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The Health of Older People in Indonesia

An Analysis Based on Access to Health Care

Master Thesis

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Abstracts

Background: Ageing populations generate many challenges and concerns including the health status of older people. The risk of being unhealthy and having a disability increases with age. Consequently, the need of health care is rising. This present study aimed to identify the relationship between access to health care (in terms of health insurance ownership and region) and health of older people in Indonesia. The main research question for this research concerned the extent to which access to health care (ownership of insurance and region) is related to the health of the older people in Indonesia. **Methods:** Using the 5th wave of IFLS data, published by RAND Corporation, three health measurements were analysed using five binary logistic models (N = 3,976 older people aged 60 years and older). **Results:** In general, three main findings were found: Older Indonesians who have better access to health care (in terms of insurance and region): (1) do not have better subjective health; (2) report more chronic conditions; and (3) have fewer functional limitations. **Conclusion:** No significant relationship was found between access to health care (in terms of health insurance and region) and subjective health; however, significant relationships were demonstrated between access to health care and both objective and functional health.

Key words: older people, access to health care, subjective health, objective health, functional health, 5th wave IFLS.

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-That which does not kill you makes you stronger (Friedrich Nietzsche) -

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List of abbreviations

ADL	Activity Daily Living
Askes	*Asuransi kesehatan* (Health insurance)
Askeskin	*Asuransi kesehatan keluarga miskin* (Health insurance for the poor)
BPJS	*Badan Penyelenggara Jaminan Sosial* (Social Security Agency)
CSDH	Commission on Social Determinant of Health
EA	Enumeration Area
IFLS	Indonesia Family Life Survey
Jamkesmas	*Jaminan kesehatan masyarakat* (Public health insurance)
Jamsostek	*Jaminan sosial tenaga kerja* (Labour social security)
JKN	*Jaminan Kesehatan Nasional* (National Health Insurance)
Puskesmas	*Pusat kesehatan masyarakat* (Public health centre)
SD	*Sekolah Dasar* (Elementary school)
SMP	*Sekolah Menengah Pertama* (Junior high school)
SMA	*Sekolah Menengah Atas* (Senior high school)
SRH	Self-Rate Health
SUPAS	*Survei Penduduk Antar Sensus* (Intercensal Population Survey)
Susenas	*Survei sosial ekonomi nasional* (National socio-economic survey)
UN-DESA	United Nations- Department of Economic and Social Affairs
UNFPA	United Nations Population Fund
WHO	World Health Organization

Chapter 1

Introduction

1.1 Background

The world's population is growing older. In the 1950-1980 period, the number of people aged 60 years and over increased by around 340 million, and continued to rise to 900 million in 2015 (representing 11% of the global population). By 2050, it is projected to reach approximately 2.1 billion or 22% of the world's population (Population Division-UNDESA, 2015). Bloom et al. (2011) stated that during1950-2050, the world's population is predicted to rise 3.7 times. However, the number of people aged 60 and over will grow by a factor of nearly 10. Among older people, those aged 80 years and over (the "oldest old") are projected to increase by a factor of 26.

The number of older people is growing faster compared to any another age group. Additionally, population ageing that occurred in most developing countries is growing faster than in developed countries in the past (Population Division-UNDESA, 2015). Developing countries must be prepared to face the ageing population, because population ageing generates many challenges and concerns about future economic growth, the operation of health care and pension systems, and the well-being of the elderly.

Given that health is considered as one of the important dimensions to measure the quality of life of citizens (Eurostat Statistics, 2015), this master's thesis focuses on issues that are likely to emerge as Indonesia's population continues at its projected path of ageing: the health of the older population and the possibilities to improve access to health care through policy interventions for older people.

1.2 Population ageing in Indonesia

Until the beginning of the 1970s, both fertility and mortality rates were high in Indonesia. On average, an Indonesian woman gave birth to 5 or 6 children, while the life expectancy was 46 years (Adioetomo & Mujahid, 2014). This situation has since been changing because of the massive family planning programme and several improvements in access to health care. These programmes have reduced the incidence of illnesses, and resulted in a lower fertility and mortality rate, which affect the age structure (Adioetomo & Mujahid, 2014). According to Indonesian population censuses, the fertility rate significantly declined from 5.6 children per woman in 1971 to 2.4 in 2010 (Statistics Indonesia, 2010). At the same time, the decreasing mortality rate contributes to the increasing of life expectancy at birth. Figure 1.1 shows the life expectancy from 1971 to 2035. There is an increase in life expectancy from 46 years in 1971 to 52 years in 1980, and 70 years in 2010 (Statistics Indonesia, 2010). Furthermore, Indonesia is predicted to have life expectancy up to 72 years in 2035 (Adioetomo & Mujahid, 2014; Arifin, et al., 2012). This fact shows that the government of Indonesia, especially for policy makers, should prepare to face an unprecedented ageing population in the next 20 years because it is related to future economic growth, the system of health care and pension, and the quality of older people's life.

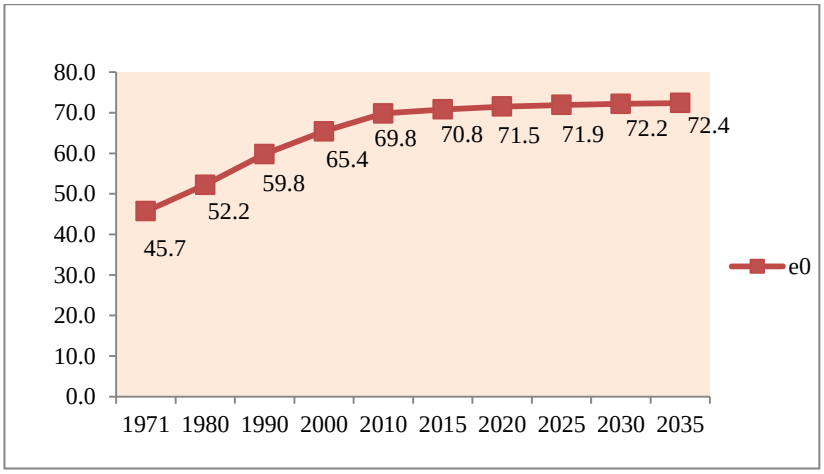

Figure 1.1. Life expectancy of Indonesia (years), 1971-2035

Source: Statistics Indonesia, Indonesia Population Censuses in 1971, 1980, 1990, 2000, and 2010.

Figure 1.2 describes the number of people aged 60 and above. It shows that in 2010 the number of people aged 60 and above is 18.1 million or 7.6% of the total population. This number is projected to increase to 48.2 million or 15.8% of the total population in 2035, and is predicted to continue to rise due to increasing life expectancy. Regarding the region, the proportion of older people in rural areas is higher than in urban area in many countries, including Indonesia (Adioetomo & Mujahid, 2014). Based on the Indonesia Population Census (2010), 8.7% of the population in rural areas is older people, compared to 6.5% in urban areas.

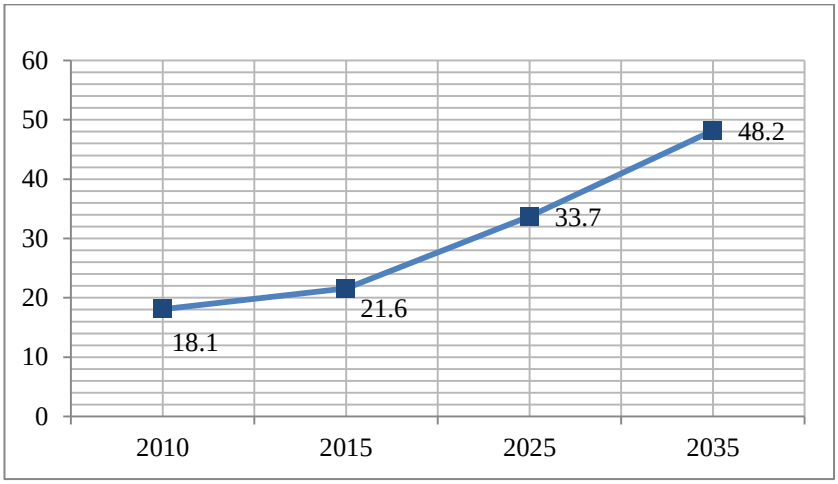

Figure 1.2. The number of people at age 60+ in Indonesia, 2010-2035
Source: Statistics Indonesia, 2010.

1.3 Problem statement

For developing countries, the challenge of population ageing is more complex than it was for the developed countries for two main reasons. Firstly, population ageing in developing countries is projected to progress far more rapidly than it did in the developed countries. Secondly, and more importantly, the developing countries face the issue of population ageing at much lower levels of economic development than in developed countries. The developed countries generally had more time and resources to gradually adjust their social and economic policies and introduce measures to meet the

increasing demands of older people, and to guarantee their quality of births (Adioetomo & Mujahid, 2014). The challenge for Indonesia is that population ageing emerges in a situation where it is unclear whether the country can afford to allocate sufficient resources needed to take care of needs, in terms of health and general well-being associated with the projected rapid increase in its older population.

As a result of population ageing, the overall prevalence of disability and morbidity in the population can be expected to increase. Whereas, the likelihood of disability as well as morbidity increases with age (Christensen, et al., 2009; Gatimu, et al., 2016). The increasing number of older persons living with a disability in the community will increase the demand for support from others. In addition, population ageing can be expected to result in an increasing need for health care. As the number of older persons continues to increase with population ageing, the government will have to take steps to ensure that their quality of life is maintained. This will call for ensuring, among others, that their health needs are met (Adioetomo & Mujahid, 2014).

1.4 Objective and research questions

Adioetomo and Mujahid (2014) have argued that there is a need for in-depth analysis of information on social and economic characteristics of older persons as well as health and disability patterns according to their background characteristics in order to inform policy makers to develop appropriate policy interventions. This study argues that knowledge of socio-demographic background factors is important, but not sufficient to develop more sensitive policy interventions. These characteristics are more or less fixed and therefore not sensitive to interventions. Hence, the focus of this thesis is on access to health care – in terms of ownership of health insurance and access to health care facilities (proxied by region) – and how this is related to the health of older persons. This research aims to identify the access of older people to health care (in terms of health insurance ownership and region) related to the health of older people in Indonesia.

The research question for this research is: *To what extent does access to health care (ownership of insurance and region) relate to the health of the older people in Indonesia?* There are three sub-questions for this research: 1a) *Is there a relationship between ownership of health insurance and health of older people in Indonesia?*; 1b) *Is there a relationship between living area (rural/urban) and health of older people in Indonesia?*; 2) *To what extent is this potential relationship moderated by the socio-economic characteristics of older people in Indonesia?*

1.5 Scientific and societal relevance

There is already some knowledge on the relationship between access to health care and health of older people (Dahlgren & Whitehead, 2006; Erlyana, et al., 2011; McFall & Yoder, 2012). However, such studies are rare for the case of Indonesia. Previous studies have documented the capability of people to access health care (in term of health costs and poverty) (O'Donnell, 2007; McIntyre , et al., 2006; van Doorslaer, et al., 2006; Pradhan & Prescott, 2002). These studies described the economic consequences of people regarding health costs, especially in developing countries. Unfortunately, studies regarding the association between access to health care and health, especially for older people, are still limited. One of the major contributions of this thesis is the use of three different measures of older people's health: subjective health, objective health, and functional health. In addition, this study also provides new information on how health insurance and region are related to the health of older people in Indonesia. The results of this study will therefore help stakeholders to create policy regarding the health of older people. In particular, the results will be useful for policy makers to realise and take action to deal with the increasingly ageing population in the next 20 years.

1.6 Structure of the research

This study consists of five chapters. The first chapter is an introduction, followed by the theoretical background and hypotheses as the basis of this study in Chapter 2. Chapter 3 explains the data and methods that used in this study. Chapter 4 reveals the results of this study that answer the research questions, and Chapter 5 contains the discussion, conclusion, and recommendations as a result of this study.

Chapter 2

Theoretical Background and Hypotheses

In the following, an overview of the theory and literature regarding the social determinants of health on older people will be described, especially for two variables of access to health care in this study: health insurance and region. Based on this theory and literature, a conceptual model is constructed along with the research hypotheses in order to answer the research questions of this study.

2.1 Introduction

The World Health Organization (1946) defines health as "a state of complete physical, mental and social-well-being and not merely the absence of disease or infirmity". This broad health concept has been used by the World Health Organization since 1946. Van Solinge (2006) has shown that studies on health and its determinants show a multitude of health concepts. The measures of health are either based on more objective data, such as the presence of disease or health problems identified in medical exams (Bosse, et al., 1987; Ekerdt, et al., 1983; Vallery-Masson, et al., 1981) reported by the person him/herself (Bosse, et al., 1987) or else based explicitly on subjective data, such as self-rated health (Ekerdt, et al., 1983; Kremer, 1985). In general, health measurements can be categorized into three major dimensions: physical health related to chronic diseases, mental health (the presence of depressed mood), and physical and social functional health (measured by the ability to climb stairs or work in a particular job). In addition, health status is not static; improvements of health status may be caused by improvements in health care (National Research Council, 2001). Several instruments are used to measure the different aspects of health. Older people who are regarded as unhealthy from an objective point of view (for example medical diagnosis) do not necessarily feel unhealthy (Helmer, et al., 1999). This suggests that outcomes may vary according to the health measures adopted. This study examines three dimensions of health: self-reported health/subjective health, objective health, and functional health.

Self-rate health (SRH) or subjective health is defined as how people reflect and perceive their health condition in general (Davies & Ware JE Jr, 1981; Wu, et al., 2013). In contrast with subjective health, objective health is defined as a condition without chronic diseases or symptoms (Belloc & Breslow, 1972) diagnosed by physicians and clinical treatments in medical facilities (Wu, et al., 2013). Functional health is related to physical (having a disability) or mental capacities that are usually measured using certain scales developed to assess the ability of individuals to do activities of daily living (ADL): basic ADL, e.g. bathing, dressing, feeding, and toileting; instrumental ADL, e.g. shopping, cooking, and housekeeping (Garcia & McCarthy, 2000).

2.2 Studies on the determinants of health

There is a large literature on the (social) determinants of health (Andersen & Newman, 1973; CSDH WHO, 2008; Dor, et al., 2006; Hadley, 2003; McFall & Yoder, 2012). Dahlgren and Whitehead (2006) have combined the various influences on health in a conceptual model called rainbow-like layers of influence (Figure 2.1). Individual characteristics such as age, sex, and constitutional factors that influence one's health are fixed factors in the basic layer attached to each individual, and general socio-economic, cultural, and environmental conditions that apply to the whole society. Subsequently, there are three layers which also determine health: an individual's life style factors, i.e. smoking, drinking, diet, and exercising; social and community networks that affect their health, i.e. living arrangements and social integration; and the ability of individuals to maintain their health, i.e. living and working

conditions, access to health care facilities, and food supply (Figure 2.1). These factors are related to the broad socio-economic, cultural, and environment conditions (Dahlgren & Whitehead, 2006).

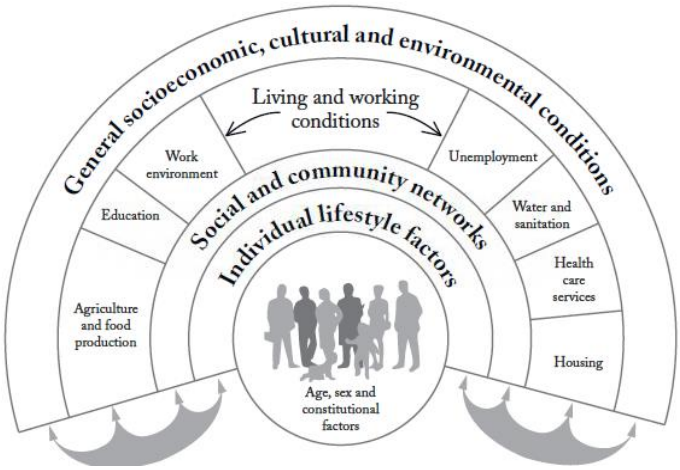

Figure 2.1. The Determinants of Health

Source: Dahlgren and Whitehead (1993, p. 20).

Furthermore, the model by Dahlgren and Whitehead (2006) stresses that living conditions and chance of life (that are very closely related to an individual's socio-economic position) have a strong influence on health. This argument is supported by WHO's CSDH (2008) who describe that socio-economic characteristics such as level of education, income, and employment status have a strong association with health status. The report of WHO's CSDH (2008) has documented that people with high income tend to live longer and healthier compared to those with low income. This statement is in line with Case et al. (2002) who noted that socioeconomic characteristics of individuals affect health. For instance, the higher the socio-economic status of a person, the greater the propensity to have better health. In terms of older people, the interaction between individual characteristics, e.g., gender, age, disabilities and skills, should also be taken into account aside from the economic, infrastructure and environment aspects (Yeung & Breheny, 2016). According to Angus and Reeve (2006) and Stephens et al. (2015), healthy ageing does not only focus on physical health as a personal achievement but also the impacts of socioeconomic status and structural barriers that affect the accessibility of health care for older people.

However, the relation between health care facilities and older people's health status remain understudied, especially for Indonesia. This factor is one of the general socio-economic conditions in the third layer of the Dahlgren and Whitehead model. This study examines two aspects of access to health care services, i.e., the ownership of health insurance, and area of living (rural-urban). For the case of Indonesia, there are several issues regarding health insurance. Public health insurance called JAMKESMAS (*Jaminan kesehatan masyarakat or public health insurance)*, which is primarily for poor people, has some limitations for the specific treatment of older persons (Adioetomo & Mujahid, 2014), while the lack of insurance coverage has been associated with health status (Andersen, 1995; Dor, et al., 2006). In addition, older people who live in rural areas are more vulnerable in functional health terms than those who live in urban areas (Arifin & Hogervorst, 2015). Furthermore, the prevalence of poverty among older people in rural areas is higher than those who live in urban areas, which could influence their access to health care (Adioetomo & Mujahid, 2014).

2.3 Health insurance in Indonesia

In 2008, 4.4% of the Indonesia's total government budget was spent on health care (World Bank, 2008). According to Thabrany (2001), most of this expenditure was allocated into funding health insurance coverage for citizens across the country. In 2000, only 14% of the Indonesian population was covered by a type of health insurance. At that time, there were three categories of health insurance. For civil servants, their health insurance was called "*Asuransi Kesehatan* or Askes", while in the private sector, particularly the formal sector, the health insurance programme was known as "*Jaminan Sosial Tenaga Kerja* or Jamsostek". In addition, in 1998 the government introduced a "Health Card" with a subsidized scheme for poor people who sought medical treatments at public health facilities following the Asian financial crisis. This health card programme was replaced by a programme called Askeskin (*Asuransi kesehatan keluarga miskin* or Health insurance for the poor) to cover low-income people (Pradhan, et al., 2007).

These schemes were tend to be fragmented, making it difficult to control health care costs and service quality. Therefore, according to Indonesia Government Act No. 40, 2004 on National Social Security System, the government initiated a mandatory health programme for all citizens, called "National Health Insurance (Jaminan Kesehatan Nasional or JKN)", managed by the Social Security Agency (*Badan Penyelenggara Jaminan Sosial* or BPJS). This was followed by the Indonesia Government Act No. 24, 2011 that stated that National Social Security would be organized by the BPJS. This was implemented in 2014 (Ministry of Health RI, 2013). Until June 2017, 177,443,940 citizens of the total population have been beneficiaries of the BPJS (BPJS, 2017).

2.4 Studies into the relationship between health insurance ownership and health

There is a large body of evidence that shows many people in developing countries live without health care that could be beneficial for them (O'Donnell, 2007). Previous studies (e.g., Aday, et al., 1984; Freeman, et al., 1987; Hafner-Eaton, 1993; Spillman, 1992) found that there is a relationship between people who do not have health insurance and access to health care. This statement is also supported by Kasper et al. (2000), who stated that health insurance has a great impact on access to health services that might influence health conditions. Regarding older people, health insurance can also be a substantial factor that affect health. Andersen and Newman (1973) noted that individual characteristics are one of the aspects that determine the use of medical care. Socio-economic factors including gender, age, and income (which may affect the capability of having health insurance) have a substantial impact on ability to access health services (Andersen & Newman, 1973). According to Suprayogo (2011), older people in Indonesia are more likely to be uninsured than other groups, particularly in Java Island. Having health insurance would improve the older people's health or the capability to access health care facilities (Hadley, 2003). Moreover, McFall and Yoder (2012) argued that there is a significant difference between insured and uninsured people in relation to health care facilities, though having health insurance does not necessarily mean people will have the best quality of health care (McFall & Yoder, 2012).

According to Wagstaff and Pradhan (2003), health insurance coverage has increased the access to health care in hospital or health centres. Hadley (2003) also noted that there is a relationship between health insurance and health. Moreover, previous research conducted regarding health services concluded that the health of uninsured people could be improved if they have health insurance. Compared to those who are uninsured, people who have the health insurance tend to have the preventive and diagnostic services earlier, minimize the propensity for severe illnesses when they are diagnosed, and are more likely to have medical treatments (Hadley, 2003).

2.5 Studies on the relationship between area of living and health

The WHO (2008) stated that the area of residence (rural or urban) is associated with the access of older people to health care. According to Ladusingh and Ngangbam (2016), region can be a factor to consider in order to understand the differences of access to health care. However, there is a lack of clarity regarding access to health care facilities, whether it is merely because of the insurance ownership or whether it is associated with the urban and rural geographic setting. For instance, people who live in rural areas have more limited access to specific medical treatments, such as physiotherapy, and occupational therapy, compared to those who live in urban areas (Pearson, 2000). This situation may occur as a result of financial problems, a lack of medical staff, or the absence of specific health care facilities (McFall & Yoder, 2012). In rural areas, the concept of extensive distance (Shengelia, et al., 2005) related to the use of health services suggests that the further the distance, the lower the use of services. This condition can be influenced by the availability of transportation, (the absence of) social support and networks, and the presence of family support to provide informal care (Wong & Regan, 2009).

Furthermore, those who reside in rural areas can be sensitive to the non-medical component cost of care as measured by the travel distance, but not sensitive to medical fee (Erlyana, et al., 2011). According to Erlyana et al. (2011), it is not merely health insurance ownership but the area of living that is an important factor regarding access to health care for people. This is related to the travel costs due to the lack of transportation to medical care facilities. Therefore, people who live in rural areas often experience more challenges in receiving medical treatment from health care provider compared to those who live in urban areas (Erlyana, et al., 2011).

2.6 Conceptual model and hypotheses

Figure 2.2 shows the conceptual model for this research. According to Dahlgren and Whitehead (2006), access to health services is one of the social determinants of health. Health insurance is considered to be a key component that affects access to health care among older people, which will influence their health (Kasper, et al., 2000). Additionally, the region where older people live also affect accessibility to access the health care (Ladusingh & Ngangbam, 2016).

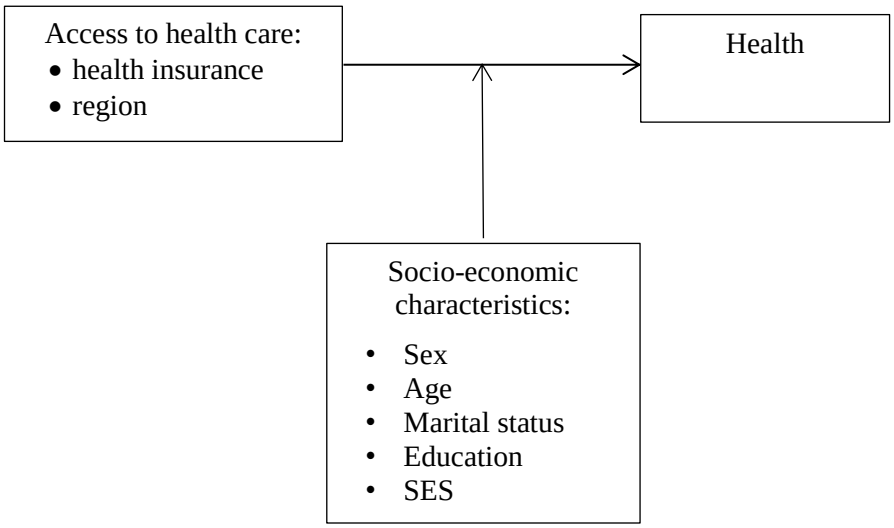

Figure 2.2. Conceptual Model

There are two hypotheses in this study. A step-by-step approach will be utilized to answer the main explanatory question with regard to the impact of access to health care on health in the older Indonesian population. In the first step, it is assumed that:

H1a: Older Indonesians who have better access to health care facilities because they have health insurance are healthier than those who have less access to health care facilities or no insurance

H1b: Older Indonesians who have better access to health care facilities because they live in urban areas are healthier than those who have less access to health care facilities (rural areas)

However, in a second step, this study would like to acknowledge that access to health care facilities (ownership of health insurance or living area) may not be randomly divided among the older population. This will be the case whenever there is a socio-economic gradient in ownership (e.g. more privileged persons tend to have insurance) or living area. In order to investigate whether or not there is an association between the health and insurance ownership, which could be traced back to confounding factors (variables that may be related to health and insurance ownership), this study controls for common demographic variables as well as indicators of socio-economic position.

H2: The relationship between access to health care and the health of older Indonesians is moderated by their socio-economic characteristics.

Chapter 3

Data and Methods

In this chapter, a description of data used and methods for this study will be presented. It also provides a short illustration of Indonesia as an area of study, sample design, data selection, an overview of the analysis and operationalizes the concepts of variables selected in this study.

3.1 Research design

The objective of this study is to identify the access of older people in Indonesia to health care (in terms of health insurance ownership and region) related to their health. Hence, to describe the relationship between these independent and dependent variables, a quantitative approach is used for this study. A quantitative approach is used to examine the hypothesis obtained from the operationalization of concepts and theories (Flick, 2015). Also, this study will use a secondary quantitative dataset for analysis.

3.2 About the study area

In terms of population size, Indonesia is the fourth largest country in the world with a current population (mid-2015) of 255.18 million in 2015 (Statistics Indonesia, 2015). It is consists of more than 17,000 islands and 34 provinces. Indonesia is located in the Southeast Asia region and borders several countries including Singapore, Malaysia, the Philippines, Thailand, and Vietnam (Statistics Indonesia, 2015; UNFPA Indonesia, 2014). Because of significant economic progress, Indonesia has become one of the world's biggest economies and is now a member of *The Group of Twenty (G-20) Finance Ministers and Central Bank Governors* (UNFPA Indonesia, 2014). Indonesia has also been experiencing changes in size and characteristics of its population. Besides population growth, ageing has become a prominent issue in this country. The population has been ageing as a result of the increasing in life expectancy (UNFPA Indonesia, 2014). More detailed information about Indonesia as area of study is presented in Table 3.1.

Table 3.1. Indonesia's Profile, 2015

Indicator	**Value**
Surface area (km^2)	1,910,931.32
Mid-year total population (millions)	255,182,144
Population/km^2	134
Rate of natural increase (%)	1.43
Life expectancy at birth (years), both sexes	70.8
Ratio of older persons (per 100 children)	26.3
Gross Domestic Product (GDP) (Billion rupiahs)	36,508,486.32

Sources: Statistics Indonesia (2010 and 2015).

3.3 Data source and the fifth IFLS sample design

The main data source used in this study is the Indonesia Family Life Survey (IFLS) 2015, available for public use from the RAND Corporation (https://www.rand.org/labor/FLS/IFLS.html). The IFLS is a

longitudinal survey. The first wave was conducted in 1993-1994, followed by IFLS 2 in 1997-1998, IFLS 3 in 2000, IFLS 4 in 2007-2008, and IFLS 5 in 2014-2015 (the latest). The data collection of IFLS is conducted by face to face interview by visiting each respondent in the selected household sample. The initial sample in IFLS 1993 consisted of over 30,000 individuals living in 13 of the 27 provinces in Indonesia (Figure 3.1). These provinces represent about 83% of the total Indonesian population. The latest wave of IFLS that is used in this thesis consists of 16,204 households; 50,148 individuals were interviewed. The survey questionnaire was divided into several books. There are four books for household level (T, K, 1, and 2), three books for individual level data from adult respondents (book 3A, 3B), one book for ever married female respondents (book 4), and one book for children younger than 15 (book 5).

Figure 3.1. Map of 13 IFLS Provinces in Indonesia

Source: https://www.rand.org/labor/FLS/IFLS.html#map

As a longitudinal survey, IFLS 5 derived its sample from IFLS1, IFLS2, IFLS2+, IFLS3 and IFLS 4. In IFLS1, the sampling scheme was stratified by provinces and region (urban/rural), and then the sample was randomly selected within these strata (Strauss, et al., 2016). Among the 27 provinces that existed in 1993, 13 provinces were selected for the study area. This selection was based on the consideration of obtaining the maximum representation of the population to capture the cultural and socio-economic diversity in Indonesia, and the effectiveness in costs because Indonesia is a big country. The provinces that were selected in this survey were: four provinces in Sumatra (North Sumatra, West Sumatra, South Sumatra, and Lampung); five provinces in Java (DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java); and four provinces outside Java and Sumatera representing outer Indonesia (Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi) (Strauss, et al., 2016). Using the frame of the 1993 Indonesian National Socio-Economic Survey (*Susenas*) that consists of about 60,000 households, enumeration areas (EAs) of IFLS were randomly selected among 13 provinces. There are 321 enumeration areas in the 13 provinces chosen in IFLS. Moreover, the sampling in urban areas and small provinces are larger to compare sufficiently between urban and rural, and between Javanese and non-Javanese. Statistics Indonesia defines a household as a group of people whose members live in the same house and share food from the same cooking pot. 20 households for each urban area, and 30 households from each rural area were selected in this survey (Strauss, et al., 2016). Household fieldwork of IFLS5 occurred between September 2014 and March 2015. IFLS5, as the most recent wave, involved more work with long distance tracking because since the original IFLS1 EAs, households have split off in and new split off households have to be tracked. Tracking is an important aspect to keep the same households in this survey and reduce the risk of losing households to

interview in IFLS5. Since IFLS4, only 53.6% of households did not move, and 64.6% stayed in rural or urban areas (Strauss, et al., 2016).

As the only large longitudinal sample survey on Indonesian households, the IFLS has a very rich data source collection at the household as well as at the individual levels (Johar, 2009). This survey has commitment to track and interview individuals who moved or split off from the original IFLS1 households. This improves data quality because it reduces the risk of bias due to non-random missing data.

3.4 Data selection

In this study, the analysis focuses on individuals aged 60 years or older, because based on the Government Act number 13 Year 1998 regarding the Welfare of the Older people (*Undang-undang Republik Indonesia Nomor 13 Tahun 1998 tentang Kesejahteraan Lanjut Usia*), an older adult is defined as a person aged 60 years and over (Statistics Indonesia, 2013). Hence, from the total sample in the IFLS 5, we selected the individuals aged 60 years and older as the unit of analysis.

3.5 Ethical consideration

This study used secondary data available publically, published by the RAND Corporation. The data does not include any personal information (i.e. name or identity number and address).

3.6 Operationalization of concepts and variables

The outcome variable in this study is health. There are three different health measures utilised as dependent variables in this thesis, that is, subjective health, objective health, and functional health. The operationalization of each health measure as well as that of the explanatory variables is described below:

a. Subjective health

Self-rate health (SRH), also called subjective health, is defined as how people reflect and perceive their health status in general (Davies & Ware JE Jr, 1981; Wu, et al., 2013). In this thesis, subjective health is measured by the individual's perception of general health condition. The measurement of subjective health is derived from Book 3B, question KK01, regarding the health condition of people in general. See Table 2 for the exact wording of the question and the coding of this variable.

b. Objective health

According to Belloc and Breslow (1972), objective or physical health can be measured as a condition without chronic diseases or symptoms and severe disability. In addition, Mossey and Shapiro (1982) stated that the objective health was defined as a report by medical doctor regarding health problems. Regarding these definitions, this thesis will focus on whether older people suffer from chronic diseases or not, and if the diagnosis is reported by the doctor. This study made use of a variable that assessed the extent to which the respondent suffered from a number of selected chronic diseases in particular degenerative diseases (i.e., hearing problems, physical disabilities, speech impediment, brain damage, and vision problems) because these diseases relate to old age. The measurement of objective health is derived from Book 3B, question CD01, regarding the health problems related to chronic diseases diagnosed by a doctor or other medical examiner.

c. Functional health

According to Holdsworth et al. (2013), health is the ability of an individual to function effectively and participate within society. Self-report methods are based on three categories: reducing the physical or mental capacities; having a disability that makes it difficult to do activities; and living with a disability that results in declining social advantages, e.g. loss of earnings is commonly used for measuring functional health (Garcia & McCarthy, 2000). According to the WHO (2000), there are different scales developed to assess the ability of individuals to do activities of daily living (ADL). Two ADLs are developed: basic ADL (for example bathing, dressing, feeding, and toileting) and instrumental ADL (for example shopping, cooking, and housekeeping) (Garcia & McCarthy, 2000). This thesis will only focus on one of the three categories of self-report methods by using the ADL. The measurement of functional health is derived from Book 3B, questions KK03f, KK03m, KK03k, KK03ka, and KK03kc, regarding the physical ability in daily living. There are five questions asked to measure this dimension: first, to dress without help; second, to bathe; third, to get out of bed; fourth, to eat (eating food by oneself when it is ready); and fifth, to control urination or defecation.

d. Health insurance

The ILO (2002) stated that social security is a form of protection provided to the community through various efforts to face financial problems that may occur due to illness, disability, unemployment, the increasing of age, or death. Social security consists of social insurance, family allowances, and protection schemes organized by employers or governments as compensation. Health protection is one of the social security tranches which protects physical health. The variable used to measure the health protection of older people in this research is the ownership of (public or private) health insurance.

e. Region

Region refers to geographical classification of a region and is divided into two categories, urban and rural. Data is based on the classification from Statistics Indonesia. According to the existing theories and literature (Dahlgren & Whitehead, 2006; Erlyana, et al., 2011), region (urban/rural) is one of the factors that determine the health of older people.

f. Age

There are differences in the concept of the cut-off ages for defining "older people" in some countries. The cut-off age depends on the retirement age, pensionable age and granting of certain benefits. As previously mentioned, in Indonesia older people are defined as individuals aged 60 years and older. In this study, we group the older people into three categories to identify the effects of age on health as a dependent variable.

g. Gender

To investigate gender differences in health status, the analysis of this study included males and females as control variables. Description of sex (male and female) was based on respondent's answers (Statistic Indonesia, 2010).

h. Marital status

There are four categories of marital status recorded in the fifth IFLS data: never married, married, divorced, and widowed/bereaved. For this thesis, these categories will be classified into two categories: married and unmarried. This variables can be an indicator to moderate the relationship between access to health care and health of older people, in particular subjective health.

i. Social-economic status (SES)

In this study, the social-economic status of older people is measured by education attainment and cell-phone ownership. Level of education is related to the job opportunities that can influence the social-economic status of a person. The definition of the level of education in this research is based on that of Statistics Indonesia (2010). The level of education is the highest education reached by an individual that is proven with a certificate or diploma. The level of education in this thesis is defined as three categories: Unschooled and below elementary school, elementary school (*Sekolah Dasar/SD*), and junior high school and above (*SMP*, *SMA*, Diploma, and University). Another indicator for SES is cell phone ownership. After looked at several variables that can be an indicator for SES i.e., main activity, house status, cell phone ownership, work status, land farming, and internet access, cell phone ownership turned out to be the best indicator. According to Wardt et al (2012), there is a relationship between the use of information and communication technology (ICT) and well-being in health.

j. Visit to health care facilities

Variable of visit to health care facilities was added to explain the negative effects of health insurance on health status, in particular for objective health. This variable related to the respondents' visits to the doctor or medical physicians at the hospital, clinic, and doctor's practices that correspond with chronic disease diagnosis. This information is derived from Book 3B, question RJ00.

3.7 Measures

Based on the theories, and the three measurements of health that were defined, and for the predicted variables and control variables, the definitions are derived from the IFLS 5 data. Both the definitions and variables as well as the operationalization are tabulated in Table 3.2.

Table 3.2. Operationalization of used variables and measurement scale in research

Variable	**Operationalization in IFLS 5 database**	**Measurement scale**
Dependent variable		
Subjective health	In general, how is your health? (Very healthy; Somewhat healthy; Somewhat unhealthy; Unhealthy). Book 3B, Question number KK01 regarding the health condition of people in general.	Binary 0 = Unhealthy (somewhat unhealthy and unhealthy) 1 = Healthy (Very healthy and somewhat healthy)
Objective health	Some health conditions that you may have been diagnosed with? (Physical disabilities, brain damage, vision problems, hearing problems, speech impediment, mental retardation, and autism) Book 3B, Question number CD01	Binary 0 = Unhealthy (at least with one chronic condition or more) 1 = Healthy (Without chronic condition)

Variable	Operationalization in IFLS 5 database	Measurement scale
Functional health	Now we would like to know your physical ability in daily activity. Activities of Daily Living (ADL): 1. To dress without help 2. To bathe 3. To get out of bed 4. To eat (eating food by oneself when it is ready) 5. To control urination or defecation Book 3B, Question number KK03f, KK03m, KK03k, kk03ka, KK03kc	Binary 0 = with difficulties (at least 1 ADL) 1 = without difficulties
Predicted variables- access to health care		
Health insurance	Are you the policy holder/primary beneficiary of health benefits, health insurance, such as ASKES, ASTEK/Jamsostek, employer provided medical reimbursement, employer provided clinic, private health insurance, savings-related insurance, Jamkesmas , Jamkesda, Jamkessos, Jampersal or Asuransi mandiri/personal insurance?	Binary 0 = No (Ref.) 1 = Yes
Region	Area	Binary 0 = Urban (Ref.) 1 = Rural
Control variables – socioeconomic characteristics		
Age	Age now	Categorical 0 = 60-69 years old (Ref.) 1 = 70-84 years old 2 = 85+
Gender	Sex	Binary 0 = male (Ref) 1 = female
Marital status	Marital status	Binary 0= unmarried (Ref.) 1= married
Education attainment	Highest Level of Schooling Attended	Categorical 0 = Unschooled or Under Primary School (Ref.) 1 = Primary school 2 = Junior high school and above
Cell phone ownership	Cell phone ownership	Binary 0 = No (Ref.) 1 = Yes
Visit to health care facilities	In the last 4 weeks have you visited a public hospital, *Puskesmas*, private hospital, clinic, health worker or doctor's practice or been visited by a health worker or doctor?	Binary 0 = No (Ref.) 1 = Yes

3.8 Missing data

In general, cases of missing data for the variables selected in this study are relatively low. There are 3,976 people aged 60 years and over selected in this study. Of the total sample, less than 5% of missing data was found. When the health insurance variable was added for analysis, there was approximately 0.35% missing data; 2.26% was missing after adding the control variables; no missing data when analyzing the total sample with variable of region; 2.03% missing data after controlling with socioeconomic variables; and 2.26% of the total sample was missing when adding all the variables into one model. In other words, missing data increases when socio-economic variables are added to the analysis. Due to the small proportion of the missing cases and these missing cases are missing completely at random (MCAR), it is therefore treated as a complete case analysis. In this condition, the missing value can be dropped from the analysis.

3.9 Methods of analysis

This study has two methods of analyses: descriptive analyses and explanatory analyses. Descriptive analyses, such as frequency distribution, are used to describe the characteristics of older persons in this study. The relationship between the dependent variables and independent variables is explained using the explanatory method. The main focus in this study is to identify the access of older people in Indonesia to health care (in terms of health insurance ownership and region) that could affect their health. Thus that the explanatory analysis reveals the relationship between health insurance, region and health of older people. To understand this relationship, two statistics methods are used: cross tabulation and logistic regressions.

According to Norusis (2008), cross tabulations can be used to see the frequencies of the dependent and independent variables separately. This cross tabulation analysis will be used as the basis to generate a regression model (Agresti, 1990). Binary logistic regressions are used for the analysis of this study because there are two discrete alternative choices to dependent variables (unhealthy=0; healthy=1). In this study, the dependent variables are not a continuous variable, but a limited variable. Using binary logistic regression as one of discrete choice models, there are three rules that must be complied with: alternatives must be mutually exclusive; the choice must be exhaustive; and the number of alternatives must be finite (Train, 2009). In the binary logistic regression, the dependent variable is dichotomous. It means that data is either coded as 0 (no, false, failure, etc.) or 1 (yes, true, success, etc.). In terms of regression, univariate and multivariate analyses were performed. Because this logistic regression is designed to predict and describe a binary categorical with the same scales, it is possible to compare the results of dependent variables.

Five models were estimated in the analysis of this study. The first model (Model 1) is the simplest model, only including one independent variable. This model shows if there is a relationship between the first access to health care variable (health insurance) as the aim of this study. The model is written in equation as follows:

$$Logit\ (odds\ of\ being\ healthy) = \beta 0 + \beta 1 health\ insurance + \epsilon$$

Model 2, control variables are added to see the effects of insurance on dependent variables adjusted for control variables.

$$Logit\ (odds\ of\ being\ healthy) = \beta 0 + \beta 1 insurance + \beta 2 agegroup + \beta 3 gender + \beta 4 maritalstatus + \beta 5 education + \beta 6 cellphone + \beta 7 visithealthcare + \epsilon$$

For Model 3, another access to health care variable is added. Similar to Model 1, only one independent variable (region) is added. This model aims to answer the question if there is relationship between region and health. The model is defined as:

$$Logit\ (odds\ of\ being\ healthy) = \beta 0 + \beta 1 region + \epsilon$$

In Model 4, the effect of region on the three health measurements as dependent variables is adjusted for control variables:

$$Logit\ (odds\ of\ being\ healthy) = \beta 0 + \beta 1 region + \beta 2 agegroup + \beta 3 gender + \beta 4 maritalstatus + \beta 5 education + \beta 6 cellphone + \beta 7 visithealthcare + \epsilon$$

Model 5 is the complete model when all the variables are included:

$$Logit\ (odds\ of\ being\ healthy) = \beta 0 + \beta 1 insurance + \beta 2 region + \beta 3 agegroup + \beta 4 gender + \beta 5 maritalstatus + \beta 6 education + \beta 7 cellphone + \beta 8 visithealthcare + \epsilon$$

In addition, the logit model is related to probabilities that can be defined as the formula below:

$$Odds\ (y) = \frac{exp^{(\beta 0 + \beta 1 X1 + \beta 2 X2 + \beta 3 X3)}}{1 + exp^{(\beta 0 + \beta 1 X1 + \beta 2 X2 + \beta 3 X3)}}$$

The formula will be used to calculate the odds of health of older people such as:

Y	= a dichotomous dependent variable, where y = (0 = unhealthy; 1 = healthy and 0 = with difficulties; 1 = without difficulties)
β_0	= the intercept of the model
β_1, β_2, β_3	= the coefficients of the formula that results the effects of variables X_1,X_2,$X_{3...}$on y
X_1,X_2,X_3	= independent variables (predicted and control variables)
ε	= the error term of the model

Chapter 4

Results

The results of analyses in this study will be presented in this chapter. It starts with short illustrations that compare the sample with Intercensal population survey data (SUPAS 2015) by BPS-Statistics Indonesia, on the following aspects: the number of respondents, the proportion of older people by gender, and geographical areas. Subsequently, the descriptive results will be shown, which describes the most relevant variables in the sample. This is followed by the results of the multivariate analyses that explain the relationship between access to health care (in terms of health insurance and region) and health of older people.

Table 4.1. shows the comparison of the sample between IFLS5 and the 2015 Intercensal Population Survey (SUPAS 2015) by Statistics Indonesia. Section 4.1 consists of the study sample regarding older people that can be compared to the results of SUPAS 2015. Generally, in IFLS5, a total of 16,204 households and 50,148 individuals were interviewed. Of this sample, 3,976 respondents (7.9% of the total IFLS' sample) aged 60 years and older were selected for the analyses in this study. Compared to SUPAS 2015, the number of respondents interviewed was 2,427,508. Of this number, 9.4% is older people. However, the number of older people estimated in SUPAS 2015 is 21.6 million, or 8.5% of the total population (Statistics Indonesia, 2015). The proportion of older people based on SUPAS data is higher than the proportion of older people in IFLS5. The reason for this may be that SUPAS covered all Indonesian regions while IFLS data only covers 13 provinces.

Table 4.1. Comparison of the sample (people aged 60+) between IFLS 5 and SUPAS 2015

Characteristics of sample	IFLS 5	SUPAS 2015
Province	13	34
Size	3,976	228,718
Proportion by gender (%)		
Male	45.6	44.6
Female	54.4	55.4
Proportion by Geographical area (%)		
Urban	54.1	40.0
Rural	45.9	60.0

Source: Author's statistical calculation based on Indonesia Family Life Survey 2015 and the Intercensal Population Survey 2015.

The proportion of older people by gender is very similar in IFLS5 and SUPAS 2015. There is a higher proportion of females than males. Of the IFLS 5 sample, 45.6% are males, and 54.4% are females. In line with SUPAS 2015 data, more than a half of the older population are females (Table 4.1). On the other hand, the proportions of respondents by geographical area (urban/rural classification) in IFLS is different to the results recorded in SUPAS 2015. Statistics Indonesia (2015) recorded that approximately 60.0% of older people live in rural areas, whereas in IFLS 5, the proportion of older people who live in urban areas (54.1%) is higher than in rural areas (45.9%). However, the estimated

proportion of older people living in urban areas from SUPAS 2015 data is 49.7% compared to 50.3% of those living in rural areas (Statistics Indonesia, 2015).

4.1 Descriptive results

Figure 4.1. presents the insurance ownership among older Indonesians based on the fifth IFLS data 2015. Of the total sample aged 60 years and over, 55.1% are uninsured. People aged 85 years and older have the lowest proportion of health insurance ownership, that is, only 39.6%. For all individuals that were interviewed in Book 3B (individuals age 15 years and over), 51.1% are uninsured. These figures show that the health insurance ownership of older individuals (44.9%) is lower than among the total population (49.9%).

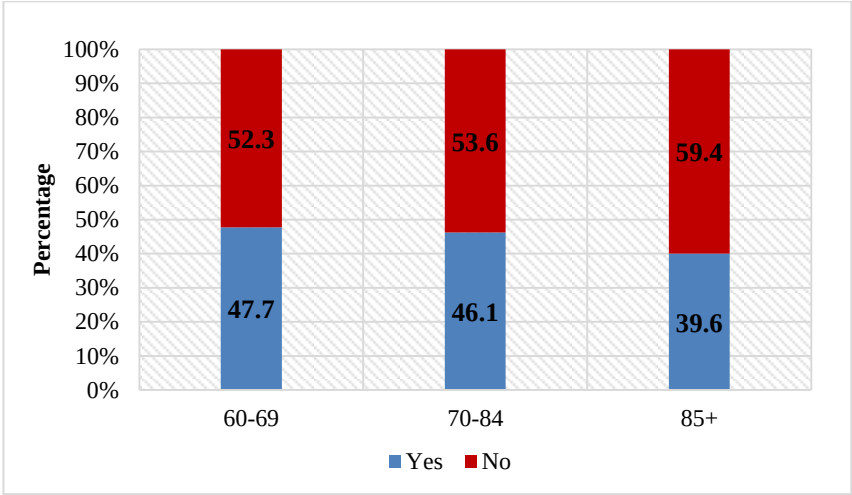

Figure 4.1. Insurance ownership among older Indonesians

Source: Author's statistical calculation based on Indonesia Family Life Survey 2015.

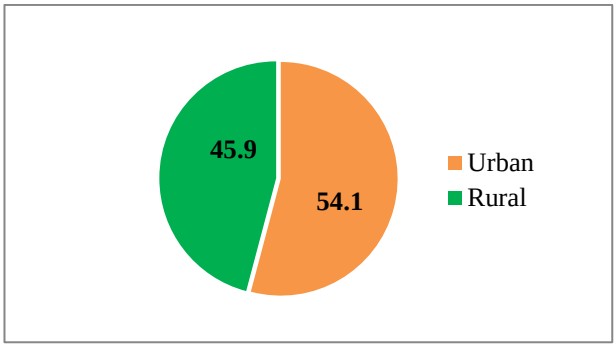

Figure 4.2. The proportion of older people by living area (%)

Source: Author's statistical calculation based on Indonesia Family Life Survey 2015.

Besides the ownership of health insurance, the area of living can be a factor that influences the accessibility of health care facilities (WHO, 2008), which will further affect the health of older people. Figure 4.2. shows the proportion of older people who live in urban areas is 54.1%, so 45.9% live in rural areas. For to the whole population in IFLS5 data, 59.1% of people live in urban areas, and 40.9% live in rural areas. It can be therefore concluded that the proportion of older people who live in urban areas is lower than among the total population.

Table 4.2. provides bi-variate results. The table describes the proportion of older people with health problems, with various categories. When looking at health insurance as the main explanatory variable in this study, the proportion of older people with subjective health problems is quite similar between those who are uninsured and those who are insured. The proportion of older people with objective health problems (diagnosed by doctor) is higher for those who have health insurance compared to those who do not have health insurance. In contrast with objective health, the proportion of older people with functional health problems (difficulties in ADL) is higher for those who are uninsured than those who are insured.

According to region, there are small differences in the proportion of older people with subjective health problems between urban and rural areas. Taking objective health as an indicator, there are large differences in the proportion of older people diagnosed with chronic diseases who live in urban and rural areas. It is also obvious that there are clear differences in the proportion of older people with ADL problems by urban and rural areas. Regarding the ownership of health insurance by region, 55.7% of older people living in urban areas own health insurance, while only 35.2% of older people living in rural areas own health insurance.

Furthermore, the health differences are large according to age. The oldest age group (85 years and older) have more health problems compared to other age groups for all three health measurements, i.e., 53.3% reported as unhealthy for subjective health category, 21.2% reported as unhealthy for the objective health category, and 39.6% reported as unhealthy for functional health category. For older persons aged 60-69 years old, 38.3% reported as unhealthy for subjective health, 15.0% are living with chronic conditions, and 14.4% reported ADL problems. There are also clear age differences in health when one looks at health insurance ownership. The higher the age, the lower the proportion who have health insurance. As shown in table 4.2, only 40.0% of older people aged 85 years and above are insured, while for those aged 70-84 it is 46.3% and 47.7% for those in the category 60-69 years old.

According to gender, the proportion of health insurance ownership among older females (45.0%) is lower than for older males (47.8%). There are large differences in the proportion of being unhealthy for subjective health and functional health indicators, but small differences for objective health as an indicator. The proportion of health insurance ownership by marital status for older people who are married is higher than those who are unmarried. 48.2% of older Indonesians who are married own health insurance, while for those who are unmarried the proportion of owing health insurance is 43.6%. The differences in the proportion of being unhealthy are large for both subjective health and functional health as indicators, contrary to objective health, for which the differences are small. The proportion of older people of the three health measurements are highest for those who are unmarried (45.0% subjective health; 18.4% objective health; 27.0% functional health), compared to the proportion of older people who are married (39.5% subjective health; 16.1% objective health; 15.8% functional health).

Education attainment and cell phone ownership are chosen as indicators for the socioeconomic status (SES) of older people. As can be observed in Table 4.2., there are large differences in the proportion of health insurance ownership by educational attainment. The proportion of having health insurance for those who completed junior high school and above is higher than those who completed primary school and below. In terms of health status, those who completed junior high school and above report more health problems for objective and functional health, but report fewer subjective health problems.

Another indicator of SES is cell phone ownership. The proportion of older people who have health insurance is higher for those who own a cell phone compared to those who do not. Regarding

health status, the proportion of older people with subjective and functional health problems is higher for those who do not have cell phones compared to those that do, but the proportion of older people who report objective health problems is lower for those who do not have a cell phone compared to those who own a cell phone.

Table 4.2. Characteristics of the sample of older Indonesians

Variables	Subjective Health	Objective Health	Functional health	Proportion of health insurance
	% with poor subjective health (Unhealthy)	% with Chronic conditions (Unhealthy)	% with ADL problems (with difficulties)	% with health insurance
Insurance				
Yes	41.7	20.3	18.5	
No	41.6	14.3	22.0	
Region				
Urban	40.9	20.7	19.1	55.7
Rural	42.9	12.9	22.2	35.2
Age				
60-69	38.3	15.0	14.4	47.7
70-84	43.4	19.2	23.8	46.3
85+	53.3	21.2	39.6	40.0
Sex				
Male	38.7	16.9	15.4	47.8
Female	44.4	17.2	24.8	45.0
Marital status				
Married	39.5	16.1	15.8	48.2
Unmarried	45.0	18.4	27.0	43.6
Indicator for Socio-economic status (SES)				
Education attainment				
Unschooled or Under Primary School	44.3	14.1	22.1	39.7
Primary school	41.1	16.2	16.8	44.7
Junior high school and above	35.9	25.6	18.3	65.4
Cell phone ownership				
Yes	34.5	20.6	14.3	57.1
No	44.2	15.9	22.5	42.7
Visit health care facilities				
Yes	57.9	23.6	25.6	54.7
No	36.4	14.9	18.8	43.5

Source: Author's statistical calculation based on Indonesia Family Life Survey 2015.

Another important feature of the sample of older Indonesians is visits to health care facilities. As shown in Table 4.2., the differences in the proportion of visits to health care and no visits to health care are relatively large for all categories. Health insurance ownership of older people who visited health care facilities is higher compared to those who did not visit them. Older Indonesians who had visited health care facilities in the last four weeks report more health problems for all three health measurements. It is not surprising because the probability of identifying chronic diseases rises according to health insurance ownership.

4.2 Multivariate results

Due to the broad concept of health, as explained in Chapter 2, this study focuses on three health measurements as dependent variables: subjective health, objective health, and functional health. In this study, five models were performed in the analysis to explain the relationship between access to health care (in term of health insurance ownership and region) and health of older people. The first model (Model 1) included only the first variable of access to health care (health insurance) to identify the crude effect of health insurance ownership on the three health measurements. Subsequently, the effects of health insurance on the three health measurements are adjusted for control variables in Model 2. Model 3 aims to identify the crude effect of another access variable (region) on all three health measurements. Model 4 identifies the effect of region on health measurements adjusted for control variables i.e., age, gender, marital status, and socioeconomic status (SES). The last model (Model 5) is a complete model that includes both access variables and control variables.

The results of multivariate regression analyses for subjective health are presented in Table 4.3. First of all, the results of health insurance on subjective health measurement are presented in Models 1 and 2. Subsequently, it is followed by the results of region on subjective health measurement (Model 3 and 4). Both access to health care variables are presented in the complete model (Model 5). The results in Table 4.3. show that there is no statistically significant association between predictor variables (health insurance ownership and region) with subjective health. These findings are in contrast with Hypotheses 1a and 1b. Thus, there is no relationship in the health status (subjective health status) of older Indonesians who have better access to health care facilities (because they have better access to health care facilities) than those who have less access to health care facilities.

Adding control variables into the models does not change the statistical significance of the predictor variables, although the effect was increased and the sign of the coefficient transform into positive after adjusted by control variables. Among the control variables, some variables did not have a significant association with subjective health. There are no significant effects of gender, marital status, and educational attainment on subjective health for all three models. There is a statistically significant association for age 85 years and above, cell phone, and visits to health care facilities. As can be observed in Table 4.3., those who are aged 85 years and older report worse subjective health compared to those aged 60-69, but there is no difference for those aged 70-84 years compared to those aged 60-69 years. Thus, the oldest old people have worse subjective health compared to the youngest old age group. Those who own a cell phone report better subjective health compared to those who do not have cell phone. Additionally, those who had visited health care facilities in the previous four weeks reported worse subjective health compared to those who do not visited health care facilities, which could be due to the fact that they visited health care facilities because they were ill.

Table 4.3. Estimates of regression analyses on the subjective health of older Indonesians.

Healthy = 1; Unhealthy = 0	**Subjective health**				
	Model 1	Model 2	Model 3	Model 4	Model 5
Predictor variables					
Insurance					
No (Ref)	--	--			--
Yes	-0.003	0.008			0.001
	(0.065)	(0.069)			(0.070)
Region					
Urban (Ref)			--	--	--
Rural			-0.080	-0.042	-0.042
			(0.065)	(0.070)	(0.071)
Control variables					
Age group					
60-69 (Ref)		--		--	--
70-84		-0.101		-0.104	-0.101
		(0.077)		(0.077)	(0.077)
85+		-0.498 ***		-0.512 ***	-0.497 ***
		(0.111)		(0.111)	(0.111)
Gender					
Male (Ref)		--		--	--
Female		-0.090		-0.098	-0.092
		(0.078)		(0.077)	(0.078)
Marital status					
Unmarried (Ref)		--		--	--
Married		0.057		0.058	0.060
		(0.079)		(0.079)	(0.079)
Educational attainment					
Unschooled or Under Primary School (Ref)		--		--	--
Primary school		0.051		0.044	0.044
		(0.089)		(0.089)	(0.089)
Junior high school and above		0.178		0.163	0.165
		(0.097)		(0.099)	(0.100)
Cellphone ownership					
No (Ref)		--		--	--
Yes		0.275 **		0.275 **	0.273 **
		(0.090)		(0.090)	(0.090)
Visit to healthcare					
No (Ref)		--		--	--
Yes		-0.930 ***		-0.933 ***	-0.931 ***
		(0.077)		(0.077)	(0.077)
Constant	0.338 ***	0.569 ***	0.368 ***	0.600 ***	0.596 ***
	(0.044)	(0.106)	(0.044)	(0.111)	(0.115)
R^2	0.0000	0.0392	0.0003	0.0398	0.0393
N	3,962	3,886	3,976	3,895	3,886

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

Standard error in parentheses

Source: Author's statistical calculation based on Indonesia Family Life Survey 2015.

The estimation of multivariate regression for objective health is presented in Table 4.4. Model 1 is the simplest model that regresses health insurance and objective health. There is a statistically significant association between health insurance and objective health with negative effect. Thus, older people who have health insurance are more likely to have more health problems (diagnosed by doctors or medical physicians) compared to those who are uninsured. Hypothesis 1a was therefore not proven on objective health, because older people with health insurance are more likely to experience chronic diseases compared to those without health insurance.

Model 2 is the regression of health insurance ownership and objective health controlled by various socio-economic characteristics. While the effect of health insurance on objective health remains negative after adding control variables, the size of the effect is smaller compared to Model 1. There are significant effects of age, educational attainment and visits to health care on objective health. Increasing age is related to the increasing risk of being less healthy. The oldest age group reported more chronic diseases than those in the younger age groups. A significant negative effect of educational attainment on objective health is also evident. The higher the level of education of older people, the higher their likelihood of experiencing a chronic disease. The other negative effect on objective health is found in visits to health care facilities. Those who had visited health care facilities in the previous four weeks were more likely to report chronic conditions than those who had not.

In Model 3, region as another proxy variable for access to health care was included. As observed in Table 4.4., those who are living in rural areas are less likely to report chronic conditions compared to those who are living in urban areas. The effect of region is also statistically significant. These findings contradict with Hypothesis 1b, that is, older Indonesians who have better access to health care facilities (because they live in urban areas) are healthier than those who have less access to health care facilities (because they live in rural areas). Adding socioeconomic characteristics (Model 4) did not yield a significant change in the effect of region on objective health, although the effect became smaller. For other control variables, there are no significant effects for gender, marital status, and cell phone ownership. There are statistically significant relationships of age, educational attainment, and visits to health care facilities with objective health. The oldest age group is more likely to report chronic conditions than those other younger age groups. In other words, the older a person is, he/she tends to report more chronic diseases. The results also show that older people with better education have a higher risk of living with chronic diseases than those with lower education. Also, those who had visited medical facilities in the last four weeks were more likely to report chronic conditions compared to those who had not. These results are reasonable because the more frequently older people visit health care facilities, the higher the probability of being diagnosed with chronic diseases.

The complete model (Model 5), which includes both predictor variables, shows that both predictor variables have a statistically significant association with objective health. However, the sign of the effect of these variables are different, i.e. negative effect for health insurance, and positive effect for region. Compared to the previous four models, the effect of both predictor variables is still the same. However, in the full model the effects decrease. In the full model, those who have health insurance are more likely to report chronic conditions compared to those who do not have health insurance, and, those who are living in rural areas are less likely to report chronic conditions than those living in urban areas. The signs and the statistical significance of the control variable in Model 5 remain the same as those in Models 2 and 4. The size of the effects of these control variables was also not statistically different compared to those in the previous model.

Table 4.4. Estimates of regression analyses on objective health of older Indonesian.

Healthy = 1; Unhealthy = 0	Objective health				
	Model 1	Model 2	Model 3	Model 4	Model 5
Predictor variables					
Insurance					
No (Ref)	--	--			--
Yes	-0.423 ***	-0.240 **			-0.186 *
	(0.085)	(0.090)			(0.091)
Region					
Urban (Ref)			--	--	--
Rural			0.565 ***	0.390 ***	0.350 ***
			(0.088)	(0.094)	(0.095)
Control variables					
Age group					
60-69 (Ref)		--		--	--
70-84		-0.448 ***		-0.447 ***	-0.445 ***
		(0.101)		(0.101)	(0.101)
85+		-0.751 ***		-0.766 ***	-0.760 ***
		(0.141)		(0.141)	(0.141)
Gender					
Male (Ref)		--		--	--
Female		-0.094		-0.094	-0.082
		(0.102)		(0.102)	(0.102)
Marital status					
Unmarried (Ref)		--		--	--
Married		0.171		0.132	0.152
		(0.103)		(0.103)	(0.103)
Educational attainment					
Unschooled or Under Primary School (Ref)		--		--	--
Primary school		-0.249 *		-0.209	-0.199
		(0.120)		(0.120)	(0.121)
Junior high school and above		-0.842 ***		-0.770 ***	-0.742 ***
		(0.119)		(0.120)	(0.122)
Cellphone ownership					
No (Ref)		--		--	--
Yes		-0.130		-0.125	-0.117 **
		(0.113)		(0.112)	(0.113)
Visit to healthcare					
No (Ref)		--		--	--
Yes		-0.507 ***		-0.521 ***	-0.503 ***
		(0.094)		(0.094)	(0.094)
Constant	1.792 ***	2.357 ***	1.347 ***	2.074 ***	2.147 ***
	(0.062)	(0.147)	(0.053)	(0.150)	(0.156)
R^2	0.0069	0.0401	0.0118	0.0426	0.0439
N	3,962	3,886	3,976	3,895	3,886

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

Standard error in parentheses

Source: Author's statistical calculation based on Indonesia Family Life Survey 2015.

Table 4.5. Estimates of regression analyses on functional health of older Indonesian.

Healthy = 1; Unhealthy = 0	Functional health				
	Model 1	Model 2	Model 3	Model 4	Model 5
Predictor variables					
Insurance					
No (Ref)	--	--			--
Yes	0.211 **	0.225 **			0.191 *
	(0.080)	(0.086)			(0.087)
Region					
Urban (Ref)			--	--	--
Rural			-0.192 *	-0.234 **	-0.202 *
			(0.079)	(0.087)	(0.088)
Control variables					
Age group					
60-69 (Ref)		--		--	--
70-84		-0.547 ***		-0.549 ***	-0.549 ***
		(0.096)		(0.096)	(0.096)
85+		-1.279 ***		-1.273 ***	-1.277 ***
		(0.124)		(0.124)	(0.124)
Gender					
Male (Ref)		--		--	--
Female		-0.429 ***		-0.438 ***	-0.436 ***
		(0.098)		(0.098)	(0.098)
Marital status					
Unmarried (Ref)		--		--	--
Married		0.265 **		0.284 **	0.278 **
		(0.096)		(0.096)	(0.096)
Educational attainment					
Unschooled or Under Primary School (Ref)		--		--	--
Primary school		0.058		0.025	0.028
		(0.115)		(0.115)	(0.116)
Junior high school and above		-0.353 **		-0.385 **	-0.415 ***
		(0.122)		(0.124)	(0.125)
Cellphone ownership					
No (Ref)		--		--	--
Yes		0.224		0.234 *	0.216
		(0.119)		(0.119)	(0.119)
Visit to healthcare					
No (Ref)		--		--	--
Yes		-0.467 ***		-0.461 ***	-0.471 ***
		(0.092)		(0.091)	(0.092)
Constant	1.269 ***	1.916 ***	1.446 ***	2.128 ***	2.047 ***
	(0.052)	(0.137)	(0.055)	(0.145)	(0.149)
R^2	0.0018	0.0605	0.0015	0.0613	0.0619
N	3,962	3,886	3,976	3,895	3,886

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

Standard error in parentheses

Source: Author's statistical calculation based on Indonesia Family Life Survey 2015.

Table 4.5. presents the multivariate regression analyses of the functional health of older Indonesians. As can be observed in Model 1, there is a significant effect of health insurance ownership on functional health. The odds of having no ADL problems for those who own insurance (insurance = 1) over the odds of reporting ADL problems for those who do not have health insurance (insurance = 0) is exp(0.211) = 1.24. That is, the odds of having no ADL problems for those who have health insurance are about 23.5% higher than the odds for those who do not own health insurance. In other words, those who own health insurance are less likely to report ADL problems compared to those who do not own health insurance. These facts confirms Hypothesis 1a, that is, older Indonesians who have health insurance (and thus assumed to have better access to health care) are more likely to live without difficulties in activity daily living (ADL). Adding the control variables as can be seen in Model 2 slightly increase the effect of health insurance on functional health. After adding control variables, the odds of having no ADL problems for those who have health insurance are about 25.2% higher than the odds for those who do not own health insurance. The only control variable that has no significant association with functional health is cell phone ownership. The other control variables, i.e., age, gender, marital status, educational attainment, and visits to health care facilities, have a statistically significant effect on functional health.

The second predictor variable, region, has a significant effect on functional health (Model 3). The odds of having no ADL problems for those who live in rural areas (rural = 1) over the odds of having no ADL problems for those who live in urban areas (rural = 0) is exp(-0.192) = 0.83. That is, the odds of having no ADL problems for those who live in rural areas are about 17.5% lower than the odds for those who live in urban areas. In other words, those who live in rural areas are more likely to have ADL problems compared to those who live in urban areas. These findings confirm Hypothesis 1b, that is, older Indonesians who live in urban areas (and thus assumed to have better access to health care) are more likely to live without difficulties in activity daily living (ADL). Adding the control variables, as can be seen in Model 4, slightly increases the effect of region on functional health. After adding control variables, the odds of having no ADL problems for those who live in rural areas are about 20.9% lower than the odds for those who live in urban areas. All control variables are statistically significant and the signs are consistent with the signs in Model 2.

In the complete model (Model 5), both health insurance and region have statistically significant association with functional health, and the effects of these variables are quite similar with the previous model. For the ownership of health insurance, the odds of reporting no ADL problems for those who have health insurance are about 21.0% higher than the odds for those who do not have health insurance. For those who live in rural areas, the odds of reporting no ADL problems are about 18.3% lower than the odds for those who live in urban areas. Thus, in all models both Hypotheses 1a and 1b are confirmed.

Among control variables, only cell phone ownership has no significant effect on functional health. Thus, there is no difference in ADL for those who own a cell phone and those who do not. The other control variables have a significant effect on functional health. For those who aged 70-84 years and aged 85+ years, the odds of reporting no ADL problems are respectively about 42.2% lower and 72.1% lower than those aged 60-69 years. Thus, increasing age increases the risk of difficulties in ADL. Females are more likely to report ADL problems compared to males, that is, the odds of reporting no ADL problems for females is about 35.3% lower compared to males. Thus, females are more susceptible to living with difficulties in ADL compared to males. Married persons are more likely to have no difficulties in ADL than unmarried persons. The odds of reporting ADL problems for married persons are about 32.0% higher than for unmarried persons. There is no difference in the odds of reporting ADL problems for those who finished primary school compared to those educated below primary school

level. But, the odds of reporting no ADL problems for those who finished junior high school and above are about 34.0% lower than those who are unschooled or educated to under primary school level. Those who visited health care facilities are more likely to report ADL problems compared to those who did not. The odds of reporting no ADL problems for those who visited health care facilities are about 37.6% lower than those who did not.

The comparison of three health measurements shows that there are different effects of predictor variables on each health indicator. First, there is no significant association between predictor variables and the subjective health status of older persons. Adding control variables into the model did not change the statistical significance of the predictor variables, although there is a change in the sign for health insurance ownership (from negative to positive). Thus, Hypotheses 1a and 1b are not confirmed when using subjective health as an indicator for the health status of older people. Although several control variables are found to have effects on the subjective health, the coefficient of the predictor variables remains not significant, and therefore Hypothesis 2 is not confirmed. However, the results show that age, cell phone ownership and visits to health care facilities have a significant effect on subjective health of older persons.

The second measurement for health status is objective health. The results show that the predictor variables are statistically significant for all models, but the sign of the coefficients were not as expected. Therefore, neither Hypothesis 1a nor Hypothesis 1b are confirmed. Furthermore, adding control variables reduces the level of significance of the predictor variables, although the coefficients are still statistically significant. To further explore the effect of control variables as the main predictor variables, Wald-test are utilised. The z-value presented in Appendix 2 shows that for Model 1 the z-value of insurance ownership is -4.98. Adding control variables in Model 2, the z-value for insurance ownership decreases to -2.68 and further decreases to -2.04 in the full model (Model 5). The same is the case for region variable, that is, the z-value is 6.43 in Model 3, decrease to 4.16 in Model 4 and further decreases to 3.67 in Model 5. Therefore, although age, educational attainment and visits to health care facilities have a significant effect on objective health, Hypothesis 2 is not confirmed, because adding control variables reduces the significance level of the predictor variables.

The regression results for the third measurement for health status show that both Hypotheses 1a and 1b are confirmed. That is, older Indonesians who have better access to health care facilities (because they have health insurance and because they live in urban areas) are healthier (in terms of ADL) than those who have less access to health care facilities. However, as the case of the second health indicator, adjusting predictor variables with control variables reduces the significance level of the predictor variables. The z-values for health insurance ownership for Model 1, Model 2 and Model 5 are 2.65, 2.61 and 2.19 respectively. The z-value for region slightly increases from -2.44 (Model 3) to -2.70 (Model 4), but decreases to -2.29 in Model 5. Therefore, Hypothesis 2 is not confirmed for the third health indicator. However, it should be noted that most of the coefficients for the control variables are statistically significant and therefore these control variables are associated with the health status of older persons, in particular doing daily living activities (ADL). Among the control variables, age, educational attainment and visits to health care facilities consistently have a statistically significant effect on all three health measurements. Therefore, age, educational attainment and visits to health care facilities are highly associated with the health status of older people.

Chapter 5

Discussion and Conclusion

This study examined the relationship between access to health care (in term of health insurance ownership and region) and health of older people in Indonesia. The main question was the extent to which access to health care (health insurance ownership and region) relates to the health of older people in Indonesia. To answer this question, three health measurements were analysed using five binary logistic regression models. This study used the 5th wave of IFLS data. From 16,204 households and 50,148 individuals that were interviewed, 3,976 respondents (7.9% of the total IFLS' sample) aged 60 years and older were selected for the analysis of this study. Chapter 1 described the issues studied in this thesis regarding the increasing number of older people and their health status. Access to health care is an important aspect that can determine the health of older people. However, not all older people have sufficient access to health care, for a number of reasons, which may affect health in old age. Subsequently, chapter 2 provided relevant theories and literature that were used for the analyses, and synthesized the hypotheses of this study. The methods and the operationalization of the concepts of this study were explained in Chapter 3. Chapter 4 described the empirical evidence of the study. This chapter presents the discussion related to the empirical results, followed by the summary and reflections on the results, and concludes with policy recommendation. The limitations of the study are also provided in this chapter.

5.1 Discussion

People's ability to access health care facilities is an important factor in staying healthy. For the case of Indonesia, based on IFLS5 data, there is no significant association between access to health care (in terms of health insurance ownership) and subjective health. The results are in contrast to the results of the existing studies (see for example Kasper et al., 2000; Wagstaff & Pradhan, 2003), which show a clear positive relationship between health insurance ownership and access to health care that affect health condition. Other studies found that there are differences of access to health care on uninsured people (Aday & Andersen , 1984; Freeman, et al., 1987; Hafner-Eaton, 1991; Spillman, 1992). On the other hand, a significant relationship of health insurance ownership was found to be the case for both objective health and functional health. However, the assumption of having health insurance related to healthy condition is not supported for objective health. In contrast, for the case of Indonesia, insured older people tend to report more chronic diseases than uninsured older people. This could be related to the fact that the doctor or medical physician diagnosis becomes the predominant factor in objective health measurement. It could also be related to the increasing intensity of visiting doctors as health insurance covers medical expenses. For the case of health as measured by ADL this study provides additional empirical support for the previous studies (see for example Hadley, 2003; and McFall & Yoder, 2012), which stated that health insurance could improve older people's health. The result for the third health measurement shows that insured older people are healthier (without difficulties in ADL) than those who are uninsured.

The second predictor variable, region, plays an important role associated with the health of older people. It is assumed that older people living in rural areas (thus with, less access to health care facilities) are more likely to be unhealthy than those living in urban areas. However, the results show that there is no significant effect of region on subjective health. Controlling with socioeconomic variables (i.e., age, gender, marital status and socioeconomic status), does not lead to an improvement in the coefficients for predicting subjective health, either in terms of size or significance level.

There is a significant effect of region on objective health, but the direction is opposite to the expected direction. In fact, the empirical evidence indicates strong associations between region and health. That is, older Indonesians who live in rural areas report fewer chronic diseases compared to those who live in urban areas. This finding might be counter intuitive at first, but given the definition of the health measurement, it could be true that those who are living in rural areas report fewer chronic diseases compared to those who live in urban areas. The limited health care facilities in rural areas (Pearson, 2000; Ladusingh & Ngangbam, 2016) may cause a late diagnosis of chronic disease for those living in rural areas, while due to easy access to health care facilities in urban areas the chronic disease might be diagnosed faster. Therefore, those who are living in rural areas are more likely to report fewer chronic diseases compared to those living in urban areas. For functional health indicator, there is a significant effect of region on the ability of ADL, therefore supporting Hypothesis 1b. Previous studies (e.g. Shengelia et al., 2005; Erlyana et al., 2011; McFall and Yoder, 2012) suggested that living in rural areas influences access to health care facilities related to health condition.

Although the socioeconomic characteristics (age, gender, marital status, and socioeconomic status) are not proven to be confounding variables of the access variables, these variables have different effects on the three health measurements. According to Dahlgren and Whitehead (2006), the socioeconomic background of older people also determines the health status. The effects of age on all three health measurements are consistently negative and statistically significant. The increasing age is related to the increasing risk of being unhealthy. This is in line with the findings of other studies (e.g. Christensen, et al., 2009; Gatimu, et al., 2016), which documented that increasing age is related to the risk of being unhealthy and having a disability. In addition, significant effects of gender and marital status are only found in terms of functional health. Older married people tend to live with fewer difficulties in ADL than unmarried people, and males have fewer difficulties in ADL than females. This is related to the higher life expectancy of females than males. Females loive longer, but are less healthy compared to males. This is in line with a previous study that found that the risk of females to have disability is higher than males (Gatimu, et al., 2016).

Using educational attainment as a proxy for socioeconomic status, a strong association was established for objective health and functional health. In contrast to what has been assumed, education has a negative effect. Those with junior high school and above tend to be unhealthier and have more difficulties in ADL compared to those with low education. It is known that those with better education are more likely to be healthy (WHO, 2008). However, this finding is in line with some other studies (Lachat, et al., 2013; Sobngwi, et al., 2002) that found educated people can be unhealthy due to life style, changing diet and job pressures. Another SES proxy, cellphone ownership, has a significant effects on subjective health, namely, that older people feel healthier if they have cell phones. This may be related to the ease of connectivity with their family through the use of cell phone.

Besides age, visits to health care facilities also has a stronger negative relation with the three health measurements compared to other control variables. Health care visits relate to the unhealthy condition of older people. These results are reasonable because the more frequently older people visit health care facilities, the more likely they are to be diagnosed with diseases by a doctor. Visits to health care facilities appeared to play an important role in explaining access to health care on objective health. Adding visits to health care facilities as a control variable was considered to gain insights into the reason behind why health insurance has a negative effect on objective health. Also, this variable has the largest effect compared to other variables. The negative results may be related to the fact that older people who own health insurance are more likely to visit health care facilities, and so have a greater probability of being diagnosed by the doctor.

From the data source perspective, the IFLS data collected from the longitudinal survey has unique information regarding health. However, there are limitations that need to be addressed in this study. First, this study only used the latest wave from all the IFLS that exist. Hence, it is difficult to capture the changes in access to health care facilities that may have occurred prior to the survey. Second, there are some other variables that are not included in this study, both access to health care variables and socioeconomic characteristics. Therefore, health of older people can also be attributed to unmeasured determinants. As an example, the data used in this study was collected when the National Health Insurance *Jaminan Kesehatan Nasional* or *JKN* (a program managed by Social Security Agency - *Badan Penyelenggara Jaminan Sosial* or BPJS) was started. Therefore, there is possible magnitude change of health on older people due to the increasing ownership of health insurance.

Despite these limitations, this study is an important step to gain better understanding of the ageing population and its challenges in Indonesia. Future research should consider the effect of health on older people after the JKN program was established.

5.2 Conclusion

The objective of this study was to identify the access of older people in Indonesia to health care (in terms of health insurance ownership and region) and how that related to their health. This study considered three health dimensions of older people as measurements i.e., subjective health, objective health, and functional health. In the following section, several conclusions can be made based on the findings.

Relationship between health insurance and health of older people

The first aspect looked at in this study that determines access to health care is health insurance. This study found that there is no significant relationship between health insurance and subjective health. For the objective health, older Indonesians who own health insurance report more chronic diseases than those who live without health insurance. For the functional health, those who are insured are less likely to have difficulties in ADL compared to those uninsured.

Relationship between region and health of older people

Region as another proxy for access to health care shows various associations with health status, depending on the definition of health indicator. For the subjective health, there is no significant relationship between region and health of older people. For objective health, those who are living in urban areas have more chronic diseases diagnosed by doctors or medical physicians. For functional health, the relationships of region and health status is in line with the existing theories and literatures that state older people who are living in rural areas are more likely to be unhealthy compared to those who are living in urban areas.

Among the enabling factors, age and visits to health care facilities are the most prominent variables that have strong effects on the health of older people. Increasing age and health care visits are related to unhealthy conditions. Based on the results, this study can also conclude that there is a correlation between visits to health care facilities and access to health care related to older people's health.

5.3 Recommendations

An ageing population offers challenges, especially regarding health issues. In order to face these challenges, this study shows that access to health care (in terms of health insurance and region) has a

relationship with health of older people. Health insurance is strongly related to the health of older people, in particular, the difficulties in ADL. Consequently, comprehensive coverage of health insurance to older people is important. The existing health insurance managed by the government should add particular services and facilities for older people. Since 2014, there has been a program called "National Health Insurance (*Jaminan Kesehatan Nasional* or JKN)" managed by the Indonesian government. This scheme should be extensively disseminated among older people in Indonesia. It is also necessary to pay attention to the poor who do not have enough money to pay the premium. The government should help them, to relieve the burden of health care costs. Future studies are necessary to gain more information regarding health insurance related to unhealthy condition. However, for those who report more chronic conditions, access to health insurance needs to be improved, to cover the health expenses due to chronic conditions that need medical attention.

The area of living should be considered as a priority when creating policies regarding older people. This study found that older people who are living in rural areas (thus with poor access to health care) are more likely to be unhealthy and have a disability than those who are living in urban areas. Therefore, it is important to focus on those who are living in rural areas. It may be related to the infrastructures and the availability of doctors or medical staff of health care in rural areas. The response should be different with older people in urban areas. Also it is suggested to ensure that health care facilities are accessible in all regions.

Besides considering improvements in access to health care, another crucial aspect is strengthening the awareness of society from a young age to prepare for old age through maintaining the quality of life, avoiding the destructive habits that can result in chronic diseases and disabilities. This is because socioeconomic characteristics also play an important role in older people's health. Hence, promoting a healthy life becomes an alternative solution for this problem.

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Appendices

Appendix 1

```
*Health1, general
*KK1 General health
*=================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
*variable KK02a KK02b.KK02c KK02i. KK02k. KK02l.
use pidlink kk02ax kk02a kk02bx kk02b kk02c kk02i kk02k kk02l using ///
"X:\My Desktop\Master Thesis\IFLS 5\hh14_all_dta\b3b_kk1.dta", clear
save generalhealth, replace
merge m:1 pidlink using "X:\My Desktop\Master Thesis\IFLS 5\health.dta"
keep if _merge>=2
drop _merge
save health, replace

*Health2, chronic
*CDnew
*=================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
*variable B3B_CD2, CD01, CD03
use pidlink cd01type cd01 using ///
"X:\My Desktop\Master Thesis\IFLS 5\hh14_all_dta\b3b_cd2.dta", clear
generate CDrecode = 1 if cd01==1
replace CDrecode = 0 if cd01!=1
collapse (sum) CDrecode, by(pidlink)
ren CDrecode CDnew
save CDnew, replace
merge m:1 pidlink using "X:\My Desktop\Master Thesis\IFLS 5\health.dta"
keep if _merge>=2
drop _merge
save health, replace

*Health3, ADL
*ADL new variable
*=================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
*variable B3B_KK03F, KK03M, KK03K,KK03KA, KK03KC
use pidlink kk3type kk03 using ///
"X:\My Desktop\Master Thesis\IFLS 5\hh14_all_dta\b3b_kk3.dta", clear
keep if kk3type=="F" | kk3type=="M" | kk3type=="K" | kk3type=="KA" | kk3type=="KC"
collapse (sum) kk03, by(pidlink)
ren kk03 ADLnew
save ADLnew, replace
merge m:1 pidlink using "X:\My Desktop\Master Thesis\IFLS 5\health.dta"
keep if _merge>=2
drop _merge
save health, replace


*Final data cleaning
*=================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
use "X:\My Desktop\Master Thesis\IFLS 5\data_table.dta", clear
ren dl03b cellphone
ren dl03d internetaccess
ren sc05 region


*recode dependent variables
*==========================

gen health1=1 if genhealth==1 | genhealth==2
replace health1=0 if genhealth==3 | genhealth==4
label variable health1 "Subbjective health"
label define health1 1 "Healthy" 0 "Unhealthy"
label values health1 health1
```

```
/*
   general |
    health |
recoded to |
         2 |        Generally how is your health?
categories | 1:Very he  2:Somewha  3:Somewha  4:Very un |     Total
-----------+--------------------------------------------+----------
 Unhealthy |         0          0      1,430        232 |     1,662
   Healthy |       431      1,883          0          0 |     2,314
-----------+--------------------------------------------+----------
     Total |       431      1,883      1,430        232 |     3,976
*/
gen health6=1 if CDgen==0
replace health6=0 if CDgen>=1 & CDgen <=4

label variable health6 "Objective health"
label define health6 1 "healthy" 0 "unhealthy"
label values health6 health6

/*
   Chronic |
 condition |  CDgen recoded to 2
degenerati |      categories
        ve |   unhealthy  healthy |     Total
-----------+----------------------+----------
         0 |         0      3,296 |     3,296
         1 |       580          0 |       580
         2 |        89          0 |        89
         3 |         9          0 |         9
         4 |         1          0 |         1
-----------+----------------------+----------
     Total |       679      3,296 |     3,975

*/

gen health7=1 if ADL==0
replace health7=0 if ADL>=5
label variable health7 "Functional health"
label define health7 1 "healthy" 0 "unhealthy"
label values health7 health7



*recode independent variables
*============================
*Insurance
*=================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
*variable B3B_cdtype cd05
use pidlink ak01 aktype ak02 ak04 using ///
"X:\My Desktop\Master Thesis\IFLS 5\hh14_all_dta\b3b_ak1.dta", clear
collapse (min) ak01, by(pidlink)
save ins_new, replace
merge 1:m pidlink using "X:\My Desktop\Master Thesis\IFLS 5\data_table.dta"
ren ak01 insurance
keep if _merge>=2
drop _merge
label variable insurance "Insurance"
replace insurance=0 if insurance==3
replace insurance=. if insurance==8
label define insurance 0 "0. No" 1 "1. Yes"
label values insurance insurance
save data_table_insurance, replace

*region
*=================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
*variable SC05 Book K
use hhid14 sc05  using ///
"X:\My Desktop\Master Thesis\IFLS 5\hh14_all_dta\bk_sc1.dta", clear
save region, replace
merge 1:m hhid14 using "X:\My Desktop\Master Thesis\IFLS 5\health.dta"
keep if _merge==3
drop _merge
save health, replace

*age and gender
```

```
cd "X:\My Desktop\Master Thesis\IFLS 5\"
use hhid14 pid14 pidlink ar07 ar09 using "X:\00-IFLS Data\IFLS5(04082016)\HH Data\bk_ar1.dta",
clear
save sex&age_01, replace
gen kelum=1 if ar09>=60 & ar09<=64 /*(usia dari 60 sampai 64)*/
replace kelum=2 if ar09>=65 & ar09<=69
replace kelum=3 if ar09>=70 & ar09<=74
replace kelum=4 if ar09>=75 & ar09<=79
replace kelum=5 if ar09>=80 & ar09<=84
replace kelum=6 if ar09>=85 & ar09<=89
replace kelum=7 if ar09>=90 & ar09<=94
replace kelum=8 if ar09>=95 & ar09<=99
replace kelum=9 if ar09>=100 & ar09<=104
replace kelum=10 if ar09>=105 & ar09<=109
replace kelum=11 if ar09>=110 & ar09<=114
label define agegrp 1 "60-64" 2 "65-69" 3 "70-74" 4 "75-79" 5 "80-84" ///
       6 "85-89" 7 "90-94" 8 "95-99" 9 "100-104" 10 "105-109" 11 "110+"
label value kelum agegrp
label var kelum "Age Group"
*labeling variable sex
label define sex 1 "Male" 3 "Female"
label value ar07 sex
save sex&age_01, replace

*marital status
use sex&age_02, clear

/*
. tab ar13

     Marital |
      status |      Freq.     Percent        Cum.
-------------+-----------------------------------
 1:Unmarried |         48        0.90        0.90 = never married
   2:Married |      3,011       56.46       57.36
 3:Separated |         12        0.23       57.58 = pisah
  4:Divorced |        176        3.30       60.89 = cerai hidup
     5:Widow |      2,082       39.04       99.92 = cerai mati
8:Don't know |          4        0.08      100.00
-------------+-----------------------------------
       Total |      5,333      100.00
*/

gen marst=1 if ar13==2
replace marst=2 if ar13==1 | (ar13>=3 & ar13<=5)


*educational attainment
*1) tidak sekolah + under SD
gen educ=1 if ar16==1
replace educ=1 if (ar16==2 & (ar17<7 | ar17==98 | ar17==99)) /*ar17=7 artinya lulus*/ ///
       | (ar16==11  & (ar17<7 | ar17==98 | ar17==99)) | (ar16==72  & (ar17<7 | ar17==98 |
ar17==99))
*2) Lulus SD
replace educ=2 if (ar16==2 & ar17==7) /*ar17=7 artinya lulus*/ | (ar16==11  & ar17==7) ///
       | (ar16==72  & ar17==7)
replace educ=3 if (ar16==3 & (ar17<7 | ar17==98 | ar17==99)) | (ar16==4 & (ar17<7 | ar17==98 |
ar17==99)) ///
       | (ar16==12 & (ar17<7 | ar17==98 | ar17==99)) |  (ar16==14 & (ar17<7 | ar17==98 |
ar17==99)) ///
       | (ar16==73 & (ar17<7 | ar17==98 | ar17==99))
*3) Minimal lulus SMP
replace educ=3 if (ar16==3 & ar17==7) | (ar16==4 & ar17==7) | (ar16==12 & ar17==7) |  ///
       (ar16==14 & ar17==7) | (ar16==73 & ar17==7)
*pesantren masuk SMP
replace educ=3 if ar16==5 | ar16==6 | ar16==15 | (ar16>=60 & ar16<=63) | ar16==74

/*
. ta ar16 educ, m

 HHM highest level of |                    educ
            education |         1          2          3          . |     Total
----------------------+--------------------------------------------+----------
         1:Unschooled |     1,238          0          0          0 |     1,238
       2:Grade school |     1,559      1,101          0          0 |     2,660
   3:General jr. high |         0          0        373          0 |       373
4:Vocational jr. high |         0          0         40          0 |        40
```

```
5:General sr. high (S |         0          0        266          0 |       266
6:Vocational sr. high |         0          0        196          0 |       196
       11:Education A |         1          4          0          0 |         5
       12:Education B |         0          0          3          0 |         3
14:Moslem School (Pes |         0          0          7          0 |         7
       15:Education C |         0          0          2          0 |         2
60:Diploma (D1, D2, D |         0          0        122          0 |       122
     61:University S1 |         0          0        123          0 |       123
     62:University S2 |         0          0         16          0 |        16
     63:University S3 |         0          0          3          0 |         3
72:Madrasah Ibtidaiya |        30         21          0          0 |        51
73:Madrasah Tsanawiya |         0          0         35          0 |        35
   74:Madrasah Aliyah |         0          0         25          0 |        25
            95:Other |         0          0          0          8 |         8
         98:Don't know |         0          0          0        158 |       158
            99:Missing |         0          0          0          2 |         2
----------------------+-----------------------------------------+----------
                Total |     2,828      1,126      1,211        168 |     5,333

*/

*mengganti nama variabel
rename ar07 sex

save marr_edu_01, replace
*============================

*cellphone
*=========
cd "X:\My Desktop\Master Thesis\IFLS 5\"
use "X:\My Desktop\Master Thesis\IFLS 5\data_table_insurance.dta", clear
replace cell=0 if cell==3
label define cell 0 "0. No" 1 "1. Yes"
label values cell cell
save "X:\My Desktop\Master Thesis\IFLS 5\data_final_regression.dta", replace

*visit to health care
*====================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
*variable B3B_RJ00a, B3B_RJ00
use pidlink rj00a rj00 using ///
"X:\My Desktop\Master Thesis\IFLS 5\hh14_all_dta\b3b_rj0.dta", clear
ren rj00 visitcare
save healthc1, replace
merge m:1 pidlink using "X:\My Desktop\Master Thesis\IFLS 5\data_final_regression.dta"
keep if _merge>=2
drop _merge
replace visitcare=0 if visitcare==3
replace visitcare=. if visitcare==8
replace visitcare=1 if visitcare==1
label define rj00 1 "1:Yes" 0 "0: No", replace
save data_final_regression, replace


*Final regression
*=================
cd "X:\My Desktop\Master Thesis\IFLS 5\"
use "X:\My Desktop\Master Thesis\IFLS 5\data_table_insurance.dta", clear
set more off

replace cell=0 if cell==3
label define cell 0 "0. No" 1 "1. Yes"
label values cell cell

save "X:\My Desktop\Master Thesis\IFLS 5\data_final_regression.dta", replace

log using "X:\My Desktop\Master Thesis\IFLS 5\20170616 - final regression tables ", replace


/*Regression
Model 1 Health1*/

logit health1 i.insurance
estimates store m1h1, title(Model 1 Health1)

/*Model 2 Health1 */
logit health1 i.insurance i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
```

```
estimates store m2h1, title(Model 2 Health1)

/*Model 3 Health1
*/
logit health1 i.region
estimates store m3h1, title(Model 3 Health1)

/*Model 4 Health1 */
logit health1 i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m4h1, title(Model 4 Health1)

/*Model 5 Health1 */
logit health1 i.insurance i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m5h1, title(Model 5 Health1)

estout * , replace label nonumber ///
                            title("Models of Health1") ///
                                                  cells(b(star fmt(%9.3f)) se(par))     ///
                                                  stats(N, fmt(%9.0g) ) legend          ///
                                                  collabels(none) varlabels(_cons Constant)

esttab * using 20170616-health1.csv, replace label nonumber ///
                            title("Models of Health1") ///
                                                  mtitle("Model 1" "Model 2" "Model 3" "Model
4" "Model 5" ) ///
                                                  nogap onecell   cells(b(star fmt(%9.3f))
se(par))     ///
                                                  stats(N, fmt(%9.0g) ) legend          ///
                                                  collabels(none) varlabels(_cons Constant)
estimates clear

/* ==================Model Health1 done==========*/



/*Model 1 Health6
*/

logit health6 i.insurance
estimates store m1h6, title(Model 1 Health6)

/*Model 2 Health6 */
logit health6 i.insurance i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m2h6, title(Model 2 Health6)

/*Model 3 Health6
*/
logit health6 i.region
estimates store m3h6, title(Model 3 Health6)

/*Model 4 Health6 */
logit health6 i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m4h6, title(Model 4 Health6)

/*Model 5 Health6 */
logit health6 i.insurance i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m5h6, title(Model 5 Health6)

estout * , replace label nonumber ///
                            title("Models of Health6") ///
                                                  cells(b(star fmt(%9.3f)) se(par))     ///
                                                  stats(N, fmt(%9.0g) ) legend          ///
                                                  collabels(none) varlabels(_cons Constant)

esttab * using 20170616-health6.csv, replace label nonumber ///
                            title("Models of Health6") ///
                                                  mtitle("Model 1" "Model 2" "Model 3" "Model
4" "Model 5" ) ///
                                                  nogap onecell   cells(b(star fmt(%9.3f))
se(par))     ///
                                                  stats(N, fmt(%9.0g) ) legend          ///
                                                  collabels(none) varlabels(_cons Constant)
estimates clear

/* ==================Model Health6 done==========*/
```

```
/*Model 1 Health7*/

logit health7 i.insurance
estimates store m1h7, title(Model 1 Health7)

/*Model 2 Health7 */
logit health7 i.insurance i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m2h7, title(Model 2 Health7)

/*Model 3 Health7
*/
logit health7 i.region
estimates store m3h7, title(Model 3 Health7)

/*Model 4 Health7 */
logit health7 i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m4h7, title(Model 4 Health7)

/*Model 5 Health7 */
logit health7 i.insurance i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare
estimates store m5h1, title(Model 5 Health7)

estout * , replace label nonumber ///
                            title("Models of Health7") ///
                                                    cells(b(star fmt(%9.3f)) se(par))     ///
                                                    stats(N, fmt(%9.0g) ) legend          ///
                                                    collabels(none) varlabels(_cons Constant)

esttab * using 20170616-health7.csv, replace label nonumber ///
                            title("Models of Health7") ///
                                                    mtitle("Model 1" "Model 2" "Model 3" "Model
4" "Model 5" ) ///
                                                    nogap onecell   cells(b(star fmt(%9.3f))
se(par))     ///
                                                    stats(N, fmt(%9.0g) ) legend          ///
                                                    collabels(none) varlabels(_cons Constant)
estimates clear


pwcorr health1 health6 health7 insurance region agegroup sex maritalstat education cell
visitcare, obs star(0.01)

log close

use "X:\My Desktop\Master Thesis\IFLS 5\data_final_regression.dta"
ta visitcare health1, row chi
ta visitcare health6, row chi
ta visitcare health7, row chi
ta educ health1, row chi
ta educ health6, row chi
ta educ health7, row chi
ta educ insurance, ro chi
ta visitcare insurance, row chi
```

Appendix 2

```
. logit health1 i.insurance

Iteration 0:   log likelihood = -2691.0198
Iteration 1:   log likelihood = -2691.0186
Iteration 2:   log likelihood = -2691.0186

Logistic regression                             Number of obs     =      3,962
                                                LR chi2(1)        =       0.00
                                                Prob > chi2       =     0.9610
Log likelihood = -2691.0186                     Pseudo R2         =     0.0000

------------------------------------------------------------------------------
     health1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   insurance |
     1. Yes  |  -.0031582   .0646256    -0.05   0.961     -.129822    .1235056
       _cons |   .3377613   .0439752     7.68   0.000     .2515714    .4239512
------------------------------------------------------------------------------
```

```
. logit health1 i.insurance i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -2638.6135
Iteration 1:   log likelihood = -2535.3037
Iteration 2:   log likelihood =  -2535.142
Iteration 3:   log likelihood =  -2535.142

Logistic regression                             Number of obs     =      3,886
                                                LR chi2(9)        =     206.94
                                                Prob > chi2       =     0.0000
Log likelihood =  -2535.142                     Pseudo R2         =     0.0392

------------------------------------------------------------------------------
             health1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
---------------------+--------------------------------------------------------
           insurance |
             1. Yes  |   .0077943   .0689312     0.11   0.910    -.1273084     .142897
                     |
            agegroup |
               70-84 |  -.1005076   .0771261    -1.30   0.193     -.251672    .0506568
                 85+ |  -.4978316   .1109318    -4.49   0.000    -.7152539   -.2804093
                     |
                 sex |
              Female |  -.0903296   .0775129    -1.17   0.244     -.242252    .0615928
                     |
         maritalstat |
             Married |    .056945   .0788142     0.72   0.470    -.0975281    .2114181
                     |
           education |
      Primary school |   .0505211   .0888146     0.57   0.569    -.1235524    .2245946
Junior high school and above |   .1777341    .097402     1.82   0.068    -.0131703    .3686386
                     |
           cellphone |
             1. Yes  |   .2748413   .0899061     3.06   0.002     .0986286    .4510539
                     |
           visitcare |
              1:Yes  |  -.9297772   .0772137   -12.04   0.000    -1.081113   -.7784412
               _cons |   .5690535    .106342     5.35   0.000      .360627    .7774799
------------------------------------------------------------------------------
```

```
. logit health1 i.region

Iteration 0:   log likelihood = -2702.2522
Iteration 1:   log likelihood = -2701.4902
Iteration 2:   log likelihood = -2701.4902

Logistic regression                             Number of obs     =      3,976
                                                LR chi2(1)        =       1.52
                                                Prob > chi2       =     0.2170
Log likelihood = -2701.4902                     Pseudo R2         =     0.0003
```

health1	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
region						
2:Rural	-.0796356	.0645034	-1.23	0.217	-.20606	.0467887
_cons	.3676374	.0438537	8.38	0.000	.2816857	.453589

```
. logit health1 i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -2646.1565
Iteration 1:   log likelihood = -2540.9351
Iteration 2:   log likelihood = -2540.7676
Iteration 3:   log likelihood = -2540.7676

Logistic regression                             Number of obs     =      3,895
                                                LR chi2(9)        =     210.78
                                                Prob > chi2       =     0.0000
Log likelihood = -2540.7676                     Pseudo R2         =     0.0398
```

health1	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
region						
2:Rural	-.0421873	.0700171	-0.60	0.547	-.1794183	.0950437
agegroup						
70-84	-.1039834	.0770182	-1.35	0.177	-.2549363	.0469696
85+	-.512353	.1106608	-4.63	0.000	-.7292443	-.2954617
sex						
Female	-.0983375	.0774192	-1.27	0.204	-.2500764	.0534014
maritalstat						
Married	.0579352	.0787847	0.74	0.462	-.09648	.2123504
education						
Primary school	.044475	.0893494	0.50	0.619	-.1306466	.2195965
Junior high school and above	.16338	.0988133	1.65	0.098	-.0302906	.3570505
cellphone						
1. Yes	.275337	.0898936	3.06	0.002	.0991488	.4515253
visitcare						
1:Yes	-.9325331	.0769381	-12.12	0.000	-1.083329	-.7817371
_cons	.6000595	.1112944	5.39	0.000	.3819264	.8181925

```
. logit health1 i.insurance i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -2638.6135
Iteration 1:   log likelihood = -2535.1264
Iteration 2:   log likelihood = -2534.9638
Iteration 3:   log likelihood = -2534.9638

Logistic regression                             Number of obs     =      3,886
                                                LR chi2(10)       =     207.30
                                                Prob > chi2       =     0.0000
Log likelihood = -2534.9638                     Pseudo R2         =     0.0393
```

health1	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
insurance						
1. Yes	.0012705	.0697952	0.02	0.985	-.1355255	.1380665
region						
2:Rural	-.0423836	.0709894	-0.60	0.550	-.1815202	.096753
agegroup						
70-84	-.1007021	.0771287	-1.31	0.192	-.2518715	.0504673
85+	-.4970787	.1109529	-4.48	0.000	-.7145424	-.2796149
sex						
Female	-.0916402	.0775467	-1.18	0.237	-.2436289	.0603485
maritalstat						
Married	.0596772	.0789467	0.76	0.450	-.0950555	.21441
education						
Primary school	.0443485	.0894193	0.50	0.620	-.13091	.2196071
Junior high school and above	.1650234	.0997151	1.65	0.098	-.0304146	.3604614
cellphone						
1. Yes	.2729031	.08997	3.03	0.002	.0965651	.4492412
visitcare						
1:Yes	-.9308517	.0772429	-12.05	0.000	-1.082245	-.7794584
_cons	.59555	.1152765	5.17	0.000	.3696122	.8214879

```
. estout * , replace label nonumber ///
>                            title("Models of Health1") ///
>                                                       cells(b(star fmt(%9.3f)) se(par))     ///
>                                                       stats(N, fmt(%9.0g) ) legend          ///
>                                                       collabels(none) varlabels(_cons Constant)
```

Models of Health1

	Model 1 He~1	Model 2 He~1	Model 3 He~1	Model 4 He~1	Model 5 He~1
general health rec~e					
0. No	0.000	0.000			0.000
	(.)	(.)			(.)
1. Yes	-0.003	0.008			0.001
	(0.065)	(0.069)			(0.070)
60-69		0.000		0.000	0.000
		(.)		(.)	(.)
70-84		-0.101		-0.104	-0.101
		(0.077)		(0.077)	(0.077)
85+		-0.498***		-0.512***	-0.497***
		(0.111)		(0.111)	(0.111)
Male		0.000		0.000	0.000
		(.)		(.)	(.)
Female		-0.090		-0.098	-0.092
		(0.078)		(0.077)	(0.078)
Unmarried		0.000		0.000	0.000
		(.)		(.)	(.)
Married		0.057		0.058	0.060
		(0.079)		(0.079)	(0.079)
Unschooled or Unde~o		0.000		0.000	0.000
		(.)		(.)	(.)
Primary school		0.051		0.044	0.044
		(0.089)		(0.089)	(0.089)
Junior high school~e		0.178		0.163	0.165
		(0.097)		(0.099)	(0.100)
0. No		0.000		0.000	0.000
		(.)		(.)	(.)
1. Yes		0.275**		0.275**	0.273**
		(0.090)		(0.090)	(0.090)
0: No		0.000		0.000	0.000
		(.)		(.)	(.)
1:Yes		-0.930***		-0.933***	-0.931***
		(0.077)		(0.077)	(0.077)
1:Urban			0.000	0.000	0.000
			(.)	(.)	(.)
2:Rural			-0.080	-0.042	-0.042
			(0.065)	(0.070)	(0.071)
Constant	0.338***	0.569***	0.368***	0.600***	0.596***
	(0.044)	(0.106)	(0.044)	(0.111)	(0.115)
N	3962	3886	3976	3895	3886

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

```
. logit health6 i.insurance

Iteration 0:   log likelihood = -1810.1164
Iteration 1:   log likelihood = -1797.6891
Iteration 2:   log likelihood = -1797.6284
Iteration 3:   log likelihood = -1797.6284

Logistic regression                             Number of obs     =      3,962
                                                LR chi2(1)        =      24.98
                                                Prob > chi2       =     0.0000
Log likelihood = -1797.6284                     Pseudo R2         =     0.0069
```

health6	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
insurance						
1. Yes	-.4230927	.084911	-4.98	0.000	-.5895153	-.2566701
_cons	1.791759	.0619493	28.92	0.000	1.670341	1.913178

```
. logit health6 i.insurance i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -1773.7603
Iteration 1:   log likelihood = -1704.9582
Iteration 2:   log likelihood = -1702.6971
Iteration 3:   log likelihood = -1702.6953
Iteration 4:   log likelihood = -1702.6953

Logistic regression                             Number of obs     =      3,886
                                                LR chi2(9)        =     142.13
                                                Prob > chi2       =     0.0000
Log likelihood = -1702.6953                     Pseudo R2         =     0.0401
```

health6	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
insurance						
1. Yes	-.2404802	.0898744	-2.68	0.007	-.4166308	-.0643297
agegroup						
70-84	-.448448	.1010961	-4.44	0.000	-.6465928	-.2503033
85+	-.7510309	.1408763	-5.33	0.000	-1.027143	-.4749184
sex						
Female	-.0941677	.1015299	-0.93	0.354	-.2931627	.1048273
maritalstat						
Married	.17147	.1026184	1.67	0.095	-.0296584	.3725984
education						
Primary school	-.2488785	.1198547	-2.08	0.038	-.4837894	-.0139676
Junior high school and above	-.8416131	.1191575	-7.06	0.000	-1.075157	-.6080687
cellphone						
1. Yes	-.1296416	.1126368	-1.15	0.250	-.3504058	.0911226
visitcare						
1:Yes	-.5068123	.0940717	-5.39	0.000	-.6911894	-.3224352
_cons	2.356887	.146584	16.08	0.000	2.069588	2.644187

```
. logit health6 i.region

Iteration 0:   log likelihood = -1817.4789
Iteration 1:   log likelihood = -1796.2742
Iteration 2:   log likelihood = -1796.0883
Iteration 3:   log likelihood = -1796.0883

Logistic regression                             Number of obs     =      3,976
                                                LR chi2(1)        =      42.78
                                                Prob > chi2       =     0.0000
Log likelihood = -1796.0883                     Pseudo R2         =     0.0118
```

health6	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
region						
2:Rural	.5652355	.0878768	6.43	0.000	.3930003	.7374708
_cons	1.346668	.0532736	25.28	0.000	1.242254	1.451082

```
. logit health6 i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -1778.6071
Iteration 1:   log likelihood = -1705.2397
Iteration 2:   log likelihood = -1702.7626
Iteration 3:   log likelihood = -1702.7601
Iteration 4:   log likelihood = -1702.7601

Logistic regression                             Number of obs     =      3,895
                                                LR chi2(9)        =     151.69
                                                Prob > chi2       =     0.0000
Log likelihood = -1702.7601                     Pseudo R2         =     0.0426
```

health6	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
region						
2:Rural	.3903993	.0939343	4.16	0.000	.2062914	.5745071
agegroup						
70-84	-.4467286	.1011349	-4.42	0.000	-.6449494	-.2485079
85+	-.765778	.1407072	-5.44	0.000	-1.041559	-.489997
sex						
Female	-.0941803	.1015463	-0.93	0.354	-.2932073	.1048467
maritalstat						
Married	.1324329	.1028088	1.29	0.198	-.0690686	.3339345
education						
Primary school	-.2088338	.1203641	-1.74	0.083	-.4447432	.0270755
Junior high school and above	-.7695197	.1204978	-6.39	0.000	-1.005691	-.5333485
cellphone						
1. Yes	-.1254597	.1123858	-1.12	0.264	-.3457318	.0948123
visitcare						
1:Yes	-.5205636	.093643	-5.56	0.000	-.7041005	-.3370267
_cons	2.074043	.1503642	13.79	0.000	1.779335	2.368752

```
. logit health6 i.insurance i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -1773.7603
Iteration 1:   log likelihood = -1698.4744
Iteration 2:   log likelihood =  -1695.874
Iteration 3:   log likelihood = -1695.8714
Iteration 4:   log likelihood = -1695.8714

Logistic regression                             Number of obs     =      3,886
                                                LR chi2(10)       =     155.78
                                                Prob > chi2       =     0.0000
Log likelihood = -1695.8714                     Pseudo R2         =     0.0439
```

health6	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
insurance						
1. Yes	-.1857445	.0911762	-2.04	0.042	-.3644465	-.0070425
region						
2:Rural	.3501087	.0953444	3.67	0.000	.1632372	.5369803
agegroup						
70-84	-.4454377	.1012857	-4.40	0.000	-.6439541	-.2469213
85+	-.7597919	.1412079	-5.38	0.000	-1.036554	-.4830296
sex						
Female	-.0816533	.1017912	-0.80	0.422	-.2811603	.1178538
maritalstat						
Married	.152266	.1030707	1.48	0.140	-.0497488	.3542808
education						
Primary school	-.1986316	.1207602	-1.64	0.100	-.4353172	.0380541
Junior high school and above	-.7416288	.1218538	-6.09	0.000	-.9804578	-.5027998
cellphone						
1. Yes	-.1167335	.1126867	-1.04	0.300	-.3375953	.1041283
visitcare						
1:Yes	-.5029872	.094254	-5.34	0.000	-.6877217	-.3182527
_cons	2.147266	.1560965	13.76	0.000	1.841323	2.45321

```
>                           title("Models of Health6") ///
>                                                      cells(b(star fmt(%9.3f)) se(par))     ///
>                                                      stats(N, fmt(%9.0g) ) legend          ///
>                                                      collabels(none) varlabels(_cons Constant)
```

Models of Health6

	Model 1 He~6	Model 2 He~6	Model 3 He~6	Model 4 He~6	Model 5 He~6
CDgen recoded to 2~s					
0. No	0.000	0.000			0.000
	(.)	(.)			(.)
1. Yes	-0.423***	-0.240**			-0.186*
	(0.085)	(0.090)			(0.091)
60-69		0.000		0.000	0.000
		(.)		(.)	(.)
70-84		-0.448***		-0.447***	-0.445***
		(0.101)		(0.101)	(0.101)
85+		-0.751***		-0.766***	-0.760***
		(0.141)		(0.141)	(0.141)
Male		0.000		0.000	0.000
		(.)		(.)	(.)
Female		-0.094		-0.094	-0.082
		(0.102)		(0.102)	(0.102)
Unmarried		0.000		0.000	0.000
		(.)		(.)	(.)
Married		0.171		0.132	0.152
		(0.103)		(0.103)	(0.103)
Unschooled or Unde~o		0.000		0.000	0.000
		(.)		(.)	(.)
Primary school		-0.249*		-0.209	-0.199
		(0.120)		(0.120)	(0.121)
Junior high school~e		-0.842***		-0.770***	-0.742***
		(0.119)		(0.120)	(0.122)
0. No		0.000		0.000	0.000
		(.)		(.)	(.)
1. Yes		-0.130		-0.125	-0.117
		(0.113)		(0.112)	(0.113)
0: No		0.000		0.000	0.000
		(.)		(.)	(.)
1:Yes		-0.507***		-0.521***	-0.503***
		(0.094)		(0.094)	(0.094)
1:Urban			0.000	0.000	0.000
			(.)	(.)	(.)
2:Rural			0.565***	0.390***	0.350***
			(0.088)	(0.094)	(0.095)
Constant	1.792***	2.357***	1.347***	2.074***	2.147***
	(0.062)	(0.147)	(0.053)	(0.150)	(0.156)
N	3962	3886	3976	3895	3886

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

```
. logit health7 i.insurance

Iteration 0:   log likelihood = -2002.6669
Iteration 1:   log likelihood = -1999.1319
Iteration 2:   log likelihood = -1999.1284
Iteration 3:   log likelihood = -1999.1284

Logistic regression                             Number of obs     =      3,962
                                                LR chi2(1)        =       7.08
                                                Prob > chi2       =     0.0078
Log likelihood = -1999.1284                     Pseudo R2         =     0.0018

------------------------------------------------------------------------------
     health7 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   insurance |
     1. Yes  |   .2114209   .0797113     2.65   0.008     .0551896    .3676522
       _cons |   1.268846   .0523772    24.23   0.000     1.166188    1.371503
------------------------------------------------------------------------------
```

```
. logit health7 i.insurance i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -1949.8201
Iteration 1:   log likelihood = -1837.2793
Iteration 2:   log likelihood = -1831.8222
Iteration 3:   log likelihood = -1831.8167
Iteration 4:   log likelihood = -1831.8167

Logistic regression                             Number of obs     =      3,886
                                                LR chi2(9)        =     236.01
                                                Prob > chi2       =     0.0000
Log likelihood = -1831.8167                     Pseudo R2         =     0.0605
```

health7	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
insurance						
1. Yes	.2245731	.0859964	2.61	0.009	.0560233	.3931229
agegroup						
70-84	-.546913	.0961467	-5.69	0.000	-.7353571	-.3584688
85+	-1.278732	.1239584	-10.32	0.000	-1.521686	-1.035778
sex						
Female	-.4289634	.0982974	-4.36	0.000	-.6216229	-.236304
maritalstat						
Married	.2646365	.0960134	2.76	0.006	.0764538	.4528192
education						
Primary school	.0581983	.1149105	0.51	0.613	-.1670222	.2834187
Junior high school and above	-.3527268	.1217466	-2.90	0.004	-.5913457	-.1141079
cellphone						
1. Yes	.2241608	.118701	1.89	0.059	-.0084889	.4568105
visitcare						
1:Yes	-.4672182	.091732	-5.09	0.000	-.6470095	-.2874269
_cons	1.916118	.1371606	13.97	0.000	1.647288	2.184948

```
. logit health7 i.region

Iteration 0:   log likelihood = -2016.7424
Iteration 1:   log likelihood = -2013.7823
Iteration 2:   log likelihood = -2013.7799
Iteration 3:   log likelihood = -2013.7799

Logistic regression                             Number of obs     =      3,976
                                                LR chi2(1)        =       5.93
                                                Prob > chi2       =     0.0149
Log likelihood = -2013.7799                     Pseudo R2         =     0.0015
```

health7	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
region						
2:Rural	-.1915327	.078656	-2.44	0.015	-.3456956	-.0373697
_cons	1.446058	.0548945	26.34	0.000	1.338467	1.553649

```
. logit health7 i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -1960.1066
Iteration 1:   log likelihood = -1845.3693
Iteration 2:   log likelihood = -1839.8644
Iteration 3:   log likelihood = -1839.8586
Iteration 4:   log likelihood = -1839.8586

Logistic regression                             Number of obs     =      3,895
                                                LR chi2(9)        =     240.50
                                                Prob > chi2       =     0.0000
Log likelihood = -1839.8586                     Pseudo R2         =     0.0613
```

health7	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
region						
2:Rural	-.2336768	.0865637	-2.70	0.007	-.4033385	-.0640152
agegroup						
70-84	-.548803	.0958471	-5.73	0.000	-.7366598	-.3609462
85+	-1.273438	.1235385	-10.31	0.000	-1.515569	-1.031307
sex						
Female	-.4383527	.0980302	-4.47	0.000	-.6304884	-.2462169
maritalstat						
Married	.2835542	.0957434	2.96	0.003	.0959006	.4712077
education						
Primary school	.0250398	.1153709	0.22	0.828	-.2010831	.2511627
Junior high school and above	-.3850885	.1238054	-3.11	0.002	-.6277427	-.1424344
cellphone						
1. Yes	.2339298	.1187236	1.97	0.049	.0012359	.4666237
visitcare						
1:Yes	-.4605267	.0910789	-5.06	0.000	-.6390379	-.2820154
_cons	2.128175	.1448403	14.69	0.000	1.844293	2.412057

```
. logit health7 i.insurance i.region i.agegroup i.sex i.maritalstat i.education i.cell i.visitcare

Iteration 0:   log likelihood = -1949.8201
Iteration 1:   log likelihood = -1834.7865
Iteration 2:   log likelihood = -1829.2018
Iteration 3:   log likelihood = -1829.1959
Iteration 4:   log likelihood = -1829.1959

Logistic regression                             Number of obs     =      3,886
                                                LR chi2(10)       =     241.25
                                                Prob > chi2       =     0.0000
Log likelihood = -1829.1959                     Pseudo R2         =     0.0619
```

health7	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
insurance						
1. Yes	.1909341	.0872868	2.19	0.029	.0198551	.3620132
region						
2:Rural	-.2017116	.0881261	-2.29	0.022	-.3744355	-.0289877
agegroup						
70-84	-.549284	.0962125	-5.71	0.000	-.7378571	-.360711
85+	-1.276544	.1241055	-10.29	0.000	-1.519786	-1.033302
sex						
Female	-.436174	.0983984	-4.43	0.000	-.6290314	-.2433167
maritalstat						
Married	.2783635	.0961935	2.89	0.004	.0898276	.4668994
education						
Primary school	.0282317	.1157468	0.24	0.807	-.1986279	.2550913
Junior high school and above	-.4149826	.1250697	-3.32	0.001	-.6601146	-.1698505
cellphone						
1. Yes	.2155006	.1189172	1.81	0.070	-.0175728	.448574
visitcare						
1:Yes	-.4712515	.0918488	-5.13	0.000	-.6512718	-.2912312
_cons	2.046697	.1493301	13.71	0.000	1.754015	2.339378

```
. estout * , replace label nonumber ///
>                            title("Models of Health7") ///
>                                                       cells(b(star fmt(%9.3f)) se(par))     ///
>                                                       stats(N, fmt(%9.0g) ) legend          ///
>                                                       collabels(none) varlabels(_cons Constant)
```

Models of Health7

	Model 1 He~7	Model 2 He~7	Model 3 He~7	Model 4 He~7	Model 5 He~7
ADL recoded to 3 c~s					
0. No	0.000	0.000			0.000
	(.)	(.)			(.)
1. Yes	0.211**	0.225**			0.191*
	(0.080)	(0.086)			(0.087)
60-69		0.000		0.000	0.000
		(.)		(.)	(.)
70-84		-0.547***		-0.549***	-0.549***
		(0.096)		(0.096)	(0.096)
85+		-1.279***		-1.273***	-1.277***
		(0.124)		(0.124)	(0.124)
Male		0.000		0.000	0.000
		(.)		(.)	(.)
Female		-0.429***		-0.438***	-0.436***
		(0.098)		(0.098)	(0.098)
Unmarried		0.000		0.000	0.000
		(.)		(.)	(.)
Married		0.265**		0.284**	0.278**
		(0.096)		(0.096)	(0.096)
Unschooled or Unde~o		0.000		0.000	0.000
		(.)		(.)	(.)
Primary school		0.058		0.025	0.028
		(0.115)		(0.115)	(0.116)
Junior high school~e		-0.353**		-0.385**	-0.415***
		(0.122)		(0.124)	(0.125)
0. No		0.000		0.000	0.000
		(.)		(.)	(.)
1. Yes		0.224		0.234*	0.216
		(0.119)		(0.119)	(0.119)
0: No		0.000		0.000	0.000
		(.)		(.)	(.)
1:Yes		-0.467***		-0.461***	-0.471***
		(0.092)		(0.091)	(0.092)
1:Urban			0.000	0.000	0.000
			(.)	(.)	(.)
2:Rural			-0.192*	-0.234**	-0.202*
			(0.079)	(0.087)	(0.088)
Constant	1.269***	1.916***	1.446***	2.128***	2.047***
	(0.052)	(0.137)	(0.055)	(0.145)	(0.149)
N	3962	3886	3976	3895	3886

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

```
. pwcorr health1 health6 health7 insurance region agegroup sex maritalstat education cell visitcare, obs star(0.01)
```

	health1	health6	health7	insura~e	region	agegroup	sex
health1	1.0000						
	3976						
health6	0.0951*	1.0000					
	3976	3976					
health7	0.2366*	0.0974*	1.0000				
	3976	3976	3976				
insurance	-0.0008	-0.0795*	0.0422*	1.0000			
	3962	3962	3962	3962			
region	-0.0196	0.1028*	-0.0386	-0.2058*	1.0000		
	3976	3976	3976	3962	3976		
agegroup	-0.0977*	-0.0639*	-0.2041*	-0.0448*	0.0629*	1.0000	
	3976	3976	3976	3962	3976	3976	
sex	-0.0568*	-0.0033	-0.1156*	-0.0281	-0.0003	0.0524*	1.0000
	3976	3976	3976	3962	3976	3976	3976
maritalstat	0.0553*	0.0304	0.1376*	0.0456*	0.0186	-0.2553*	-0.4619*
	3976	3976	3976	3962	3976	3976	3976
education	0.0682*	-0.1176*	0.0465*	0.1987*	-0.2796*	-0.2464*	-0.2160*
	3901	3901	3901	3888	3901	3901	3901
cellphone	0.0847*	-0.0539*	0.0879*	0.1248*	-0.1486*	-0.2722*	-0.1861*
	3976	3976	3976	3962	3976	3976	3976
visitcare	-0.1877*	-0.1003*	-0.0729*	0.0969*	-0.0536*	-0.0168	0.0334
	3969	3969	3969	3959	3969	3969	3969

	marita~t	educat~n	cellph~e	visitc~e
maritalstat	1.0000			
	3976			
education	0.1802*	1.0000		
	3901	3901		
cellphone	0.1683*	0.4341*	1.0000	
	3976	3901	3976	
visitcare	0.0007	0.0625*	0.0471*	1.0000
	3969	3895	3969	3969