\eta$	$\Delta \eta C$	$\Delta C\eta$	$\Delta \eta C$	$\Delta C\eta$	$\Delta \eta C$	$\Delta C\eta$	$\Delta \eta C$	$\Delta C\eta$	$\Delta \eta C$
6-17 yrs	−0.001	−0.001	0.000	0.000	0.002	0.012	0.000	0.000	0.000	−0.001
18-30 yrs	0.004	0.000	0.008	0.003	−0.013	0.003	−0.002	−0.001	0.005	0.002
31-45 yrs	0.004	−0.004	0.012	−0.008	−0.023	−0.012	−0.003	0.002	0.008	−0.006
46-64 yrs	−0.002	−0.013	−0.004	−0.012	0.010	−0.031	0.001	0.003	−0.003	−0.009
65 yrs +	−0.001	−0.003	−0.002	0.000	0.015	0.005	0.000	0.000	−0.001	−0.001
African/Black	0.004	−0.040	−0.025	0.019	−0.002	−0.052	0.009	−0.014	−0.027	0.028
Coloured	0.000	0.007	−0.001	−0.007	0.000	0.001	0.000	0.001	−0.001	−0.003
White	−0.002	0.047	−0.004	−0.067	−0.001	0.025	0.001	0.011	−0.002	−0.036
Married	0.000	0.024	0.001	−0.003	0.000	0.260	0.000	0.007	0.000	−0.020
Widowed	0.001	−0.001	0.000	0.000	0.001	−0.017	0.000	0.000	0.000	0.001
Divorced	0.001	0.001	0.000	0.000	0.000	0.009	0.000	0.000	0.000	−0.001
Single	0.000	−0.023	0.000	0.005	−0.001	−0.226	0.000	−0.007	0.000	0.020
No schooling	0.001	0.005	−0.001	0.000	0.004	−0.045	0.000	0.000	0.000	0.004
Less than diploma	0.001	0.001	0.001	0.000	0.021	−0.005	0.000	0.000	0.000	0.001
Diploma certificate	0.000	−0.004	−0.006	0.000	0.006	0.028	0.002	−0.003	−0.005	0.003
Honours degree	0.000	−0.002	−0.005	0.018	0.003	0.011	0.001	−0.006	−0.003	0.013
Postgraduate degree	0.000	−0.002	−0.001	0.001	0.000	0.006	0.000	−0.001	0.000	0.001
Employed	0.000	0.001	−0.005	−0.008	0.007	0.037	0.001	0.002	−0.004	−0.007
Urban	−0.004	0.024	−0.006	−0.009	−0.002	0.012	0.003	−0.008	−0.007	0.020
Western Cape	0.001	0.007	0.001	−0.004	0.001	−0.018	0.000	0.001	0.000	−0.004
Eastern Cape	0.001	−0.016	−0.001	0.005	−0.003	0.014	0.001	0.002	−0.001	−0.006
Northern Cape	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Free State	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Kwazulu-Natal	0.001	−0.007	0.001	0.000	0.003	0.009	−0.001	0.000	0.002	−0.001
Gauteng	−0.001	0.022	0.000	−0.006	0.002	−0.024	0.000	−0.001	0.000	0.002
Mpumalanga	0.000	0.000	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000
Limpopo	0.000	−0.003	0.000	0.002	0.002	0.005	0.000	0.001	0.000	−0.004
Grant recipient	0.001	0.009	0.018	0.039	−0.028	−0.025	−0.004	−0.010	0.012	0.026
Total	0.009	0.030	−0.021	−0.031	0.007	−0.013	0.009	−0.017	−0.027	0.025

This table presents a change in the concentration index for each of the health variables considered. The change over time in the concentration index, weighted by the first period elasticity is denoted as $\Delta C\eta$, and vice versa for $\Delta \eta C$. Estimates represent the relative contributions of changes in the explanatory variables to changes in the corresponding concentration indexes. Estimates are obtained from equation (3.7) and weighted to the population using the adjusted sample weights. For enhanced readability, estimates with the standard errors are reported in Table B.3.3 in the appendix. Number of observations for 2004 and 2014 are 96,532 and 90,153 respectively.

Furthermore, the decomposition suggests that changing inequalities across age groups, provinces and social grants receipt explain considerable change in disability inequality over time. Meanwhile, changes in medical aid coverage are attributable to changing inequalities across age

groups, racial groups and educational attainment levels. With respect to inequality in the preference related to the choice of health care over time, we find that rising inequalities across racial groups, different educational attainment levels, and metropolitan status are crucial in explaining inequality in the preference for private health care over time.

Changing elasticities, with respect to each of the health variables, also play an important role in explaining differences over time. For instance, changing elasticities associated with age, racial groups, marital status, provinces and education, also account for the bulk of changes in ill-health inequality over time. Meanwhile, changing elasticities attributable to employment status, metropolitan status, age groups, marital status, racial groups and province of location are found to be important variables in explaining changes in medical aid coverage over time. In addition, changes in the preference for public health care are explained by changing elasticities associated with racial groups, marital status, education, metropolitan status, social grant receipt, and province of location.

Overall, taking the changes in all the determinants of the health variables into account, the result suggests that the bulk of the changes in inequalities in the utilisation of private heath care is largely attributable to inequalities in its social determinants, while considerable inequalities in ill-health, medical aid coverage, disability and utilisation of public health care are mainly attributable to changing elasticities with respect to their social determinants.

3.5 Discussion and Conclusion

Using nationally representative data from the 2004 and 2014 General Household Surveys (GHSs), this paper uncovers the relative changes in health inequalities over the second decade of post-apartheid South Africa. It also provides an explanation on changes in the social determinants of health that account for disparities in health and health care over time. The health indicators considered in the analysis include ill-health, disability, medical aid coverage, public and private health care preference. The concentration index regression model and the Oaxaca-type decomposition of change in the concentration index were employed to achieve the stated objectives.

From our empirical analysis, it was evident that there exist considerable levels of conventional social health gradients in most of the health indicators considered, which are consistent with previous similar studies (Ataguba et al., 2011, 2015; Zere and McIntyre, 2003); however, disability is found to be more concentrated among the better off than the poor. We find pro-rich

inequalities in medical aid coverage and preference for private health care. Furthermore, the decomposition suggests that rising inequalities in ill-health are largely explained by inequalities among those residing in urban areas and in the relatively richer provinces, while increasing inequalities in social grant receipts and among those residing in relatively poorer provinces largely explain inequality in disability overtime. Meanwhile, rising inequality in medical aid coverage and utilisation of private heath care are mainly attributable to inequalities in educational attainment and among the black Africans. However, changing elasticities in SDH, rather than rising inequalities, are found to be important factors in explaining inequality in the utilisation of public health care facility in the event of illnes. According to the WHO, three key sectors (education, social protection, and urban development infrastructure) were highlighted as crucial for improving health outcomes and health equity (Ataguba et al., 2015). From our findings, besides the household and individual characteristics, these three key sectors were also identified as domains for more interventions in an effort to reduce health inequalities in South Africa.

Chapter 4

Gender Differentials in Health: A Differences-in-Decompositions Estimate

4.1 Introduction

Since the fall of Apartheid, a regime characterised primarily by racial inequality, a number of policies have targeted reductions in inequalities. Many of those policies have been directed towards tackling gender inequality (Mbeki, 2001). In spite of these policies, gender inequality persists (Kabeer, 2005), particularly in relation to health (Govender and Penn-Kekana, 2008; Kruger et al., 2012; Pillay and Kriel, 2006; Reddy et al., 2009; Statistics South Africa, 2012*a*). Given the government's commitment to gender equality (African National Congress, 2012) and health for all her citizens (Booysen, 2003; South Africa Constitution, 1996), one would expect considerably smaller gender gaps in health today, relative to a decade ago. Nevertheless, observed health differences between males and females remain pervasive.

Previous literature has primarily analysed health inequality at a fairly aggregated level. A number of empirical studies (see Ataguba et al., 2011, 2015; Bradshaw, 2008; Burgard and Treiman, 2006; Christian, 2014; Gilson and McIntyre, 2007; Govender and Penn-Kekana, 2008; Harris et al., 2011; Harrison, 2012; Koch, 2009; Nteta et al., 2010; Omotoso and Koch, 2017) have examined issues of aggregate inequality and inequity in health, at the population level. However, these studies have not identified the drivers of change at a disaggregate level, e.g. across gender, and, therefore, present a narrow perspective of health inequality.

Available evidence suggests that education and social grants are important determinants of gendered health inequality in South Africa (Aguero et al., 2006; Ataguba et al., 2015; Heinrich et al., 2012; UNICEF et al., 2014). Over the post-apartheid period, South Africa has maintained a reasonably equitable gender balance in education and social grant receipt (Chapman, 2006; Goldblatt, 2005; Patel, 2012). In particular, the non-contributory old age pension and child grant have a strong gender dimension, with a sizeable proportion of females as beneficiaries (Taylor Commission et al., 2002). It is claimed that over 70% of recipients of old-age pensions are females, while they are almost always the recipients, as care givers, of child support grants. Such grants are often used to purchase basic food items, and meet additional health care and educational costs (African National Congress, 2005; Burns et al., 2005; Goldblatt, 2005); see Table C.1.1 in the Appendix for a summary of social grants available in South Africa. Hence, social grants, which have greater numbers of females as recipients, are an important income source.

Through these grants, severe poverty and risky health behaviours, such as persistent hunger and drug abuse can be reduced, especially among young people (UNICEF et al., 2014). More specifically, household income in the form of pensions has been shown to be positively associated with changes in child health and educational status (Duflo, 2000; Edmonds, 2005). Consequently, social grants, along with other socio-economic factors, are essential components of our analysis of gender differentials in health. Understanding their impact on narrowing gendered health differentials over time, though, deserves further scrutiny, as they can provide information for designing and implementing appropriate policies and health interventions aimed at closing gendered health gaps. It can also serve as a way of indirectly assessing the effectiveness, or otherwise, of prior policies and reforms aimed at reducing gendered health differentials. Moreover, it can help to identify the key drivers of the differentials, so that sectors needing further improvement or intervention can be highlighted.

Thus, the empirical contribution of this research is three-fold. Firstly, we establish the degree of gender inequality in health over a recent period. Secondly, we uncover the relative change in gender-based health (in)equality over that period. Thirdly, we examine the factors that have contributed to the change, and their relative importance. This research makes a further minor methodological contribution to the analysis of gender equality within health. Although the approach we follow has been employed in the analysis of gender equality in the labour market (see Kassenboehmer and Sinning, 2014; Wellington, 1993), we are not aware of it being applied to

health inequality. Methodologically, we difference two separate Blinder-Oaxaca decompositions, which are also differences; thus, there is similarity between our differences-in-decompositions and differences-in-differences (Bertrand et al., 2004). The approach is applied to health in 2005 and 2014. The initial year marks the introduction of the Government Employees Medical Scheme (GEMS) (Govender et al., 2013), while the latter marks one decade later. Because the standard decomposition partitions the gender gap (in any year) into differences in both observed and unobserved factors, the differences-in-decompositions method partitions the changes in the gender gap (across those two years) into changes in both observed and unobserved factors.[1]

We find that the gender gap in health differentials narrowed by about 2% between 2005 and 2014. Further investigation reveals that the narrowing of the gender gap is mainly attributable to changes in female receipt of social grants and the levels of educational attainment. This finding resonates with other related research showing that education and social grants are important factors for reducing gendered health inequality.

4.2 Data, Trends and Descriptive Analysis

4.2.1 Data

We utilise data from South Africa's 2005 (Statistics South Africa, 2005) and 2014 (Statistics South Africa, 2014*a*) General Household Surveys (GHS); each survey is nationally representative and contains information on health and other health-related behaviour, along with other socio-economic and demographic information.[2] In each survey, approximately 30,000 households are interviewed, and the survey, which started in 2002, is conducted yearly, but cannot be treated as either an individual- or household-level panel. To account for differences in survey designs, which cannot be entirely avoided, we employ the sampling weights provided in the datasets[3].

In our empirical analysis, health is measured by ill-health status, whether or not the respondent suffered from any illness or injury during the month preceding the survey; the binary response (suffered an illness=1) is our dependent variable. Regrettably, the choice of the health variable, ill-health status, used for our analysis was constrained by the availability of data in the

[1] As with differences-in-differences, the order of differencing in the differences-in-decompositions does not matter. In other words, one could, instead, decompose health over time, separately, for men and women, and difference that across gender; the results would be identical.

[2] The GHS datasets are publicly available and can be accessed from `https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/526/get_microdata`.

[3] For details on the derivation of the GHS weights and other adjustments made in the datasets, see the respective survey metadata files and technical notes sections of the statistical releases `https://www.datafirst.uct.ac.za/dataportal/index.php/catalog`.

GHS. Ideally, a measure of health would be medically-certified or self-assessed general health. However, the surveys do not contain information on general health conditions. Questions that assessed health were limited to self-reported ill-health and disability[4]. Consequently, our analysis is limited to ill-health status, as this is the best one available to us at this point.

The resultant samples were 107,857 and 92,445 in 2005 and 2014, respectively, after the data were cleaned. The set of control variables used in our analysis can be divided into eight categories: i) educational attainment (with categorical values: no schooling, less than diploma, diploma or certificate, university degree and postgraduate degree); ii) race (with categories: black Africans, coloured, Asian/Indian and white); iii) marital status (with categories: married, widow or widower, divorced or separated and single); iv) employment status (whether or not the individual is employed); v) province (in which province the individual was residing at the time of the survey);[5] vi) metropolitan status (whether or not the individual lives in an urban area); and vii) Age (with categories: less than 6 years, 18-30 years, 31-45 years, 46-64 years and 65 years and beyond).

4.2.2 Trends in Health

We begin our analysis with the age profile of illness for males and females in the two time periods. The left panel depicts the age profile of illness in 2005, while the right panel illustrates the age profile of illness in 2014. Comparing males and females in both time periods, we observe that while females follow an $S-$pattern, males follow the expected J (though, the pattern is not too clear in 2014), with troughs occurring between ages 10 and 20 in both years. We observe that females report ill-health more often than their male counterparts in both years, except at around 80 years of age. We also observe improvement in our health measure for both males and females, when comparing the 2005 and 2014 age-illness profiles.

[4]Self-reported health status has been validated by comparing with medical records or clinical reports (Heaton et al., 2017; Martin et al., 2000; Van Doorslaer and Jones, 2003). However, validation of self-reported social constucts often used in health disparities research is a much harder task to achieve (Hidalgo and Goodman, 2012)

[5]We included the nine provinces which are Western Cape, Eastern Cape, Northern Cape, Free State, Kwazulu/Natal, North-West, Gauteng, Mpumalanga and Limpopo. For enhanced readability, only the two relatively rich provinces (Western cape and Gauteng) are reported in our results.

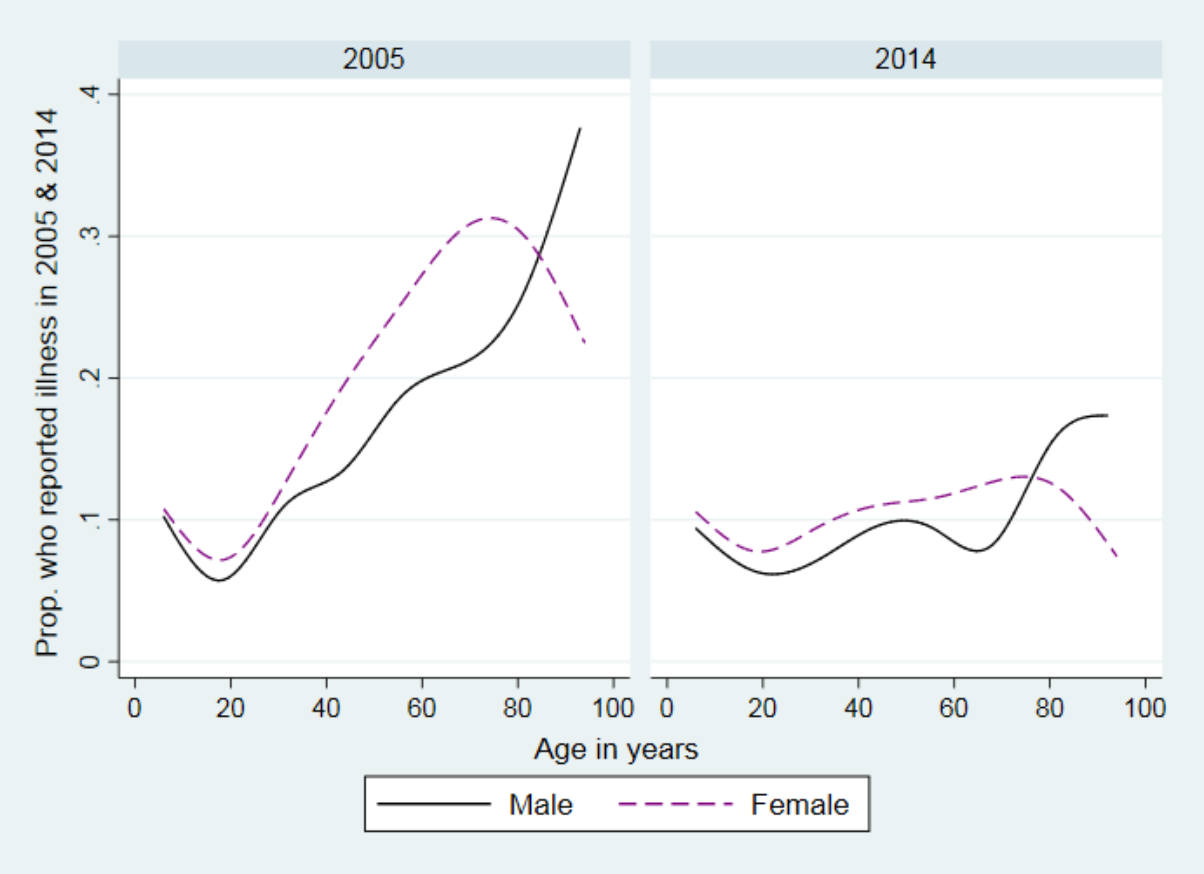


Figure 4.1: Age-illness profiles for men and women in GHS 2005, panel (a), and GHS 2014, panel (b). Illustrated proportions are for those reported being ill in the 30 days prior to the survey at any age. The illustrations are taken from spline regressions of illness on age in each of the survey years; thus, the pattern is smoothed.

4.2.3 Descriptive Analysis

4.2.3.1 Changes in Health Status and Explanatory Variables

Table 4.1 presents changes in the weighted means of the explanatory variables and the health status from 2005 to 2014 for both males and females. The changes[6] in (weighted) means suggest changes in the population over the time period. For example, the population is relatively older in 2014 than in 2005, and that is true for both males and females. The population is generally better educated, as there is a lower proportion of the population in the lower education ranks and a greater proportion within upper educational outcomes. Specifically, the percentage of males without formal education decreased from about 19% in 2005 to 14% in 2014, while that of females decreased from 20% in 2005 to about 15% in 2014.

[6]Table C.2.2 in the Appendix explicitly details the changes in the weighted means for all the variables for males and females in both time periods.

Table 4.1: Changes in the Weighted Means of the Variables between 2005-2014 for Males and Females

	Male		***Female***	
	Means	Standard errors	Means	Standard errors
Less than 6 yrs	−0.013***	(0.003)	−0.012***	(0.003)
6-17 yrs	−0.033***	(0.004)	−0.022***	(0.003)
18-30 yrs	−0.001	(0.004)	−0.012**	(0.004)
31-45 yrs	0.024***	(0.004)	0.013***	(0.003)
46-64 yrs	0.016***	(0.003)	0.020***	(0.003)
65 yrs +	0.006***	(0.001)	0.012***	(0.002)
Black African	0.018***	(0.004)	0.013***	(0.004)
Coloured	−0.002	(0.002)	−0.000	(0.002)
Indian/Asian	0.000	(0.002)	−0.000	(0.001)
White	−0.016***	(0.003)	−0.013***	(0.003)
Married	−0.001	(0.004)	0.001	(0.004)
Widowed	0.003**	(0.001)	0.000	(0.002)
Divorced	−0.002	(0.001)	−0.002	(0.001)
Single	−0.002	(0.004)	0.001	(0.004)
No schooling	−0.045***	(0.003)	−0.047***	(0.003)
Less than diploma	0.013***	(0.004)	0.009*	(0.004)
Diploma certificate	−0.004*	(0.002)	−0.000	(0.002)
Honours degree	0.015***	(0.002)	0.019***	(0.002)
Postgraduate degree	0.001	(0.001)	0.002***	(0.000)
Employed	0.296***	(0.003)	0.186***	(0.003)
Urban	0.013***	(0.004)	0.024***	(0.004)
Western Cape	0.003	(0.003)	0.009**	(0.003)
Gauteng	0.011*	(0.005)	0.022***	(0.004)
Grant recipients	0.211***	(0.003)	0.108***	(0.003)
Ill-health	−0.024***	(0.003)	−0.032***	(0.003)
No. of observation in 2005	50,536		57,321	
No. of observation in 2014	43,469		48,976	

Standard errors in parentheses.* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimates are weighted to the population using the sample weights.

Similarly, the percentage of both males and females with an honours degree increased from about 2% in 2005 to approximately 4% in 2014 (see Table C.2.2 in the appendix for detailed breakdowns). There is also more observed employment in 2014 than in 2005, increases in grant receipt and urbanisation, as well as changes in the racial composition of the population.

Further, the proportion of both male and female social grant beneficiaries increased over time; the percentage of female grant recipients increased from 19% in 2005 to 30% in 2014, while the male percentage increased from 7% to 28% (see Table C.2.2). Finally, as expected from Figure 4.1, there has been an improvement in health, a reduction in reported ill-health for both males and females. While male average ill-health reports reduced by 2%, female average ill-health reports reduced by 3%, suggesting a 1% improvement for females relative to males (Table 4.1).

4.2.3.2 Gender Gap in Health

In furtherance of the first objective of this paper, we continue our analysis by estimating the gender gap in health over the studied two time periods. In order to do this, we employ a linear model while controlling for the aforementioned demographic and socio-economic variables. Our approach is similar to differences-in-differences; we include a year effect (2005 is the base category), a gender effect (males are the base category) and a gender-year interaction effect (males in 2005 are the base category), the last of which provides information regarding the degree to which the health gender gap has improved or worsened from 2005 to 2014. We undertake the analysis using a Linear Probability Model (LPM), which is heteroskedastic (therefore, we apply robust standard errors), and weight it to the population.

$$H_{igt} = \alpha_g g + \lambda_t t + \tau D_{gt} + X_{gt}^{'}\delta + \upsilon_{igt} \tag{4.1}$$

In (4.1), H_{igt} is the health outcome of interest for individual i in gender g (base category = male) by year t (base year = 2005); α_g and λ_t are the fixed effects for gender and year respectively. D_{gt} is the gender-year interaction, X_{gt} are control variables and υ_{igt} is an error term. τ measures how the gender gap in health has changed over the ten-year period.

The results reported in Table 4.2 provide information on the determinants of ill-health status, along with the gender gap in ill-health, for 2005 and 2014. From the results, we see a slight reduction in reported ill-health status through time. As expected, the gender gap narrowed by approximately 0.01 (1%), although not to a statistically significant degree, such that females were 1% less likely than males to report illness over time.

Table 4.2: Parameter Estimates of the Gender Gap in Health, 2005-2014.

	Coefficients	Standard errors
Year (Y_{2014}=1)	−0.0371***	(0.002)
Y_{2014}*female	−0.0081	(0.042)
Less than 6 yrs	0.0166	(0.012)
6 - 17 yrs	−0.0320**	(0.010)
18 - 30 yrs	−0.0398***	(0.010)
31 - 45 yrs	−0.0258*	(0.010)
46 - 64 yrs	−0.0130	(0.009)
Black African	0.0323**	(0.011)
Coloured	0.0294*	(0.012)
White	0.0611***	(0.013)
Married	0.0133	(0.037)
Widowed	0.0136	(0.037)
Divorced	0.0307	(0.039)
Single	0.0062	(0.036)
No schooling	0.0238	(0.015)
Less than Diploma	−0.0023	(0.013)
Diploma certificate	0.0054	(0.016)
Honours degree	0.0013	(0.018)
Postgraduate degree	−0.0058	(0.039)
Employment status	−0.0041	(0.005)
Metropolitan status (urban)	0.0242***	(0.004)
Grant recipient status	−0.0044	(0.005)
Western Cape	−0.0367***	(0.008)
Gauteng	0.0121	(0.009)
Constant	0.1248***	(0.001)
Observation	200,302	
R^2	0.007	

Robust standard errors in parentheses.* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimates are weighted to the population using the sample weights. Dependent variable is health status (ill or not)

4.2.3.3 Effects of Explanatory Variables on Ill-Health Status in 2005 and 2014

The preceding set of results provide some evidence on the degree of gender inequality in health over the studied period. However, the analyses assumed that health determinant relationships were the same for males and females across the two surveys, which could be overly restrictive.

Therefore, in order to uncover the relative change in gender-based health inequality over the studied period, which is the second objective of this research, we relax that assumption. We allow for differential determinants for both men and women in each of the surveys. Results from that analysis, which are also based on linear probability models appropriately weighted to the population and robust to heteroskedasticity, are reported in Table 4.3.

Table 4.3: Estimated Effect of Explanatory Variables on Ill-Health Status of Males and Females (by year)

	Male				***Female***			
	2005		2014		2005		2014	
6 - 17 yrs	−0.0388***	(0.011)	−0.0390***	(0.011)	−0.0349**	(0.012)	−0.0473***	(0.010)
18 -30 yrs	−0.0377***	(0.011)	−0.0517***	(0.012)	−0.0224	(0.012)	−0.0550***	(0.011)
31- 45 yrs	0.0165	(0.013)	−0.0425***	(0.012)	0.0383**	(0.012)	−0.0407***	(0.011)
46 - 64 yrs	0.0569***	(0.014)	−0.0471***	(0.012)	0.1211***	(0.013)	−0.0274*	(0.011)
65 yrs plus	0.0701***	(0.019)	−0.0308*	(0.014)	0.1367***	(0.016)	−0.0146	(0.012)
Black African	−0.0111	(0.011)	−0.0325***	(0.009)	0.0226	(0.012)	−0.0261**	(0.009)
Coloured	−0.0144	(0.014)	−0.0244*	(0.009)	0.0079	(0.014)	−0.0284**	(0.010)
Indian/Asian	−0.0279	(0.016)	−0.0453***	(0.013)	−0.0155	(0.017)	−0.0566***	(0.014)
Married	−0.0041	(0.008)	0.0074	(0.006)	−0.0055	(0.007)	0.0075	(0.006)
Widow/widower	0.0181	(0.022)	0.0507**	(0.016)	0.0162	(0.012)	0.0072	(0.008)
Divorced	0.0170	(0.020)	0.0399*	(0.017)	0.0588**	(0.019)	0.0218	(0.013)
Less than Diploma	−0.0327***	(0.009)	−0.0371***	(0.009)	−0.0230*	(0.010)	−0.0270**	(0.008)
Diploma certificate	−0.0287	(0.017)	−0.0300*	(0.013)	0.0093	(0.016)	−0.0187	(0.012)
Honours degree	−0.0414*	(0.021)	−0.0254	(0.015)	−0.0132	(0.024)	−0.0224	(0.014)
Postgraduate	−0.0746	(0.039)	−0.0351	(0.031)	−0.0464	(0.055)	−0.0293	(0.037)
Employment status	0.0134	(0.011)	0.0015	(0.005)	−0.0172*	(0.008)	0.0029	(0.005)
Western Cape	0.0149	(0.011)	−0.0123	(0.008)	0.0398***	(0.012)	−0.0139	(0.008)
Gauteng	−0.0007	(0.009)	0.0248***	(0.007)	0.0178*	(0.008)	0.0343***	(0.008)
Metropolitan status	0.0081	(0.005)	0.0190***	(0.004)	0.0086	(0.005)	0.0238***	(0.004)
Grant recipients	0.0756***	(0.010)	−0.0031	(0.006)	0.0387***	(0.006)	−0.0051	(0.005)
Constant	0.1408***	(0.014)	0.1637***	(0.012)	0.0860***	(0.013)	0.1583***	(0.012)
R^2	0.027		0.015		0.043		0.015	

Robust standard errors are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimates are weighted to the population using the adjusted sample weights. Number of observations for males in 2005 and 2014 are 50,237 and 42,261 respectively. Number of observations for females in 2005 and 2014 are 56,031 and 47,892 respectively.

The first conclusion to be drawn from the results is that, with the exception of low levels of education (either less than diploma/certificate or diploma/certificate), along with Gauteng and metropolitan status, there is little evidence to suggest that the relationships are both time-independent and gender neutral - see Table 4.3 - although, there is some evidence of gender

neutrality within a survey, as well as time independence within genders. For example, having earned less than a diploma with a certificate is associated with an approximately 3% reduction in reported illness for men and women in both years. Living in Gauteng is associated with a 3% increase in reported illness for both males and females in 2014. In like manner, living in a metropolitan area implies a 1-2% increase in reported illness in 2014.

In addition to the above effects that are similar across surveys and gender, we find evidence of gender neutrality in 2005 and 2014 (meaning similar male and female estimates in those years) for age. We also find gender neutrality in 2014 across race categories, honours and postgraduate degree receipt, employment status, grant receipt and living in the Western Cape. Generally, any formal education is better than no formal education, in the sense that formal education is for the most part associated with a reduction in ill-health. For the honours and postgraduate levels in 2014, that decrease is about 4-5%. For grant receipt and living in the Western Cape in 2014, the decrease is about 1%, but is statistically insignificant.

Time independence within genders (meaning similar estimates for males or females in both 2005 and 2014) is observed for all male marital status categories and most of the female marital status categories. In these cases, marital status other than single (the reference category) is associated with increased illness reports, from 1-5%, with larger estimates associated with divorce and separation. Finally, the observed $J-$shape in 2005 and $S-$patterns in 2014 for the age categories suggest a relative improvement from 2005 to 2014 in the health of both males and females.

To this point, we have seen that there are differences between men and women in the characteristics that we observe between the 2005 and 2014 surveys. Furthermore, we see that there are differences in the estimated determinants across survey years and gender, which provides impetus for a decomposition analysis.

4.3 Empirical Strategy

In order to examine the relative importance and contributions of changes in the socio-economic factors to the change in the health differential between males and females over time, our empirical analysis follows the developments underpinned by Blinder-Oaxaca decomposition, extended to deal with multiple changes.

4.3.1 Decomposing Health Differences Between Two Groups

To set the stage, we illustrate a typical Blinder-Oaxaca decomposition of the gender health gap. Thus, we decompose across two groups $g = \{f, m\}$. We denote health by H_{ig}, while X_{ig} is a set of health-related characteristics for each individual i in group g and the conditional expectation of H_{ig} is linear, such that health for individual i in group g follows:

$$E[H_{ig}|X_{ig}] = X'_{ig}\beta_g, \qquad g = \{f, m\}. \tag{4.2}$$

A Blinder-Oaxaca decomposition separates the gender health differential $\Delta H^{f,m}$ attributable to differences in observed characteristics and the returns to those endowments. The decomposition proposed by Blinder (1973) and Oaxaca (1973) and generalized by Oaxaca and Ransom (1994) can be expressed as:

$$\begin{aligned} \Delta H^{f,m} &= E(H_m) - E(H_f) = E(X_m)'\beta_m - E(X_f)'\beta_f \\ &= [E(X_m] - E(X_f)]'\beta^* + [E(X_m)'(\beta_m - \beta^*) + E(X_f)'(\beta^* - \beta_f)] \end{aligned} \tag{4.3}$$

The first term on the right hand side of (4.3) refers to the part of the health difference (or gap) that may be explained by group differences in observed characteristics, while the two remaining terms are attributable to differences in coefficients between the two groups, i.e., differences in the returns to individual attributes. In (4.3), the reference vector β^* is given by the linear combination of the estimates from (4.2):

$$\beta^* = \rho\beta_m + (1 - \rho)\beta_f. \tag{4.4}$$

The linear combination "weights" (ρ) can be chosen in a variety of ways. For example, setting $\rho = 1$ puts all the weight on men, while setting $\rho = 0$ places all the weight on women. If the chosen value of ρ places all the weight on one of the groups, however, the decomposition will be reference dependent. Based on theoretical derivations, Neumark (1988) and more recent studies (Fortin, 2008; Jann, 2008; Kassenboehmer and Sinning, 2014; Neumark, 1988) advocate coefficients from a pooled regression over both groups as an estimate for parameter vector β^*. Thus, we employ this strategy in our subsequent empirical analysis (see (4.8)).

4.3.2 Differencing the Decomposition of the Gender Gap in Health Over Time

Our interest, however, is not in the canonical decomposition of the gender health gap; rather, it is in understanding whether the decomposition has remained constant over the past decade, and, if not, what might explain any observed deviation. In other words, our goal is to examine the relative importance of the determinants in explaining changes in the gender health gap over time. Although Oaxaca (1973) showed that the average gap (or difference) in an outcome could be decomposed into the differences in the endowments and the returns (including the constant term), that analysis, as implied by (4.3), allows for only one binary dimension for decomposition (e.g., two groups within one survey or one group across two surveys) rather than multiple dimensions, a point we discuss below. Thus, we need to extend the canonical decomposition structure.

We begin by extending the previous notation in (4.2). Specifically, we denote H_{igt} as the health outcome of interest for individual i in gender g (base category = male) by year t (base year = 2005) considered in our analysis. Similarly, X_{igt} is a set of health-related characteristics for each individual i in group g and time t. The conditional expectation of H_{igt} remains linear, such that health for individual i in group g and survey year t follows:

$$E[H_{igt}|X_{igt}] = X'_{igt}\beta_{tg}, \qquad g = \{f, m\}, \qquad t = \{2005, 2014\} \tag{4.5}$$

Within any survey year, a typical decomposition can be undertaken, yielding (4.6), which modifies (4.3).

$$\begin{aligned} \Delta H_t^{f,m} &= E(H_{tm}) - E(H_{tf}) = E(X_{tm})'\beta_{tm} - E(X_{tf})'\beta_{tf} \\ &= [E(X_{tm}] - E(X_{tf})]'\beta^* + [E(X_{tm})'(\beta_{tm} - \beta^*) + E(X_{tf})'(\beta^* - \beta_{tf})], \end{aligned} \tag{4.6}$$

Differencing the gender gap over time results in the following expression:

$$\begin{aligned}
\Delta H^{f,m}_{2005,2014} &= \Delta H^{f,m}_{2014} - \Delta H^{f,m}_{2005} \\
&= (H_{m,2014} - H_{m,2005}) - \left(H_{f,2014} - H_{f,2005}\right) \\
&= [E(X_{2014,m}) - E(X_{2014,f})]'\beta^* - [E(X_{2005,m}) - E(X_{2005,f})]'\beta^* \\
&+ [E(X_{2014,m})'(\beta_{2014,m} - \beta^*) + E(X_{2014,f})'(\beta^* - \beta_{2014,f})] \\
&- [E(X_{2005,m})'(\beta_{2005,m} - \beta^*) + E(X_{2005,f})'(\beta^* - \beta_{2005,f})]
\end{aligned} \tag{4.7}$$

Up to this point, we have assumed β^*, but not defined it. As noted by a number of authors (see Blinder, 1973; Cotton, 1988; Fortin et al., 2011; Fortin, 2008; Jann, 2008; Kassenboehmer and Sinning, 2014; Neumark, 1988; Oaxaca, 1973; Oaxaca and Ransom, 1994; Reimers, 1983; Wellington, 1993, amongst others), any single decomposition should be reference independent. Thus, there has been considerable discussion (see previous papers) regarding the choice of the weighting matrix and the resulting reference vector. Suggestions have been made in the literature to estimate the reference vector using a pooled linear regression model.

In the extended analysis, we consider four groups rather than two; thus, β^* must take that into account. We extend the linear combination in (4.4) to cover all four groups, such that:

$$\beta^* = \rho_{2005,m}\beta_{2005,m} + \rho_{2005,f}\beta_{2005,f} + \rho_{2014,m}\beta_{2014,m} + (1 - \rho_{2005,m} - \rho_{2005,f} - \rho_{2014,m})\beta_{2014,f} \tag{4.8}$$

To understand the source of the health status differentials between males and females over time, we decompose the health differential into components describing the contribution of individual characteristics and the coefficients of the individual characteristics.

4.4 Decomposition Results

Table 4.4[7] contains the decomposition results for the health differential between females and males in 2005 and 2014. On average, the estimates in 2014 show a health differential of -0.0163, which is smaller than the average health differential of -0.0310 observed in 2005. These estimates suggest that the average gender gap in health narrowed considerably over time by 0.0147 in favour of females.

Furthermore, the within-period decomposition results in Table 4.4 indicate that a consid-

[7]See Table C.3.3 in the appendix for the estimates of the OLS regression decomposition of changes in the health differentials for females and males between 2005 and 2014.

erable part of the gender gap in health may be attributed to differences in age, marital status and grant recipient status of females and males. For the most part, the portions of the gender gap due to differences in age, marital status and grant recipient status are mostly positive for both time periods. On average, the portion of the gender gap in health attributable to age differences ranges from 1-6% in 2005 and 3-10% in 2014. Meanwhile, the gender gap due to differences in marital status is about 1-4% in 2005, and 1-7% in 2014. The proportion of the gender gap attributable to grant receipts is 14.4% in 2005 and 1.8% in 2014.

In contrast, the portion of the gender gap in health attributable to residing in an urban area is largely negative. The negative contribution of urban residence is slightly larger in 2014 (2.1%) than in 2005 (1.3%), which is consistent with the relative increase in females' residence in the urban areas over time (see Table C.2.2). Though small, living in the Western Cape and Gauteng provinces contribute positively to the gender gap in health. Specifically, living in the Western Cape and Gauteng explains about 0.7% and 0.4% of the gender gap in 2005, and 0.4% and 0.7% in 2014, respectively. Only 1.3% of the gender gap is attributable to being employed in 2014. The part of the gender gap due to being employed is negative in 2005, suggesting that higher levels of employment among males in 2005 implies improved health for males relative to females in 2005. The positive contribution of having earned a diploma/certificate and an honours qualification to the gender gap are slightly higher in 2014 than in 2005, which is to be expected, given the relative increase in females' educational attainment over time (see Table C.2.2). We observe relatively stable contributions of racial differences to the gender health differential in both time periods. Precisely, being black African contributes about 1.3% in both time periods. However, since our model focuses predominantly on socio-economic characteristics, a number of factors are not captured in our model. As a result, about 51-63% of the average gender health differential remains unexplained. We observe that female relative health would not have improved without changes in the composition of some of the socio-economic factors, suggesting that the changing compositions are at least partly responsible for the relative health improvement.

Table 4.4: OLS Decomposition of the Gender Gap in the Health Differentials

	Changes due to Means			*Changes due to Means*		
Variables	Coefficient	Stand. error	% Expl.	Coefficient	Stand. error	% Expl.
(A) 2014[a]				**(B) 2005**[b]		
Raw Difference	−0.0163	(0.0020)		−0.0310	(0.0021)	
6 - 17 yrs	−0.0014	(0.0002)	8.6	−0.0020	(0.0002)	6.4
18 - 30 yrs	−0.0005	(0.0001)	2.8	−0.0001	(0.0001)	0.5
31 - 45 yrs	0.0000	(0.0000)	0.2	−0.0002	(0.0001)	0.6
46 - 64 yrs	−0.0015	(0.0002)	9.3	−0.0010	(0.0001)	3.3
65 yrs plus	−0.0017	(0.0002)	10.3	−0.0013	(0.0002)	4.3
Black African	−0.0002	(0.0001)	1.3	−0.0004	(0.0001)	1.3
Coloured	0.0000	(0.0000)	0.0	0.0001	(0.0000)	−0.2
White	0.0001	(0.0000)	−0.7	0.0001	(0.0001)	−0.5
Married	−0.0002	(0.0003)	1.4	−0.0002	(0.0002)	0.5
Widowed	−0.0009	(0.0015)	5.7	−0.0009	(0.0015)	2.9
Divorced	−0.0003	(0.0002)	1.8	−0.0003	(0.0002)	1.0
Single	−0.0011	(0.0014)	6.9	−0.0012	(0.0014)	3.8
No schooling	−0.0002	(0.0001)	1.4	−0.0004	(0.0001)	1.2
Less than Diploma	0.0001	(0.0001)	−0.4	0.0001	(0.0001)	−0.3
Diploma certificate	−0.0002	(0.0001)	1.2	−0.0001	(0.0000)	0.4
Honours degree	0.0000	(0.0000)	0.1	0.0000	(0.0000)	−0.1
Postgraduate	0.0000	(0.0000)	−0.1	0.0000	(0.0000)	0.0
Employed	−0.0002	(0.0002)	1.3	0.0001	(0.0001)	−0.2
Urban	0.0003	(0.0001)	−2.1	0.0004	(0.0001)	−1.3
Western Cape	−0.0001	(0.0001)	0.4	−0.0002	(0.0001)	0.7
Gauteng	−0.0001	(0.0000)	0.7	−0.0001	(0.0000)	0.4
Grant recipients	−0.0003	(0.0001)	1.8	−0.0045	(0.0003)	14.4
Unexplained	−0.0083	(0.0020)	51.0	−0.0196	(0.0020)	63.1

[a]Decomposition of health differential between females and males in 2014. [b]Decomposition of health differential between females and males in 2005. Robust standard errors are reported in parentheses. Estimates are obtained from equation (3.7), and weighted to the population using the adjusted sample weights. Number of observations for males and females in 2014 are 43,469 and 48,976, respectively. Number of observations for males and females in 2005 are 50,536 and 57,321, respectively.

In Table 4.5, we present the decomposition results for the changes in the health gender gap over time (i.e, the differences between the values in Table 4.4), which are equal to the decomposition results of the gender differences in health differential (i.e, the differences between the values in Table C.3.3). As Table 4.5 indicates, the gender gap narrowed by 0.0147 (1.5%)

between 2005 and 2014.

As expected, given the previous sets of results, the changes in the contributions are not generally large. We observe small effects by age, race & location. Even though the effects are small, they are in the direction expected. A breakdown of the education variable shows that changes in the average number of those without formal education (see Table C.2.2) improved health differentials by 1.11%, in favour of females relative to males. This result underpins the importance of education in improving health outcomes and providing further evidence that education plays an important role in narrowing the gender gap in health (Ataguba et al., 2015).

Our findings suggest that education and social grants play important roles in narrowing gendered health differentials in South Africa. Although there have been many negative myths and perceptions about social grants and how recipients use them, our finding supports other related studies (Aguero et al., 2006; Case, 2004; Chapman, 2006; Duflo, 2000, 2003; Goldblatt, 2005; Patel, 2012; Ralston et al., 2015), which show the critical role that social protection grants play in the survival, livelihoods and health of households and individuals, especially when recipients are females. Over the current post-apartheid period, social grant recipients in South Africa have increased exponentially, from an estimated 4 million in 1994 to over 17 million in 2017. In fact, grant amounts have increased and ages of those who qualify have also been extended, in favour of females. Moreover, education in South Africa continues to take strain as the government strives to achieve equal opportunities for both males and females. Our finding can, thus, be beneficial in informing the need to further sustain and improve equal access, and especially for females, to education and social grant, which are features of the constitution – "all citizens have the right to basic education, and appropriate social assistance from the government "(see South Africa Constitution, 1996, Section 29(1)) and (see South Africa Constitution, 1996, Act No. 108), respectively – thus, ensuring access for those who are qualified remains a policy priority.

Furthermore, we find that living in Western Cape also accounts for 1.11% of the change in the gender gap in health, while changes in the composition of those within the age brackets 6-17 years and 31-45 years explain about 4% and 1% of the differential, respectively. Changes in the composition of being single explain about 0.43% of the gender gap in health over time. We also observe that some proportion of the explained gap can be attributed to the racial composition of males and females, specifically being Black African (1.14%) (see Table C.4.4). However, we find changes in employment status to be less relevant in narrowing the gender gap in health

Table 4.5: OLS Decomposition of Changes in the Health Differential between Females and Males

	Changes due to Means		
Variables	Coefficient	Standard error	% Explained
Raw Difference	0.0147		
6 - 17 yrs	0.0006	(0.008)	3.89
18 - 30yrs	−0.0003	(0.009)	−2.15
31 - 45 yrs	0.0002	(0.010)	1.14
46 - 64 yrs	−0.0005	(0.012)	−3.38
65 yrs plus	−0.0003	(0.007)	−2.36
Black African	0.0002	(0.015)	1.39
Coloured	−0.0001	(0.016)	−0.42
White	0.0000	(0.017)	−0.25
Married	−0.0001	(0.101)	−0.52
Widowed	0.0000	(0.102)	−0.23
Divorced	0.0000	(0.102)	0.00
Single	0.0001	(0.101)	0.43
No schooling	0.0002	(0.018)	1.11
Less than Diploma	0.0000	(0.017)	−0.13
Diploma certificate	−0.0001	(0.019)	−0.50
Honours degree	0.0000	(0.022)	−0.23
Postgraduate	0.0000	(0.038)	−0.01
Employed	−0.0003	(0.006)	−1.89
Urban	0.0000	(0.005)	−0.29
Western Cape	0.0002	(0.011)	1.11
Grant recipients	0.0042	(0.005)	28.25
Total	0.0035		23.55

Bootstrapped SEs using 1000 resamples are reported in parenthesis. Number of observations for males and females in 2014 are 43,469 and 48,976, respectively. Number of observations for males and females in 2005 are 50,536 and 57,321, respectively.

differentials. Overall, the decomposition results show that changes in the levels of educational attainment, racial composition, residential location and changes in the receipt of social grants play significant roles in narrowing the gender gap in health, in favour of females relative to males.

However, 76% of the reduction is explained by changes in the returns to various male/female attributes, especially the returns to education, race, age and marital status, as depicted in Figure 4.2. In general, these results point to the relevance of socio-economic factors in narrowing the gender gap in health. From our analysis, changes in social grant receipts and in the average

number of those without formal education are relevant factors for narrowing the gender gap. Thus, improvements in gender equality, as it relates to health, could be furthered by policies addressing inequality in educational attainment and social protection programmes.

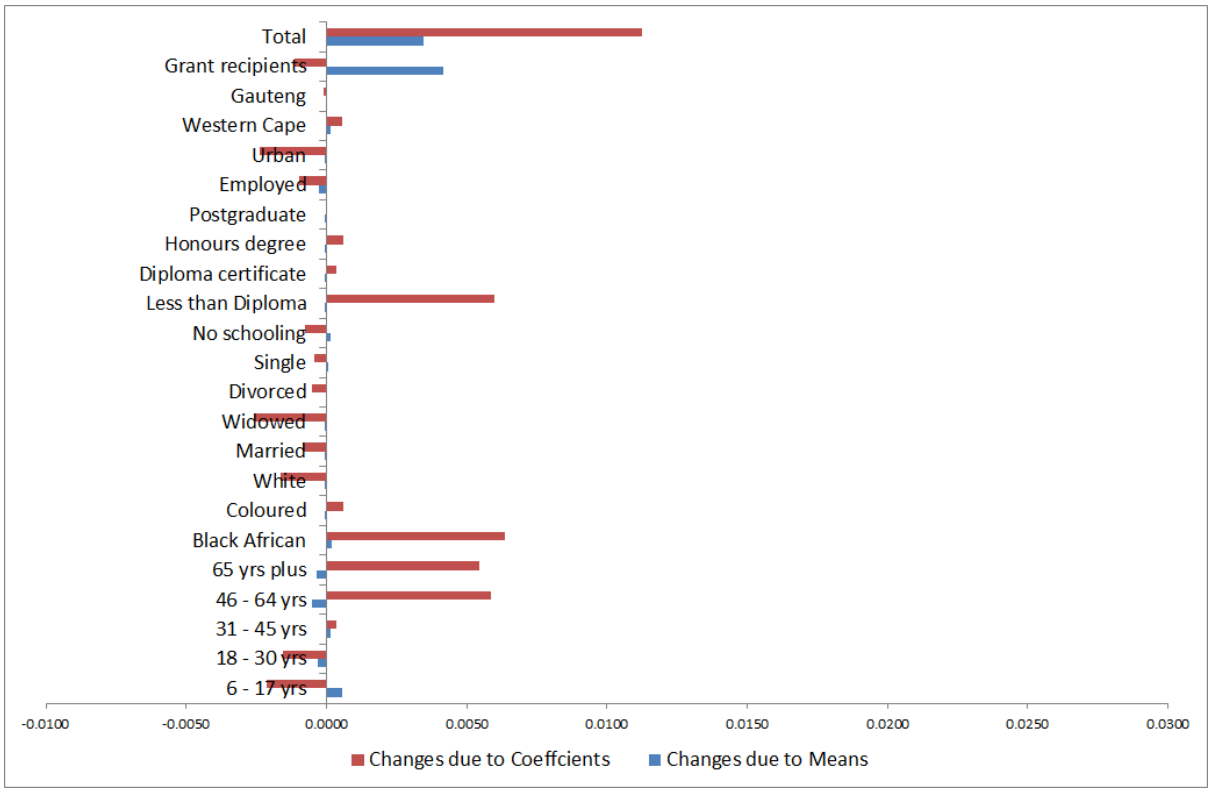


Figure 4.2: The contributions of the observed and unobserved characteristics to the gender gap in the health differential over the time periods 2005-2014

4.5 Discussion

Between 2004-2012, the education and housing amenities components of the public budget shares increased, while the social protection portion of the public budget decreased slightly (see Table 4.6). However, public budget allocations to education, health and social protection have been prioritised in recent years. For instance, in 2016, budget allocations to education, health and social protection ranked first, second and third, respectively. In particular, the number of individuals receiving social grants has increased from about 4 million in 1994 to over 17 million in 2016 (Ferreira, 2017); social spending has also increased with the gradual amendments of age eligibility for old age pension and child support grant, and changes in the "means test" threshold. In addition, education and social grants have a strong gender dimension (Burns et al., 2005; Goldblatt, 2005; Patel, 2012). For instance, the old age pension reaches significantly more

females than males, due to demographic considerations and the different age eligibility condition (60 years for females and 65 years for males), which was upheld until recently (Department of Social Development, 2002; Taylor Commission et al., 2002). Although undertaken differently, our work is in agreement with other recent work, which suggest that social grant receipt is positively associated with improvement in child health status, particularly for female children living with pension-eligible maternal grandmothers (Case, 2004; Duflo, 2000; UNICEF et al., 2014). The gender of the social grant recipient is key, with evidence suggesting that female beneficiaries, more than their male counterparts, are likely to spend their unearned income on improving their child's health (Duflo, 2003). Social grants are thus an important income through which females can achieve improved health in South Africa, since grants are largely accessed by females. In order to ensure more rapid progress in addressing gendered health differentials, further strengthening of "gender-friendly" policies relating to education and the core component of social safety may continue to prove beneficial.

Since the emergence of democracy in South Africa, there has been a relative increase in receipt of formal education and social grants by South African females, especially the previously disadvantaged population groups. The educational system of the country has also changed drastically. There has been improvement in the distribution of educational attainment, because of education policies and reforms including a 'return to school' policy for girls who fall pregnant while in school, the establishment of the Gender Equity Unit and the Gender Equity Directorate Act, the Girls Education Movement (GEM) and 'Techno-Girl Programme', amongst others (Moletsane, 2010). These programmes and policies are aimed at increasing females' average schooling participation and gaining gender parity in education.

Table 4.6: Selected public expenditure as % share of total public expenditure, South Africa 1994-2012

	1994/95	*1999/2000*	*2004/05*	*2009/10*	*2011/12*
Education	21.6	21.3	19.7	20.2	21.5
Social protection	10.8	11.9	15.8	15.8	15.6
Health	10	11.4	11.3	11.4	12.3
Housing & community amenities	3.5	3.9	4.9	8.6	9.2

Source: (South African Reserve Bank, 2013)

4.6 Limitations of the study

Unfortunately, the health variable used for our analysis was constrained by the availability of data in the GHS. Preferably, the measure of health would be medically-certified or self-assessed general health. However, the GHSs do not contain such information; instead questions were limited to ill-health and disability. Thus, we consider the lack of information on general health status to be a key limitation. Consequently, our analysis is a limited assessment of health, though it is the best one available at this point. Although, the National Income Dynamics Study (NIDS) (Leibbrandt et al., 2009) contains self-assessed health (SAH), it does not cover the last decade considered, which we are able to do with the GHS.

4.7 Conclusion

In this research, we examine the gender gap in health, using population-weighted General Household Survey (GHS) data from 2005 and 2014. We extended the standard Blinder-Oaxaca decomposition to decompose health differentials between males and females. To assess the contributions of both observed and unobserved characteristics, and their relative importance in explaining the changes in health and the health gender gap over time, we differenced the Blinder-Oaxaca gender decompositions. We find that the gender gap in health narrowed between 1-2% between 2005 and 2014. The results of the differences-in-decompositions analysis indicate that the narrowing of the gender gap in health is mainly attributable to changes in the levels of educational attainment, especially the reduction in those without formal education in favour of females relative to males. A considerable portion of the narrowing is also attributable to changes in female receipt of social grants. Furthermore, we have been able to provide some evidence that racial composition and residential location contribute to narrowing the gender gap in health between males and females.

Our findings, which are consistent with similar studies (Aguero et al., 2006; Case, 2004; Chapman, 2006; Duflo, 2000, 2003; Goldblatt, 2005; Patel, 2012; Ralston et al., 2015), suggest that education and social grants play important roles in narrowing gendered health differentials in South Africa. In recent years, social grant recipients in South Africa have increased dramatically. Moreover, grant amounts have increased and ages of those who qualify have also been extended, in favour of females. Also, South African government strives to improve equal access to education for both males and females. Our finding can, thus, help in informing the need to

further sustain and improve equal access, for both males and females, to education and social grant, which are features of the constitution. Thus, ensuring access for those who are qualified remains a policy priority. In furtherance of achieving gender equality in health, policies could be reviewed to further strengthen gender equality in education and social protection programmes.

Chapter 5

Conclusion

The emergence of democracy and subsequent formulation of macroeconomic policies and reforms to redress the damaging impacts of the apartheid legacy have no doubt brought about profound changes to South Africa's socio-economic outlook, in terms of education, health, social protection and employment distribution. Budgetary allocations to these and other key sectors of the economy have increased considerably over the last two decades. Moreover, there has been improved access to resources, basic amenities and opportunities for the previously disadvantaged population groups. Policy interventions have targeted reductions in socio-economic inequalities in various areas. By extension, this has also applied to the health care system. However, evidence from the literature suggests that health inequalities, which are strongly linked to the social determinants of health, persist.

Thus, this thesis investigates the effects of changes in social determinants of health on health inequality over time, both at the aggregate and disaggregate levels. The thesis tries to achieve three objectives. The first objective is to examine trends in health and health-related behaviour between 2004 and 2014, the second decade since the end of apartheid. The second objective is to investigate the impact of changes in the social determinants of health, and how that correlated with health inequality over the decade. The third objective is to examine the factors contributing to the narrowing gendered health differential. To achieve the first and second objectives, key health indicators, which include ill-health, disability, medical aid coverage, and public or private health care facility preferences were considered; careful steps were taken to ensure consistency and comparability of the health indicators contained in the General Household Surveys (GHS) data used for this study. For the third objective, ill-health was chosen as the measure of health status.

Using the comparable GHS data on ill-health, disability, medical aid coverage, preferences for public and private health care facilities, we estimate dynamic and robust trends for these health indicators. In addition, we profile the trends across a broad range of socio-demographic factors. It was found that, over time, medical aid coverage and the general population's 'preference' for public health care decreased, while reports of ill-health status increased over time. Moreover, the likelihood that an individual, who is covered by a medical aid scheme, would prefer to utilize public health care (in the event of illness) decreased over time.

We also investigate the effects of changes in the SDH on health inequalities over time, employing Oaxaca-type decomposition of the change in a concentration index. This method is preferred, because it not only illustrates how changes in health inequalities (over time) are attributable to changes in their determinants, but also to changes in their elasticities. We find that rising inequalities in ill-health are largely explained by widening inequalities among those residing in urban areas and in relatively richer provinces. Meanwhile, rising inequality in medical aid coverage and preferences for the utilisation of private heath care are mainly attributable to inequalities in educational attainment and among the racial groups. However, changing elasticities in SDH, rather than rising inequalities, are found to be important factors in explaining widening inequality in the preference for public health care.

Moreover, we use a differences-in-decompositions technique to analyse changes in gendered health differentials between 2005 and 2014. In the analysis, we also assess the contribution of social determinants in explaining those differentials. We find that the gender gap in health narrowed between 2005 and 2014, and the narrowing of that gap can be mainly attributed to changes in educational attainment and social grant receipt. Specifically, there has been a relative increase in the receipt of formal education and social grants by women. These findings suggest that changes in education and unconditional cash transfers to the poor are critical for reducing gendered health inequality in South Africa. Thus, further improvements in gender equality, as it relates to health, can be furthered by policies addressing more equality in educational attainment and social protection. However, a sizable proportion of the reduction is explained by changes in returns to various male/female attributes.

This thesis focuses on the core of the health and development discourse, especially with the global appeal for developing nations to meet the Sustainable Development Goals. In South Africa, the goal of government is to reduce all forms of socio-economic and gender-related inequalities in all aspects of life. Existing research relating to this goal fails to present a complete

picture of health inequalities, because it has focused predominately on the aggregate analysis of health inequality. There is little empirical work focusing on the disaggregate relationship between health inequality and factors that drive it. Yet, this information is needed to give more insight on the sort of health inequality reduction policies, along with other cognate sectors' policies, to be targeted in order to be effective.

In terms of the methods applied in this thesis, none of the studies in South Africa have used these methods to study health inequality, despite the fact that these methods are very informative in explaining contributions of factors driving health inequality (over time). In our view, this thesis has shown that additional methods are useful in revealing subtle relationships that may be concealed in the standard analysis. Most notably, difference-in-decomposition, which we use has not been applied in health inequality studies. This technique has been specifically helpful in uncovering drivers of change in health inequality, which otherwise would have been masked if conventional decomposition had been used. There is thus a methodological contribution to this thesis.

In South Africa, the results in this thesis can be a key input in the health inequality reduction agenda. However, there are areas that are equally critical to South Africa's quest for health inequality reduction but are not covered in this thesis, due to data limitations. For example, there is lack of information on medically-certified or self-assessed general health status in the GHS. Although, the National Income Dynamics Study (NIDS) contains self-assessed health (SAH), it does not cover the last decade considered, which we are able to do with the GHS. Moreover, there are no specific policy variables for impact evaluation of a particular policy on a targeted group of individuals. In addition, the thesis would have been enriched if it included an analysis of the multidimensional perspective to health inequality. This, however, was not possible due to data limitation, where health indicators were captured in the surveys. Hence, another area for future research is multidimensional health inequality because it is vital to understand multiple deprivations related to health inequality.

Overall, we find that changes in education, social grants receipt, employment and other key household attributes are key determinants of changes in health inequality over time, either at the aggregate or disaggregate level. Therefore, government can enhance access to quality education and social grants in order to improve the well-being of households, particularly those in the lower income quintiles. However, education alone cannot bring about dramatic changes, unless demand for labour is created to absorb the newly educated. To do so, the formal sector

needs to be expanded.

Essentially, social inequality in health has been identified as one of the greatest challenges to public health in South Africa. Our findings show that a number of social factors, including urban infrastructure, housing, education and social protection, need to be addressed in order to further tackle the avoidable and widely considered unacceptable socio-economic health inequalities in the South African society. Evidence from this thesis supports the theories and views that the causes of social inequalities in health are multiple and inter-related. The action to tackle these causes also probably needs to be interconnected, intersectoral/multi-sectoral and across intervention levels.

Thus, this thesis recommendations for policy implications are explicitly intersectoral in nature, which will entail combining multiple social interventions. The recommendations are aptly situated within the context of Guglielmin et al. (2018), Shankardass et al. (2012), Braveman et al. (2011) and Whitehead (2007) research on the typology of actions to tackle social inequalities in health. Whitehead (2007) outlines a typology of tackling health inequalities through policies and interventions which are based on the underlying theory of how the action is expected to bring about the desired change. She proposes that the common interventions tend to fall into one of four main categories which include: strengthening individuals, strengthening communities, improving living and working conditions and associated access to essential services, and promoting healthy macro-policies [1].

Housing, education and social protection should become the focus of interventions to tackle health inequalities in many African countries, including South Africa, where there is such a stark social gradient, both in education and access to socio-economic resources. In South Africa, for instance, there is relatively negative social gradients in education and access to other basic economic resources for some groups. Rates of school dropouts and attendance are higher in people experiencing disadvantages, though they might find it easy to access the unconditional social grants. The social gradient in school performance and access to basic economic resources definitely reflect to a certain extent the social patterning in the South African society.

Interventions to tackle these social problems are apparent in all four categories outlined by (Braveman et al., 2011; Guglielmin et al., 2018; Shankardass et al., 2012; Whitehead, 2007), although category 4 is the most important, as fas as the evidence from this thesis is concerned.

[1](see Braveman et al., 2011; Guglielmin et al., 2018; Shankardass et al., 2012; Whitehead, 2007) for more details on the typology of actions to tackle social inequalities in health

Notably, category 4 interventions include macroeconomic policies, such as those encapsulated in the WHO Framework for Action on the Social Determinants of Health (Commission on Social Determinants of Health, 2008*a*) that emphasize macro-level polices in addressing the social factors leading to ill health and health inequities. Examples include strengthening the education system, labour market, social safety and political systems, including the redistributive policies that would reduce socio-economic inequalities in a society.

Social protection policy in this context provides another example of the important concept of differential impact. Although the policy could be restrictive in that coverage may be relatively small, for instance, only some proportions of the disadvantaged population groups might have access to unconditional social grants, the impact however could be largely positive on affected households. Greater impacts are usually on lower-income groups/households through increased consumption of basic food items, and meeting additional health care and educational costs (Burns et al., 2005; Goldblatt, 2005), although the impact of social grants is controversial in the context of the causality debates, as it would have a disproportionate impact on the living standards of the poor households. Such households in South Africa, for example, spend a larger proportion of their unconditional grants and income on foods, education and other health-enhancing activities and products (Duflo, 2000; Edmonds, 2005). For these reasons, a number of studies advocated efforts to ameliorate the financial and social hardship, and unwarranted socio-economic health inequalities experienced by low-income families through unconditional transfers.

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Appendix A

Appendix for Chapter 2

A.1 Descriptive statistics of Ill-health status, Public health care facility preferences and Medical aid coverage

Table A.1.1: Descriptive statistics of Ill-health status, Public health facility preferences and Medical aid coverage

	Ill-health status		***Public health facility***		***Medical aid coverage***	
Years	n	%	n	%	n	%
All	152,341	12	850,774	78.19	174,178	13.68
2002	12,116	11.9	5,669	5.5	14,907	14.6
2003	11,430	11.5	5,488	5.5	14,018	14.1
2004	11,571	11.9	73,506	75.8	13,788	14.2
2005	14,231	13.2	85,214	79.1	11,754	10.9
2006	12,981	12.3	86,140	81.7	11,421	10.8
2007	12,277	11.4	87,140	80.7	12,301	11.2
2008	13,817	14.6	76,717	81.3	11,765	12.4
2009	17,862	19.1	73,925	78.9	13,052	13.8
2010	11,274	11.9	73,876	78.3	14,172	14.8
2011	9,701	10.5	72,167	78.3	13,086	14
2012	8,681	9.6	69,116	76.4	14,351	15.7
2013	7,329	7.9	71,263	76.4	15,390	16.4
2014	9,071	9.8	70,553	76.5	14,173	15.3

The result indicates that, on average, about 12%, 78% and 14% reported being ill, preferences for public health care (when ill), and being members of a medical aid scheme, respectively. In 2009, almost 20% of the sampled population reported that they were ill in the one month preceding the actual survey. By 2010, that proportion had decreased considerably. In 2006, approximately 82% were more likely to prefer to seek treatment at a public health facility, when

ill. From 2008, however, relatively fewer people affirmed that they would prefer to utilise public health care services, in the event of illness. Finally, the percentage of individuals who reported they were members of medical aid schemes remained relatively stable over the survey years. However, coverage increased in the last few survey years reported here.

A.2 Logit Marginal Effects of the Explanatory Variables on the Health Variables

Table A.2.2: Marginal Effects for Ill-health, Preference for Public health care and Medical aid coverage

	Ill-health status	*Public health facility*	*Medical aid coverage*
2005	0.010***	−0.018***	−0.001
	(0.002)	(0.003)	(0.002)
2006	0.009***	0.004	−0.002
	(0.002)	(0.003)	(0.002)
2007	−0.003	−0.024***	0.003
	(0.002)	(0.003)	(0.002)
2008	0.025***	0.008**	0.020***
	(0.002)	(0.003)	(0.002)
2009	0.073***	−0.010***	0.018***
	(0.002)	(0.003)	(0.002)
2010	0.000	−0.024***	0.024***
	(0.002)	(0.003)	(0.002)
2011	−0.016***	−0.017***	0.008***
	(0.002)	(0.003)	(0.002)
2012	−0.021***	−0.028***	0.020***
	(0.002)	(0.003)	(0.002)
2013	−0.039***	−0.011***	0.026***
	(0.002)	(0.003)	(0.002)
2014	−0.017***	−0.013***	0.020***
	(0.002)	(0.003)	(0.002)
Age	0.000	0.005***	−0.006***
	(0.000)	(0.000)	(0.000)
Age-squared	0.000***	−0.000***	0.000***
	(0.000)	(0.000)	(0.000)
African/Black	−0.001	0.625***	−0.473***
	(0.002)	(0.003)	(0.003)
Coloured	0.002	0.510***	−0.390***
	(0.002)	(0.003)	(0.004)
Indian/Asian	−0.002	0.274***	−0.298***
	(0.003)	(0.006)	(0.005)
Female	0.017***	0.005***	0.004***

Continued on next page...

Marginal Effects for Ill-health, Preference for Public health care and Medical aid coverage: Continued

	Ill-health status	***Public health facility***	***Medical aid coverage***
	(0.001)	(0.001)	(0.001)
Married	0.011***	−0.070***	0.081***
	(0.001)	(0.002)	(0.002)
Widow/widower	0.025***	0.001	0.008**
	(0.002)	(0.004)	(0.003)
Divorce or separated	0.039***	−0.007	0.017***
	(0.003)	(0.005)	(0.003)
Less than diploma/certificate	−0.048***	−0.043***	0.039***
	(0.001)	(0.002)	(0.001)
Diploma/certificate	−0.043***	−0.397***	0.338***
	(0.003)	(0.005)	(0.005)
Honours/degree	−0.042***	−0.542***	0.484***
	(0.003)	(0.006)	(0.007)
Postgraduate degree	−0.049***	−0.594***	0.468***
	(0.007)	(0.018)	(0.028)
Employment status	−0.004***	−0.074***	0.047***
	(0.001)	(0.002)	(0.001)
Metropolitan status	0.014***	−0.150***	0.109***
	(0.001)	(0.002)	(0.001)
Observation	1,064,453	1,064,453	1,064,453
R^2	0.04	0.25	0.29

Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: This table contains marginal effects for ill-health, preference for public health facility utilisation, and medical aid coverage. Unlike the results reported in Table 2.2, we include the dummies of the year variable in this estimation. The marginal effects are separate for ill-health (left), preference for public health facility utilisation (middle), and medical aid coverage (right). Marginal effect is a measure of the instantaneous effect that a change in an explanatory variable has on the predicted probability of the outcome variable (in this case, our outcome variables are ill-health, preference for public health facility utilisation, and medical aid coverage), when the other covariates are held constant.

Appendix B

Appendix for Chapter 3

B.1 Components of Asset Indices

Table B.1.1: Components of Asset Indices, Using the 2004 and 2014 General Household Surveys

Variable	2004 Weights	2014 Weights
Electricity	0.202	0.280
Piped tap water	0.215	0.256
Radio	0.142	0.067
Television	0.245	0.308
Phone	0.196	0.112
Refrigerator	0.252	0.317
Car	0.196	0.230

Number of observations for 2004 and 2014 are 97,036 and 92,445 respectively.

Notes: This table presents the weights of the asset indices for the two time periods. The values were obtained by applying factor analysis on a set of wealth-related questions. Estimates are weighted to the population using the sample weights. All variables are binary.

B.2 Inequality Decomposition

Table B.2.2: Inequality decompositions for 2004 and 2014: Contributions to the Concentration Indices

	Ill-health status		Medical aid coverage		Disability		Public facility		Private facility	
	2004	2014	2004	2014	2004	2014	2004	2014	2004	2014
6-17 yrs	0.007	0.005	0.001	0.001	−0.030	−0.016	0.000	0.000	0.001	0.000
18-30 yrs	0.002	0.006	0.002	0.013	−0.011	−0.021	0.000	−0.003	0.001	0.008
31-45 yrs	−0.001	0.000	−0.004	−0.001	0.036	0.001	0.001	0.000	−0.002	0.000
46-64 yrs	0.005	−0.009	−0.007	−0.024	0.081	0.061	0.002	0.006	−0.005	−0.017
65 yrs +	0.001	−0.002	−0.002	−0.003	0.009	0.030	0.000	0.001	0.000	−0.002
African/Black	0.011	−0.025	0.149	0.143	0.065	0.011	−0.049	−0.053	0.149	0.150
Coloured	0.000	0.007	−0.017	−0.026	−0.001	0.000	0.007	0.009	−0.021	−0.025
White	−0.010	0.035	0.144	0.073	−0.012	0.012	−0.022	−0.010	0.066	0.028
Married	−0.019	0.005	0.016	0.013	−0.268	−0.009	−0.009	−0.002	0.026	0.007
Widowed	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	−0.001	0.000
Divorced	0.000	0.001	0.000	0.000	−0.009	0.000	0.000	0.000	0.001	0.000
Single	0.020	−0.003	−0.005	0.001	0.222	−0.005	0.006	−0.001	−0.019	0.002
No schooloing	−0.011	−0.006	0.003	0.003	0.024	−0.017	−0.001	−0.001	−0.002	0.002
Less than diploma	−0.001	0.001	0.000	0.001	0.008	0.025	0.000	0.000	−0.001	0.000
Diploma certificate	0.006	0.001	0.031	0.025	−0.056	−0.022	−0.005	−0.006	0.020	0.018
Honours degree	0.003	0.001	0.030	0.042	−0.044	−0.029	−0.005	−0.009	0.017	0.027
Postgraduate degree	0.001	0.000	0.006	0.006	−0.011	−0.004	−0.001	−0.001	0.003	0.004
Employed	−0.002	0.000	0.024	0.011	−0.059	−0.015	−0.006	−0.003	0.019	0.008
Urban	0.009	0.029	0.060	0.045	0.001	0.012	−0.013	−0.018	0.040	0.052
Western Cape	−0.018	−0.010	−0.008	−0.011	0.005	−0.012	0.001	0.002	−0.003	−0.006
Gauteng	−0.015	0.006	0.002	−0.004	−0.008	−0.029	0.002	0.001	−0.006	−0.004
Grant recipient	−0.007	0.002	0.003	0.060	−0.041	−0.093	−0.001	−0.015	0.003	0.042

Number of observations for 2004 and 2014 are 96,532 and 90,153 respectively.

Notes: This table presents decompositions of the concentration indexes for the two time periods. The numbers denote the relative contributions of the corresponding variables to the concentration indexes in each year. The numbers were obtained by decomposing the concentration indexes into their explained components.

B.3 Oaxaca-type Decomposition of Change

Table B.3.3: Oaxaca-type decomposition of change in the health inequalities, 2004-2014

	Ill-health status		Medical aid coverage		Disability		Public facility		Private facility	
	$\Delta C\eta$	*se*	$\Delta C\eta$	*se*	$\Delta C\eta$	*se*	$\Delta C\eta$	*se*	$\Delta C\eta$	*se*
6-17 yrs	−0.001	(0.008)	0.000	(0.006)	0.002	(0.007)	0.000	(0.008)	0.000	(0.008)
18-30 yrs	0.004	(0.009)	0.008	(0.007)	−0.013	(0.007)	−0.002	(0.010)	0.005	(0.009)
31-45 yrs	0.004	(0.009)	0.012	(0.008)	−0.023	(0.007)	−0.003	(0.011)	0.008	(0.010)
46-64 yrs	−0.002	(0.010)	−0.004	(0.009)	0.010	(0.008)	0.001	(0.011)	−0.003	(0.011)
65 yrs +	−0.001	(0.012)	−0.002	(0.009)	0.015	(0.009)	0.000	(0.012)	−0.001	(0.012)
African/Black	0.004	(0.015)	−0.025	(0.028)	−0.002	(0.006)	0.009	(0.032)	−0.027	(0.031)
Coloured	0.000	(0.016)	−0.001	(0.030)	0.000	(0.006)	0.000	(0.035)	−0.001	(0.035)
White	−0.002	(0.016)	−0.004	(0.030)	−0.001	(0.006)	0.001	(0.033)	−0.002	(0.003)
Married	0.000	(0.230)	0.001	(0.113)	0.000	(0.237)	0.000	(0.120)	0.000	(0.117)
Widowed	0.001	(0.230)	0.000	(0.113)	0.001	(0.237)	0.000	(0.120)	0.000	(0.118)
Divorced	0.001	(0.231)	0.000	(0.113)	0.000	(0.236)	0.000	(0.121)	0.000	(0.117)
Single	0.000	(0.230)	0.000	(0.113)	−0.001	(0.237)	0.000	(0.120)	0.000	(0.117)
No schooling	0.001	(0.018)	−0.001	(0.018)	0.004	(0.017)	0.000	(0.023)	0.000	(0.021)
Less than diploma	0.001	(0.017)	0.001	(0.017)	0.021	(0.016)	0.000	(0.023)	0.000	(0.021)
Diploma certificate	0.000	(0.019)	−0.006	(0.022)	0.006	(0.017)	0.002	(0.026)	−0.005	(0.024)
Honours degree	0.000	(0.020)	−0.005	(0.024)	0.003	(0.017)	0.001	(0.028)	−0.003	(0.026)
Postgraduate degree	0.000	(0.038)	−0.001	(0.042)	0.000	(0.018)	0.000	(0.040)	0.000	(0.038)
Employed	0.000	(0.004)	−0.005	(0.005)	0.007	(0.002)	0.001	(0.006)	−0.004	(0.006)
Urban	−0.004	(0.005)	−0.006	(0.006)	−0.002	(0.002)	0.003	(0.009)	−0.007	(0.009)
Western Cape	0.001	(0.010)	0.001	(0.014)	0.001	(0.005)	0.000	(0.020)	0.000	(0.020)
Eastern Cape	0.001	(0.009)	−0.001	(0.009)	−0.003	(0.004)	0.001	(0.015)	−0.001	(0.015)
Northern Cape	0.000	(0.012)	0.000	(0.014)	0.000	(0.006)	0.000	(0.021)	0.000	(0.021)
Free State	0.000	(0.011)	0.000	(0.012)	0.000	(0.005)	0.000	(0.019)	0.000	(0.018)
Kwazulu-Natal	0.001	(0.008)	0.001	(0.009)	0.003	(0.004)	−0.001	(0.015)	0.002	(0.015)
Gauteng	−0.001	(0.010)	0.000	(0.011)	0.002	(0.004)	0.000	(0.017)	0.000	(0.017)
Mpumalanga	0.000	(0.010)	0.000	(0.011)	0.001	(0.004)	0.000	(0.017)	0.000	(0.018)
Limpopo	0.000	(0.010)	0.000	(0.009)	0.002	(0.004)	0.000	(0.015)	0.000	(0.015)
Grant recipient	0.001	(0.006)	0.018	(0.005)	−0.028	(0.004)	−0.004	(0.007)	0.012	(0.007)

Number of observations for 2004 and 2014 are 96,532 and 90,153 respectively.

Bootstrapped SEs using 1000 resamples are reported in parenthesis.

Notes: This table presents a change in the concentration index for each of the health variables considered. The change over time in the concentration index, weighted by the first period elasticity is denoted as $\Delta C\eta$. The numbers represent the relative contributions of changes in the explanatory variables to changes in the corresponding concentration indexes. The numbers were obtained by estimating equation (3.7).

Appendix C

Appendix for Chapter 4

C.1 Description of Social Grants in South Africa

Table C.1.1: A Description of Social Grants in South Africa

Grant type (Approximated number of recipients at September 2015)	Values in rands (per month)	Eligibility
Grant for the Aged (3.1 million)	1,500	Previously paid to males aged 65 or older and females aged 60 and older. At present, both males and females aged 60 and older qualify
Child Support Grant (11.9 million)	350	paid to the main caregiver of a child 18 or younger. The applicant must meet up with the "means test" criterion
Disability Grant (1.1 million)	1,500	Paid to individuals 18 years and older who are unable to work because of disability. Recipients must submit a medical assessment or report no older than three months
War Veteran Grant (277)	1,520	Paid to those who are disabled or at least 60 years, and have served in the South African army during the Second World War or Korean War
Foster Child Grant (533,000)	890	Paid to foster parents in respect of children placed in their care through a court order
Grant-in-Aid (126,600)	320	Paid to individuals receiving the grant for older persons, disability or war veteran's grant, and who require full-time care because of physical or mental disability
Care Dependency Grant (129,000)	1,500	Paid to main caregiver of a child with a permanent, severe disability. The applicant must submit a medical assessment report on the child's behalf and meet up with the "means test" criterion
Social Relief of Distress		A temporary grant awardable to people in dire need. It may be paid out to people awaiting payment of an approved social grant or who have been affected by a disaster.

Adapted from Department of Social Development, South Africa

C.2 Weighted Means of the Explanatory and Health Variables

Table C.2.2: Weighted Means of the Explanatory and Health Variables between 2005-2014

	Male			***Female***		
	2005	2014	Δ	2005	2014	Δ
6 - 17 yrs	0.267	0.234	−0.033	0.243	0.221	−0.022
18 - 30 yrs	0.250	0.250	−0.001	0.246	0.234	−0.012
31 - 45 yrs	0.195	0.219	0.024	0.197	0.210	0.013
46 - 64 yrs	0.121	0.138	0.016	0.134	0.154	0.020
65 yrs plus	0.033	0.039	0.006	0.054	0.066	0.012
Black African	0.782	0.800	0.018	0.786	0.800	0.013
Coloured	0.091	0.089	−0.002	0.091	0.090	0.000
Asian/Indian	0.026	0.026	0.000	0.024	0.024	0.000
White	0.101	0.085	−0.016	0.099	0.086	−0.013
Married	0.282	0.281	−0.001	0.270	0.271	0.001
Widowed	0.013	0.016	0.003	0.074	0.074	0.000
Divorced	0.013	0.012	−0.002	0.024	0.022	−0.002
Single	0.691	0.689	−0.002	0.630	0.631	0.001
No schooling	0.189	0.144	−0.045	0.201	0.154	−0.047
Less than diploma	0.740	0.753	0.013	0.731	0.740	0.009
Diploma certificate	0.041	0.036	−0.004	0.045	0.044	0.000
Honours degree	0.020	0.035	0.015	0.016	0.035	0.019
Postgraduate	0.004	0.005	0.001	0.001	0.003	0.002
Employed	0.057	0.352	0.296	0.077	0.262	0.186
Urban	0.633	0.647	0.013	0.605	0.629	0.024
Western cape	0.110	0.113	0.003	0.106	0.115	0.009
Gauteng	0.241	0.252	0.011	0.210	0.233	0.022
Grant recipients	0.070	0.281	0.211	0.190	0.299	0.108
Ill-health	0.112	0.088	−0.024	0.137	0.105	−0.032
No. of observation	50,536	43,469		57,321	48,976	

C.3 OLS Decompositions of the Gendered Health Differentials

Table C.3.3: OLS Decomposition of Gendered Health Differentials Over Time

	Changes due to Means			*Changes due to Coefficients*		
Variables	Coefficient	Stand. error	% Explained*	Coefficient	Stand. error	% Unexplained*
C. Female						
Raw Difference	0.0406	0.0020				
6 - 17 yrs	-0.0015	0.0002	-3.8	-0.0008	0.0026	-1.9
18 - 30y rs	-0.0002	0.0001	-0.6	0.0045	0.0026	11.1
31 - 45 yrs	0.0001	0.0000	0.2	0.0135	0.0023	33.2
46 - 64 yrs	-0.0015	0.0002	-3.6	0.0233	0.0021	57.5
65 yrs plus	-0.0007	0.0001	-1.7	0.0118	0.0011	29.0
Black African	-0.0005	0.0001	-1.2	0.0033	0.0117	8.2
Coloured	0.0002	0.0001	0.5	-0.0038	0.0020	-9.2
White	-0.0001	0.0000	-0.1	-0.0049	0.0010	-11.9
Married	0.0000	0.0000	0.0	-0.0148	0.0235	-36.5
Widowed	-0.0001	0.0001	-0.2	-0.0038	0.0083	-9.4
Divorced	0.0000	0.0000	-0.1	-0.0011	0.0022	-2.7
Single	-0.0001	0.0001	-0.3	-0.0362	0.0600	-89.1
No schooling	0.0011	0.0003	2.8	0.0030	0.0054	7.4
Less than Diploma	0.0000	0.0000	0.0	0.0217	0.0189	53.5
Diploma certificate	-0.0001	0.0000	-0.3	0.0003	0.0010	0.8
Honours degree	-0.0002	0.0001	-0.6	0.0003	0.0005	0.8
Postgraduate	0.0000	0.0000	0.0	0.0000	0.0001	-0.1
Employed	0.0005	0.0004	1.2	-0.0016	0.0010	-4.0
Urban	-0.0013	0.0001	-3.2	-0.0060	0.0028	-14.9
Western Cape	0.0004	0.0001	1.0	-0.0004	0.0012	-0.9
Gauteng	0.0005	0.0002	1.3	-0.0060	0.0012	-14.7
Grant recipients	-0.0052	0.0003	-12.7	0.0149	0.0018	36.8
Total	-0.0103	0.0007	-25.4	0.0509	0.0021	125.4
D. Male						
Raw Difference	0.0259	0.0020				
6 -17 yrs	-0.0021	0.0002	-8.2	0.0013	0.0032	5.2
18 - 30yrs	0.0001	0.0001	0.3	0.0061	0.0028	23.4
31 - 45 yrs	-0.0001	0.0000	-0.3	0.0131	0.0023	50.8
46 - 64 yrs	-0.0010	0.0001	-3.8	0.0175	0.0018	67.5
65 yrs plus	-0.0003	0.0001	-1.3	0.0064	0.0008	24.6
Black African	-0.0007	0.0001	-2.7	-0.0031	0.0110	-11.8
Coloured	0.0003	0.0001	1.0	-0.0044	0.0020	-16.8
White	0.0000	0.0000	-0.1	-0.0032	0.0011	-12.4
Married	0.0001	0.0001	0.2	-0.0140	0.0367	-54.0
Widowed	0.0000	0.0001	-0.2	-0.0013	0.0022	-5.0
Divorced	0.0000	0.0000	-0.1	-0.0006	0.0017	-2.2
Single	-0.0002	0.0002	-0.7	-0.0358	0.0999	-138.3
No schooling	0.0010	0.0002	3.7	0.0038	0.0044	14.6
Less than Diploma	0.0000	0.0000	0.1	0.0158	0.0165	60.9
Diploma certificate	0.0000	0.0000	-0.1	0.0000	0.0008	-0.1
Honours degree	-0.0002	0.0001	-0.8	-0.0003	0.0005	-1.1
Postgraduate	0.0000	0.0000	0.0	-0.0001	0.0001	-0.2
Employed	0.0008	0.0006	3.0	-0.0006	0.0012	-2.5
Urban	-0.0013	0.0001	-4.8	-0.0037	0.0029	-14.1
Western Cape	0.0003	0.0001	1.0	-0.0009	0.0012	-3.6
Gauteng	0.0005	0.0002	1.9	-0.0059	0.0013	-22.7
Grant recipients	-0.0093	0.0005	-36.1	0.0161	0.0016	62.1
Total	-0.0138	0.0010	-53.3	0.0397	0.0022	153.3

Number of observations in 2014: 43,469 males and 48,976 females.
Number of observations in 2005: 50,536 males and 57,321 females.

Robust standard errors are reported.
Notes: This table presents decompositions of the health differentials betweeen 2005 and 2014, for females and males, respectively. The coefficients represent the relative contributions of the explanatory variables to the corresponding gendered health differentials. * – connotes deterioration in females' health relative to males and vice versa.

C.4 Decomposition of Gender Gap in the Health Differentials

Table C.4.4: Decomposition of Gender Gap in the Health Differentials from 2005 to 2014

	Changes due to Means					***Changes due to Coefficients***				
	Female (A)		Male (B)			Female (C)		Male (D)		
	Coeff.	s.e	Coeff.	s.e	Δ	Coeff.	s.e	Coeff.	s.e	Δ
Raw Difference	0.0406^{+}	0.0020	0.0259^{+}	0.0020	0.0147					
6 - 17 yrs	−0.0015^{+}	0.0002	−0.0021^{+}	0.0002	0.0006	−0.0008	0.0026	0.0013	0.0032	−0.0021
18 - 30 yrs	−0.0002^{+}	0.0001	0.0001	0.0001	−0.0003	0.0045*	0.0026	0.0061**	0.0028	−0.0016
31- 45 yrs	0.0001**	0.0000	−0.0001*	0.0000	0.0002	0.0135^{+}	0.0023	0.0131^{+}	0.0023	0.0003
46 - 64 yrs	−0.0015^{+}	0.0002	−0.0010^{+}	0.0001	−0.0005	0.0233^{+}	0.0021	0.0175^{+}	0.0018	0.0059
65 yrs plus	−0.0007^{+}	0.0001	−0.0003^{+}	0.0001	−0.0003	0.0118^{+}	0.0011	0.0064^{+}	0.0008	0.0054
Black African	−0.0005^{+}	0.0001	−0.0007^{+}	0.0001	0.0002	0.0033	0.0117	−0.0031	0.0110	0.0064
Coloured	0.0002*	0.0001	0.0003*	0.0001	−0.0001	−0.0038*	0.0020	−0.0044**	0.0020	0.0006
White	−0.0001	0.0000	0.0000	0.0000	0.0000	−0.0049^{+}	0.0010	−0.0032^{+}	0.0011	−0.0016
Married	0.0000	0.0000	0.0001	0.0001	−0.0001	−0.0148	0.0235	−0.0140	0.0367	−0.0009
Widowed	−0.0001	0.0001	0.0000	0.0001	0.0000	−0.0038	0.0083	−0.0013	0.0022	−0.0025
Divorced	0.0000	0.0000	0.0000	0.0000	0.0000	−0.0011	0.0022	−0.0006	0.0017	−0.0005
Single	−0.0001	0.0001	−0.0002	0.0002	0.0001	−0.0362	0.0600	−0.0358	0.0999	−0.0004
No schooling	0.0011^{+}	0.0003	0.0010^{+}	0.0002	0.0002	0.0030	0.0054	0.0038	0.0044	−0.0008
Less than diploma	0.0000	0.0000	0.0000	0.0000	0.0000	0.0217	0.0189	0.0158	0.0165	0.0060
Diploma certificate	−0.0001**	0.0000	0.0000	0.0000	−0.0001	0.0003	0.0010	0.0000	0.0008	0.0003
Honours degree	−0.0002*	0.0001	−0.0002*	0.0001	0.0000	0.0003	0.0005	−0.0003	0.0005	0.0006
Postgraduate	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	−0.0001	0.0001	0.0000
Employed	0.0005	0.0004	0.0008	0.0006	−0.0003	−0.0016	0.0010	−0.0006	0.0012	−0.0010
Urban	−0.0013^{+}	0.0001	−0.0013^{+}	0.0001	0.0000	−0.0060**	0.0028	−0.0037	0.0029	−0.0024
Western Cape	0.0004^{+}	0.0001	0.0003^{+}	0.0001	0.0002	−0.0004	0.0012	−0.0009	0.0012	0.0006
Gauteng	0.0005^{+}	0.0002	0.0005^{+}	0.0002	0.0000	−0.0060^{+}	0.0012	−0.0059^{+}	0.0013	−0.0001
Grant recipients	−0.0052^{+}	0.0003	−0.0093^{+}	0.0005	0.0042	0.0149^{+}	0.0018	0.0161^{+}	0.0016	−0.0011
Total	−0.0103^{+}	0.0007	−0.0138^{+}	0.0010	0.0035	0.0509^{+}	0.0021	0.0397^{+}	0.0022	0.0113

Number of observations in 2014: 43,469 males and 48,976 females.
Number of observations in 2005: 50,536 males and 57,321 females.
Robust standard errors are reported. $^{+}$ $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Notes: This table presents estimates of the decompositions of changes in the health differentials between 2005 and 2014 for females and males.

Table C.4.5: Decomposition Result of the Changes in the Health Differentials between Male and Female Over Time

	Changes due to Means					***Changes due to Coefficients***				
	2014 (E)		2005 (F)			2014 (G)		2005 (H)		
	Coeff.	s.e	Coeff.	s.e	Δ	Coeff.	s.e	Coeff.	s.e	Δ
Raw Difference	−0.0163^{+}	0.0020	−0.0310^{+}	0.0021	0.0147					
6 - 17 yrs	−0.0014^{+}	0.0002	−0.0020^{+}	0.0002	0.0006	0.0013	0.0028	0.0035	0.0030	−0.0021
18 - 30 yrs	−0.0005^{+}	0.0001	−0.0001*	0.0001	−0.0003	−0.0003	0.0028	0.0012	0.0026	−0.0016
31 - 45 yrs	0.0000	0.0000	−0.0002**	0.0001	0.0002	−0.0012	0.0023	−0.0016	0.0022	0.0003
46 - 64 yrs	−0.0015^{+}	0.0002	−0.0010^{+}	0.0001	−0.0005	−0.0011	0.0021	−0.0069^{+}	0.0018	0.0059
65 yrs plus	−0.0017^{+}	0.0002	−0.0013^{+}	0.0002	−0.0003	0.0015*	0.0009	−0.0039^{+}	0.0009	0.0054
Black African	−0.0002*	0.0001	−0.0004^{+}	0.0001	0.0002	−0.0129	0.0104	−0.0192	0.0122	0.0064
Coloured	0.0000	0.0000	0.0001	0.0000	−0.0001	−0.0007	0.0017	−0.0013	0.0023	0.0006
White	0.0001*	0.0000	0.0001^{+}	0.0001	0.0000	−0.0006	0.0010	0.0010	0.0011	−0.0016
Married	−0.0002	0.0003	−0.0002	0.0002	−0.0001	−0.0033	0.0105	−0.0024	0.0423	−0.0009
Widowed	−0.0009	0.0015	−0.0009	0.0015	0.0000	−0.0003	0.0026	0.0023	0.0077	−0.0025
Divorced	−0.0003	0.0002	−0.0003	0.0002	0.0000	−0.0001	0.0008	0.0005	0.0026	−0.0005
Single	−0.0011	0.0014	−0.0012	0.0014	0.0001	−0.0091	0.0268	−0.0087	0.1135	−0.0004
No schooling	−0.0002*	0.0001	−0.0004^{+}	0.0001	0.0002	−0.0003	0.0025	0.0005	0.0065	−0.0008
Less than Diploma	0.0001	0.0001	0.0001	0.0001	0.0000	−0.0076	0.0092	−0.0136	0.0233	0.0060
Diploma Certificate	−0.0002**	0.0001	−0.0001**	0.0000	−0.0001	−0.0008	0.0006	−0.0011	0.0011	0.0003
Honours degree	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	−0.0006	0.0004	0.0006
Postgraduate	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	−0.0001	0.0001	0.0000
Employed	−0.0002	0.0002	0.0001	0.0001	−0.0003	0.0010	0.0015	0.0020**	0.0006	−0.0010
Urban	0.0003^{+}	0.0001	0.0004^{+}	0.0001	0.0000	−0.0020	0.0031	0.0004	0.0026	−0.0024
Western Cape	−0.0001	0.0001	−0.0002^{+}	0.0001	0.0002	0.0002	0.0012	−0.0004	0.0012	0.0006
Gauteng	−0.0001*	0.0000	−0.0001**	0.0000	0.0000	−0.0013	0.0014	−0.0012	0.0011	−0.0001
Grant recipients	−0.0003*	0.0001	−0.0045^{+}	0.0003	0.0042	0.0006	0.0021	0.0017	0.0011	−0.0011
Total	−0.0080^{+}	0.0005	−0.0115^{+}	0.0005	0.0035	−0.0083^{+}	0.0020	−0.0196^{+}	0.0020	0.0113

$^{+}$ $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors are reported.
Number of observations in 2014: 43,469 males and 48,976 females.
Number of observations in 2005: 50,536 males and 57,321 females.
Notes: This table presents estimates of the decompositions of changes in the health differentials between females and males in 2014 and 2005.