DIFFERENTIAL IMPACT OF HEALTH INSURANCE ON OUT OF POCKET HEALTH
EXPENDITURE BETWEEN HOUSEHOLD WITH AND WITHOUT NON-COMMUNICABLE
DISEASES IN URBAN HANOI IN 2012

Miss Nguyen Thanh Thuy

A Thesis Submitted in Partial Fulfillment of the Requirements

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ความแตกต่างของผลกระทบของการประเมินสุขภาพต่อค่าใช้จ่ายของบุคคลในการรับบริการทางการแพทย์ระหว่างครัวเรือนของผู้เป็นโรคไม่ติดต่อกับผู้ไม่เป็นโรคไม่ติดต่อในเขตเมืองฮานอย ปี ค.ศ. 2012

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Thesis Title	DIFFERENTIAL IMPACT OF HEALTH INSURANCE ON OUT OF POCKET HEALTH EXPENDITURE BETWEEN HOUSEHOLD WITH AND WITHOUT NON-COMMUNICABLE DISEASES IN URBAN HANOI IN 2012
By	Miss Nguyen Thanh Thuy
Field of Study	Health Economics and Health Care Management
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ความแตกต่างของผลกระทบของการประเมินสุขภาพต่อค่าใช้จ่ายของบุคคลในการรับบ
ริการทางการแพทย์ระหว่างครัวเรือนของผู้เป็นโรคไม่ติดต่อกับผู้ไม่เป็นโรคไม่ติดต่อในเ
ขตเมืองฮานอย ปี ค.ศ. 2012. (DIFFERENTIAL IMPACT OF HEALTH INSURANCE
ON OUT OF POCKET HEALTH EXPENDITURE BETWEEN HOUSEHOLD WITH
AND WITHOUT NON-COMMUNICABLE DISEASES IN URBAN HANOI IN 2012)
อ.ที่ปรึกษาวิทยานิพนธ์หลัก: อ. ดร.ธัชนันท์ โกมลไพศาล, 84 หน้า.

โรคไม่ติดต่อ (NCDs) เป็นภาระทางเศรษฐกิจที่สำคัญในสังคม และมีแนวโน้มเพิ่มสูงขึ้น
สัดส่วนการตายจาก NCDs เป็นตัวเลขที่สูง โดยในเวียดนามนั้น 75% ของการเสียชีวิตนั้นเกิดจาก
NCDs ในขณะที่ค่าใช้จ่ายสำหรับการรักษาผู้ป่วย NCD ก็มีตัวเลขค่อนข้างสูง
อีกทั้งยังพบว่าระดับการจ่าย OOP (Out-of-Pocket) ในปัจจุบันของชาวเวียดนามก็สูงมาก
คือมีค่าตั้งแต่ 50% - 70% ของค่าใช้จ่ายด้านสุขภาพรวม
โดยกฎหมายประกันสุขภาพได้รับการดำเนินการในเวียดนามในปี 2009
โดยมีวัตถุประสงค์เพื่อให้บรรลุหลักประกันสุขภาพอย่างทั่วถึง ในปี 2012 เวียดนามมีประชากร
59.3 ล้านคนที่มีประกันสุขภาพ หรือคิดเป็นประมาณ 67%   ของประชากรทั้งหมด
วัตถุประสงค์หลักของงานวิจัยนี้คือการศึกษาผลกระทบของการมีประกันสุขภาพต่อค่าใช้จ่ายด้าน
สุ ข ภ า พ ข อ ง แ ต่ ล ะ บุ ค ค ล ที่ มี แ ล ะ ไ ม่ มี โ ร ค N C D s
งานวิจัยนี้ทำการสำรวจข้อมูลทุติยภูมิจากตำบลต่างๆ ของฮานอย ในปี 2012 และได้ประยุกต์ใช้
Tobit regression, quantile regression และ logit regression ในการจำแนกปัจจัยต่างๆ
ที่ ส่ ง ผ ล ต่ อ ค่ า ใ ช้ จ่ า ย O O P แ ล ะ ค่ า ใ ช้ จ่ า ย O O P
แบบที่เป็นสัดส่วนของการบริโภครวมของแต่ละบุคคลและค่าใช้จ่ายด้านสุขภาพของครัวเรือน
ทั้งนี้ผลการวิจัยพบว่าการทำประกันสุขภาพภาคบังคับสามารถช่วยลดค่าใช้จ่าย OOP
และค่าใช้จ่าย OOP แบบที่เป็นสัดส่วนของการบริโภครวมของแต่ละบุคคลได้
โดยเฉพาะอย่างยิ่งกลุ่มคนที่มีค่าใช้จ่ายด้านสุขภาพที่สูงกว่าคนอื่น
มากไปกว่านั้นยังพบว่าการทำประกันสุขภาพภาคบังคับสามารถช่วยคุ้มครองทางการเงินแก่ผู้ป่วย
โ ร ค ค ว า ม ดั น โ ล หิ ต สู ง ใ น ก ร ณี ใ ช้ บ ริ ก า ร ผู้ ป่ ว ย น อ ก
แ ล ะ ผู้ ป่ ว ย ที่ เ ป็ น โ ร ค เ บ า ห ว า น ใ น ก ร ณี ใ ช้ บ ริ ก า ร ผู้ ป่ ว ย ใ น
บุคคลที่ได้รับการศึกษาในระดับสูงและใช้บริการการดูแลสุขภาพแบบผู้ป่วยในจะมีค่าใช้จ่าย OOP
สูง บุคคลที่อาศัยอยู่ในย่านสลัมซึ่งสมาชิกในครัวเรือนมีการใช้บริการแบบผู้ป่วยใน และมีผู้ป่วย
NCDs   ภ า ย ใ น ค รั ว เ รื อ น
จะมีโอกาสเพิ่มขึ้นที่จะประสบปัญหาภาระทางค่าใช้จ่ายด้านสุขภาพที่สูงของครัวเรือน

สาขาวิชา   เศรษฐศาสตร์สาธารณสุขและการจัด   ลายมือชื่อนิสิต ....
             การบริการสุขภาพ   ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก ....
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5685676229 : MAJOR HEALTH ECONOMICS AND HEALTH CARE MANAGEMENT
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NGUYEN THANH THUY: DIFFERENTIAL IMPACT OF HEALTH INSURANCE ON OUT OF POCKET HEALTH EXPENDITURE BETWEEN HOUSEHOLD WITH AND WITHOUT NON-COMMUNICABLE DISEASES IN URBAN HANOI IN 2012. ADVISOR: TOUCHANUN KOMONPAISARN, Ph.D., 84 pp.

Non-communicable diseases (NCDs) imposed a large economic burden in society and are having an increasing trend. The mortality rate of those with NCDs is remarkable and alarming: 75% of deaths were due to NCDs in Vietnam while cost for treatment of NCD patients is quite high. The current level of out-of-pocket (OOP) payment in Vietnam was very high ranging 50% - 70% of total health expenditure. Health Insurance Law was implemented in Vietnam in 2009 and the coverage of health insurance increases steadily through the year from 1998 to 2012 aimed to achieve Universal Coverage. Up to 31/12/2012, Vietnam has 59.3 million people covered by health insurance; account for around 67% of population. The main objective of this study is to determine the impact of health insurance on health expenditure of individual with and without NCDs. We used secondary data from survey conducted in urban districts of Hanoi in 2012. Tobit regression, quantile regression and logit regression were employed to identify the factors that affect OOP payment of individuals, OOP as a proportion of total consumption (OOP/TC) and catastrophic health spending of households. The main findings of this study are that compulsory health insurance can financially protect individuals, help them to reduce their OOP payment as well as the OOP spending as a proportion of total consumption, especially for those in upper tail of OOP distribution. Moreover, compulsory health insurance can help to protect hypertension patients for outpatient services and for diabetes patients when seek inpatients health care services. Individual with high educational level and used inpatient health care services will have higher OOP expenditure. Living in slum residential area, households have member used inpatient services and NCDs rate within a household are factors that increase the chances of incurring catastrophic health expenditure for households.

Field of Study:	Health Economics and Health Care Management	Student's Signature	....
		Advisor's Signature	....
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ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

MOH	Ministry of Health
UHC	Universal Health Coverage
OOP	Out-of-pocket
HCFP	Health care funds for the poor
VHLSSs	Vietnam Household Living Standards Surveys
VHI	Voluntary Health Insurance
CHI	Compulsory Health Insurance
OLS	Ordinary Least Square
WHO	World Health Organization

CHAPTER I

INTRODUCTION

1.1. Problems and Its Significance

1.1.1. Current situation of Non-communicable Diseases (NCDs)

Today, all countries in over the world are facing to the rising of non-communicable disease (NCDs). Chronic non-communicable diseases are defined as diseases are not cause by bacteria, viruses or parasite; these diseases progress with a long duration, which prolong more than 3 months with slow progression and not transmitted from person to person and can cause disability (World Health Organization, 2010a). According to WHO, NCDs are well-known leading cause of almost two thirds of all worldwide deaths (36 million of 57 million death in 2008). NCDs imposed a large social and economic burden in society and have an increasing trend, cause 63% deaths worldwide in 2008 and accounts for nearly 80% of all deaths in recent year and occur in low and middle income countries; over 9 million premature deaths (before 60 years old) was due to NCDs – around 29% of NCD deaths, of which 90% occur in low and middle income countries (World Health Organization, 2010a). WHO also reported that from 2010 to 2020, the total number of deaths due to NCDs will be increased by 15%.

Globalization, urbanization, unplanned urbanization and social inequities in developing countries with tobacco use, insufficient physical activity, unhealthy diet and alcohol consumption are major determinants and the four common modifiable risk factors of NCDs. Each of these risk factors has an evident impact on the increasing of NCDs cases dramatically and everyone in all age groups can be affected by NCDs in direct or indirect ways. Among NCDs, four of the most important and serious diseases responsible for the majority of NCDs morbidity and mortality are cardiovascular diseases - is the leading cause of deaths and at the top of mortality rate table (48% of NCDs deaths), follow by cancers, asthma/chronic obstructive pulmonary disease (COPD), and diabetes account for around 80% of all NCDs deaths.

These mortality and morbidity from four above major NCDs will be continued rise in the near future in all over the world.

In South East Asia Region, one project was conducted in 2004 and this project showed the result was the percentage of NCDs deaths in this area increased from 59% in 2002 to 69% in 2030 while the proportion of deaths due to communicable diseases and the other diseases has a downward trend from 37% to 14% in 2030 (Colin D. Mathers & Dejan Loncar, 2006). As an example in Indonesia, using both household survey and basing on basic health research in 1995, 2001 and 2007, researchers reported that the backward in trend in percentage of deaths by communicable disease and NCDs was occurred: cause by communicable disease decrease and by NCDs has an increasing tendency (Ministry of Health Republic of Indonesia, 2010).

Figure I-1: Trend of mortality and morbidity by NCDs
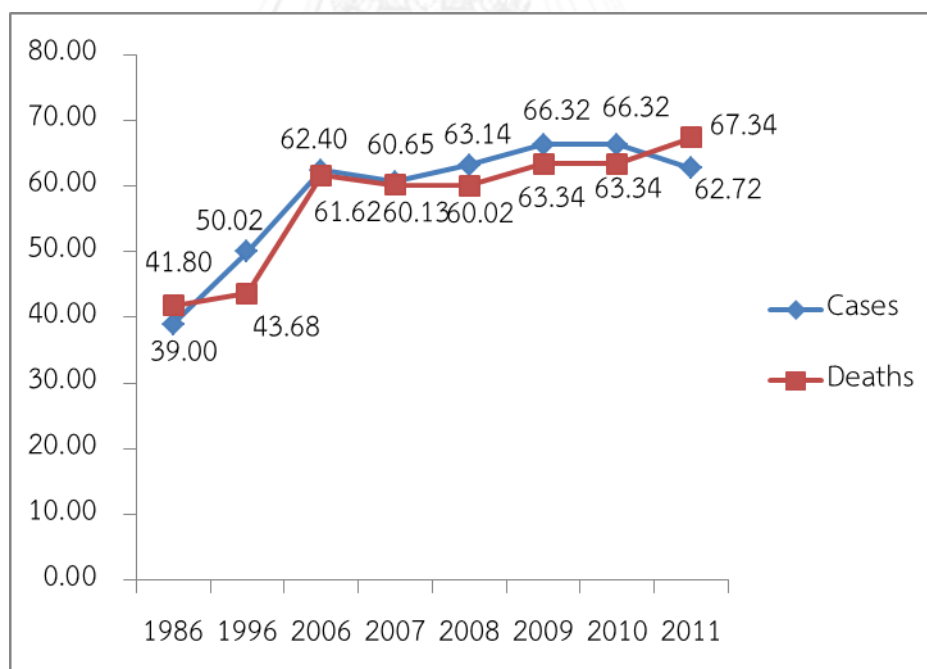
(Source: Health Statistics Yearbook, MOH, 2012)

Health Statistical Yearbook of Vietnam reported that the incident of NCDs in 2011 was 62.72%, which two times larger than communicable disease is 25.89%; and

the rate of deaths with NCDs was 67.34%, which four times higher than communicable diseases was 16.62%. The general trend in mortality and morbidity from NCDs, to which cardiovascular disease accounted a significant share, is increases over year in 1986 – 2011 period (Figure I-1) (Ministry of Health, 2012).

In NCDs country profile which is reported by WHO, the total NCD death of Vietnam in 2008 was around 430,000 people and NCD premature deaths under age 60 is 45.8% (that different between gender males distribute 26.4% and females were 19.4% of all NCD premature deaths under 60 years old) (World Health Organization, 2011). Death due to NCDs in male group are more than in females, it is completely reasonable because males are the higher risk group with tobacco using and alcohol intake even some people use tobacco and/or alcohol daily and this group seem less taking care for themselves and less seeking health care services than females group.

Figure I-2 show the proportional mortality of NCDs in Vietnam 2008 reported by WHO in 2011 (2008 is the first year of Vietnam using the Disability Adjusted Life Year (DALY) to estimate the Burden of diseases). According to the recent statistic on NCDs showed in above figure, 75% of the deaths were due to NCDs in Vietnam, cardiovascular diseases with highest rate at the top of mortality rate; responsible for 40% of total deaths in all ages, follow by cancers (14%), respiratory diseases 8% and diabetes was 3%. Other NCDs accounted approximate 10% of total deaths in all ages.

Figure I-2: Proportional mortality of NCDs in Vietnam 2008

(% of total deaths, all ages)
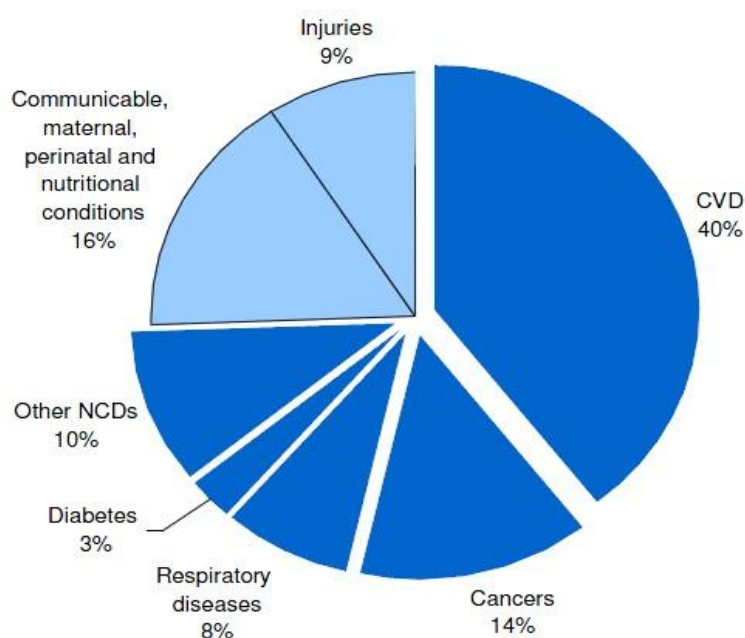
(Source: Non-communicable Diseases Country Profile, WHO, 2011)

In Vietnam actual situation, proportion morbidity and mortality in whole country by cancer (neoplasm) country rise from 2.49% and 1.68% in 2010 to 3.42% and 3.76%, by disease of respiratory system in 2010 are 21.32% and 10.81%. While in Red River Delta region (Hanoi belongs to Red River Delta), these proportion for two diseases mentioned above accounted around one half of the proportion in whole country: are 2.37% - 2.78% and 19.67% - 5.17% (morbidity and mortality rate respectively). According to latest data which is reported by Institute of Cancer Research Prevention and – K Hospital in Hanoi, there are 75,000 deaths in among 150,000 incidences of cancer patients. Additionally, hypertension, chronic respiratory and asthma and diabetes are always in the top of leading causes of morbidity with highest cases in whole country are 515.50; 420.49 and 184.46[1] (Ministry of Health, 2011).

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[1] Unit: Per 100,000 inhabitants

These are remarkable and alarming increasing figure for Government, health system researchers and policy makers in every country. Chronic NCDs prolong more than 3 months with slow progression as definition of WHO, in addition, NCD patients can be required both inpatient and outpatient treatment for a long time. This fact makes the treating health expenditures and medical costs such as drugs and medicines for NCDs are regularly, more expensive and costly than some eventual diseases, injury or communicable diseases. People with chronic NCDs or household whose member has NCDs can be faced with the huge and long-period amount out-of-pocket health expenditure. Therefore, NCDs patients particularly are poorer patients or individual in vulnerable population groups can be suffered from financial paying such as high OOP spending much higher than the other groups. Besides, many research in some developed and developing countries have shown that the impact of NCDs on finance of individual and household is very high, expenditures for NCDs accounted for over a third of total health expenditure of these countries (Charu C. Garg & Evans, 2011). The increasing trend of NCD cases will effect on the increasing individual and household out-of-pocket health care expenditure, especially in low and middle-income countries, including the developing country is Viet Nam.

1.1.2. Viet Nam's health care financing

The Gross domestic product (GDP) per capital of Vietnam in current US$ is estimated around US$155.8 billion in 2012. Total health expenditure as a share of GDP went up almost every year from 5.1% to 6.8% in period 2002 – 2011 (Figure 2) (World Bank, 2012). Monthly average income and expenditure per capita at current prices of whole country according to Living standard report in 2010 is VND 1,378,000 (US$ 72.9) and VND 1,211,000 (US$ 64.07) respectively, equivalent around US$ 874.8 and US$ 768.8 per year (General Statistics Office of Vietnam, 2012). Noticeably, these average income figures are low while total health expenditure per capita in 2010 is quite high US$ 216.

State budget and private health expenditure are two main financing sources of Vietnam's health financing. Beside budget which is distributed by Government, private health spending that includes OOP spending from patients pay for health

care services. Moreover, current level of out-of-pocket payment (OOP) is very high, ranging 50% – 70% of total health expenditure from 2002 on now. WHO defined household's capacity to pay is non-subsistence spending and household catastrophic health expenditure is occurred when OOP payment is equal or exceeds 40% of its capacity to pay (non-food expenditure). Beside, one of target indicators defined by WHO for countries which is on the way to achieve full health insurance coverage, Asia Pacific region in particular is "OOP payment should not exceed 30% - 40% of total health expenditure" (World Health Organization, 2009).

Figure I-3: Health expenditure (% of GDP) Vietnam 2002-2011
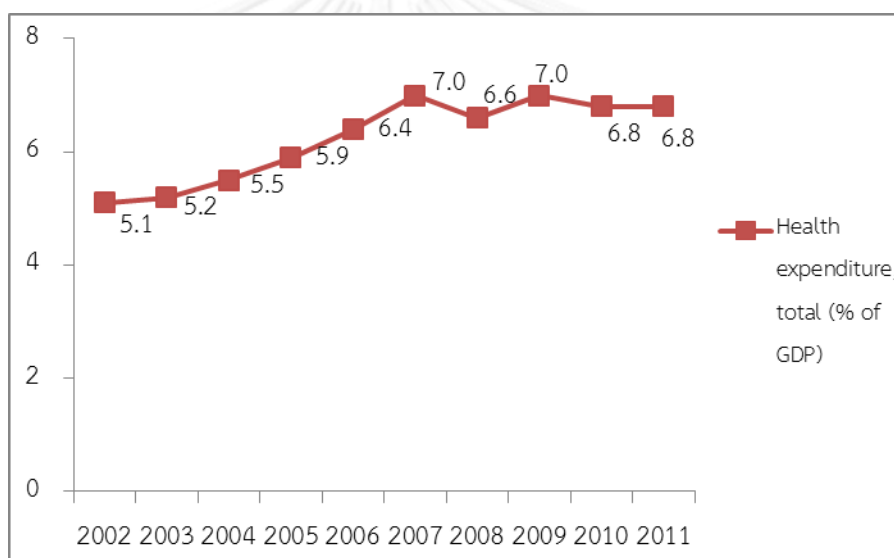
(Source: World Bank Data, 2002 – 2011)

Figure I-3 shows us the current situation of OOP health expenditure as a share of Vietnam's GDP in period 2002 - 2011. Although the trend for OOP health spending in Vietnam is a gradual downward from 64.31%, it still decreases slightly. The decreasing trend of OOP payment on health is unstable and these figures on OOP payment on health in recent are around 56% to 62% in period 2006 -2011 and this spending is much higher compared to the other countries region and the world.

This current situation of OOP proportion is still quite higher than the ideal figures that recommended by WHO as mention above 40%. According to the results from the Vietnam Household Living Standard Surveys from 2002 to 2010 (VHLSS), the

share of out-of-pocket expenditures for inpatient and outpatient health care services have been at approximately 40% each (Ministry of Health, 2013). By the way of consequences, now, Vietnam suffers financial burden on OOP payment to health care heavily and it is difficult for Vietnam to move toward UC and protect finance highly if Vietnam does not have any solution to reduce OOP health expenditure for health care services.

Figure I-4: Out-of-pocket health expenditure
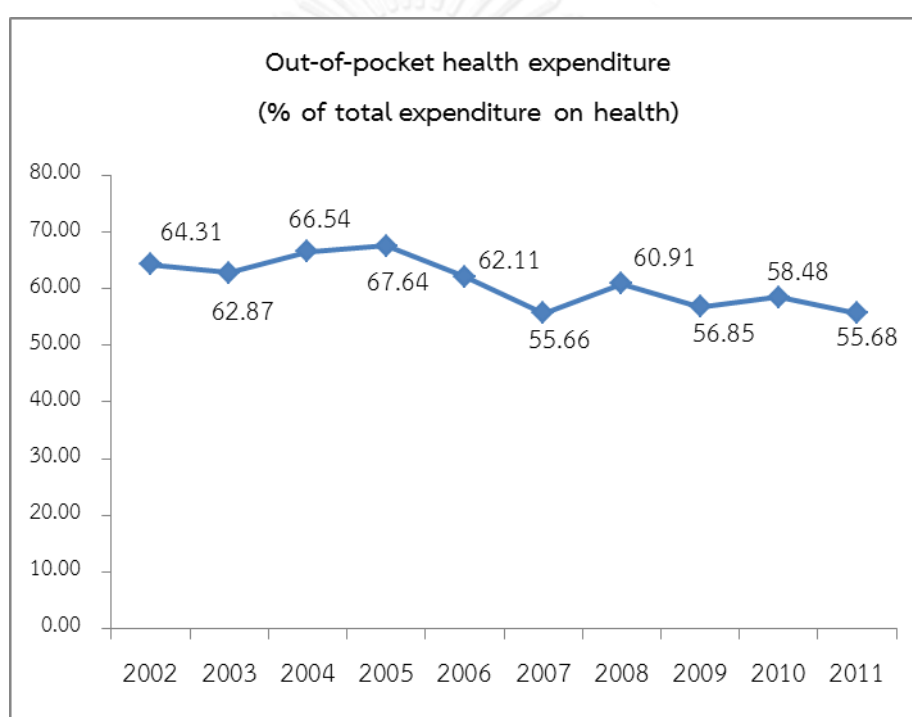
(Source: World Bank Data 2002 – 2011)

In Vietnam, some evidences have been found about how health insurance impact to health expenditure, out of pocket payment and utilization of both individual and household. "Financial protection" or "household financial burden associated with NCDs" were interested in and researched in developing countries especially in rural area by many researchers. On the other hand, some studies have shown the burden of household caused by NCDs is increasing rapidly. However, the impact of health insurance on household whose member has NCDs is still few. There have been few studies cover both two above important issues for individual and

households with NCDs in urban area in Vietnam, how health insurance help individual and households with NCDs member on OOP payment when they seek health care services is needed.

1.2.   Research questions

1.2.1. Primary question

How does health insurance impact on out-of-pocket health expenditure of individuals and households with and without non-communicable disease in some urban districts of Hanoi?

1.2.2. Secondary questions

➢ What is the current situation of health insurance coverage among households with different socioeconomic characteristics in selected districts of Hanoi?

➢ What is the difference on mean of out-of-pocket payment of individuals and households with and without NCDs in different socio-economic characteristics?

➢ What are the factors effect on out-of-pocket health expenditure of individuals and households in the study setting?

1.3.   Research Objectives

1.3.1. General objective

To examine impacts of health insurance on reduction of out-of-pocket health expenditure of individuals and households with and without non-communicable disease in urban of Hanoi

1.3.2. Specific objectives

➢ To describe the coverage of health insurance among households with and without NCD patients in selected districts in Hanoi

- ➢ To estimate out-of-pocket health expenditure among individuals and households with and without NCDs in the study setting
- ➢ To identify the factors effect on out-of-pocket health expenditure of individuals and households with and without NCDs in the study setting.

1.4.   Scope of Study

This study will analyze the factors impact on out-of-pocket health expenditure associated with NCDs in urban district of Vietnam. Secondary data used in this study was conducted in 2 urban districts of Hanoi are Hoan Kiem and Dong Da in a research about inequalities in chronic non-communicable disease in urban Vietnam, 2012.

1.5.   Hypothesis

1. There is difference on mean OOP payment of individual living in difference socio-economic groups.
2. Individual enroll health insurance have OOP health expenditure less than people who not enroll health insurance.
3. There is difference on impact of health insurance on people have and do not have NCDs when seeking health care service.
4. The higher NCDs within a household, the more likely household face catastrophic health expenditure.

1.6.   Possible Benefits

After economic and social reform "Doi moi" in 1986, the economic growth significantly leads to the increasing rapidly of the urban population in recent years. In general, this is one of a littler new studies on urban area in Vietnam and particularly in Hanoi. This study aims to provide overview about current situation of health insurance enrollment of households whose member has NCDs as well as the impact of health insurance on reducing OOP and the differences among socioeconomic groups in urban of Hanoi. Moreover, this study expects to provide evidences for government and policy makers. This study can make some new and/or valuable

policy in health insurance to improve equalities and equities for poor and vulnerable groups and improve financial protection of health insurance for helping people to reduce financial burden when seeking health care services, especially for NCDs patients.

CHAPTER II

BACKGROUND

2.1. Basic information

Vietnam is a developing country located on the Eastern seaboard of the Indochina peninsula, sharing common borders with China to the North, Laos and Cambodia to the West. To the East and South lies the East Sea. Mountains and hills cover four-fifths of Vietnam's territory. The country coastline stretches for 3,444 km.

The total area of Vietnam is 330,951.1 km^2 and the population about 88.78 million people. The most populated areas in Vietnam are the Red River Delta and the Mekong Delta (General Statistics Office of Vietnam, 2012). Some basic information with some main indicators about population and economic of Vietnam in period 2009 – 2012 are presented in Table II-1 below.

Table II-1: Viet Nam - Basic indicators

Basic Indicators	2009	2010	2011	2012	
Population	86.03	86.93	87.84	88.78	millions
Urban population	25.61	26.42	27.26	28.12	millions
Urban population (% of total)	29.77	30.39	31.04	31.68	%
GDP (current US$)	106.01	115.93	135.53	155.82	billions
GDP growth (% change per year)	5.40	6.42	6.24	5.25	%
GDP per capita (current US$)	1,232	1,334	1,543	1,755	$
GNI per capita (current US$)	1,120	1,270	1,390	1,550	$

GDP = gross domestic product, GNI = gross national income, CPI = consumer price index

(Source: World Bank Data, 2012)

2.2. Health care system

The public healthcare system plays a key role in Viet Nam health system which is a mixed public-private provider system and organized into three levels. The first and highest level is Ministry of Health (MoH); the second level is 63 Provincial Health Departments which is under MoH and the last us primary healthcare level include District Health Services, Commune Health Centers and Village Health Workers (Hoang Van Minh et al.). Currently, in 2012, Vietnam has total 46 units under direct management of MoH with 24,210 patient beds, in which: 41 Hospitals, 3 Leprosarium and 2 Regional polyclinic; and 12,407 units managed by Provincial department of health has total 237,190 patient beds with 963 Hospitals, 35 Sanatoriums and rehabilitation hospitals, 20 Leprosarium, 11 Maternity clinic, 621 Regional polyclinic and 10,757 Medical service unit in communes, precincts, offices and enterprises (General Statistics Office of Vietnam, 2012).

Table II-2: Vietnam Health Factsheet - Key Indicators

Key Indicators on Health	2009	2010	2011	2012
Birth rate, crude (per 1,000 people)	16.65	16.43	16.16	
Death rate, crude (per 1,000 people)	5.58	5.61	5.64	
Life expectancy at birth, total (years)	75.17	75.31	75.46	
Mortality rate, infant (per 1,000 live births)	18.90	18.70	18.60	18.40
Mortality rate, neonatal (per 1,000 live births)	12.60	12.60	12.50	12.40
Mortality rate, under-5 (per 1,000 live births)	23.60	23.40	23.20	23.00

(Source: World Bank Data, 2012)

2.3.   Information about Health Insurance system

Universal Health Coverage is defined in the 2010 WHO Report as a goal to help all people to access to needed health services and do not suffer financial hardship paying for those services (World Health Organization, 2010b). Conceptual framework of WHO about UHC include 3 dimensions (Figure II-1)

- Population coverage: the proportion of population can be covered by health insurance and can access possible health care services
- Service coverage: the range of services that are covered
- Financial coverage: the proportion of the total cost covered by insurance for reducing service users' direct out of pocket

Figure II-1: Three dimensions of Universal Health Coverage
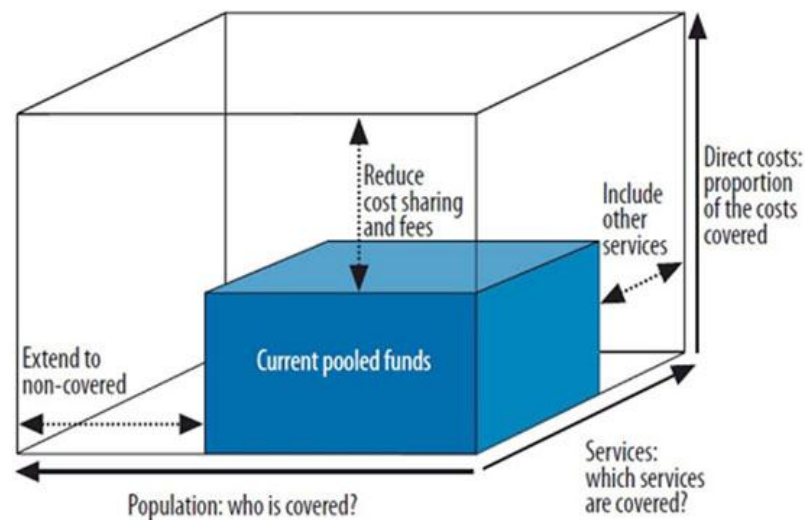
(Source: WHO Report, 2010)

Vietnam economy has boosted up; transiting to the lower middle income country from low income country and Vietnam has many evident changes in all sectors as a result of establishment of social and economic reform, known as "Doi moi" (Renovation) in 1986, especially in Vietnam's health system. And the Law on Health Insurance is as a solution for Vietnam to move toward Universal Coverage

target (UC), sometimes called Universal Health Coverage (UHC), aimed to achieve full coverage in 2014 with a roadmap to expand groups covered (Figure II-2):

- 2009: Implement health insurance for children under age of 6
- 2010: Implement health insurance for near poor people, pupils and students
- 2012: Implement health insurance for famers, people in agricultural, forestry, fishery and salt making households
- 2014: Implement health insurance for dependents of workers, cooperative members, family enterprises, others and remaining groups

Social Health Insurance (SHI) as a health insurance scheme provided by Government was introduced in Vietnam in Decree No. 229/1992/HDBT in 1992 aim to combine private and public health sector, creating conditions for all citizens can take care and improve their health. After 17 years, Social health insurance law was approved in 2008 and become effective on 1 July 2009 which called Health Insurance Law consists of two schemes: a compulsory scheme and a voluntary scheme. The compulsory scheme has two separate sub-programs: a social health insurance (SHI) scheme for the formal sector and employed in targeted programs; and the health care funds for the poor (HCFP).

Figure II-2: Roadmap towards Universal Coverage
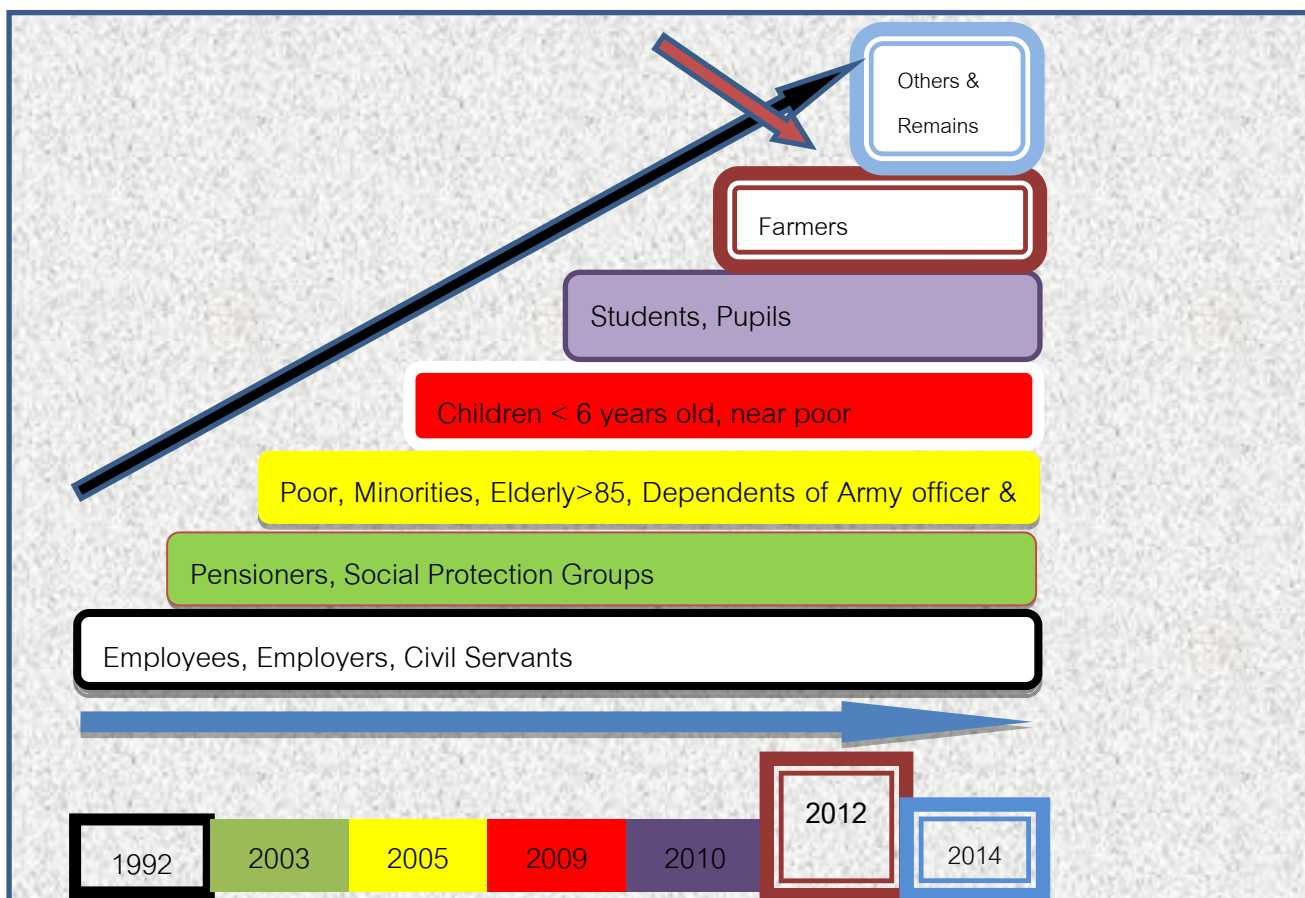
(Source: Vietnam Social Security, 2012)

Benefit Package of Health insurance

Nowadays, except some special disease such as incurable diseases, almost healthcare service users co-payment 5% - 20% of total health services cost and Health insurance will covers 80% of total expenditure or more depends on participant groups and what kinds of disease, medicines and services. According to Law on Health insurance, participants will be covered by health insurance and the benefit coverage package of participants when enroll health insurance was classified as follow:

- Cover 100% health care check-up or medical treatment cost for officer, non-commissioned officers, professional officers, professional non-commissioned

officers working in public security; people who contributed to the revolution and children fewer than 6 years old.

- Cover 100% health check-up or medical treatment cost in case cost for treatment or health check-up is less than the rate prescribe by the Government and for case seeking health care service at commune level.

- Cover 95% health check-up or medical treatment cost for pensioners, person who receives monthly allowance, monthly social security allowance; the poor, ethics minorities living in disadvantages areas.

- Cover 80% health check-up or medical treatment cost for the others objects

The transportation cost is also covered by the health insurance for the poor, ethnic minorities, eligible persons and children under 6 when the patients need to be transferred to another hospital with a higher level due to emergency cases (Vietnam Social Security, 2010).

When people seek health care services at register primary facility level, the health insurance fund will cover 100% cost if total health care check-up or treatment cost is less than 15% of minimum salary/wages (from 1st May, 2012, minimum salary is 1,050,000 x 15% = 157,500 VND - around US$ 7.5) for all health care services in the list of health insurance. If the reimbursement is greater than 15% of minimum salary/wages, patients have to co-payment from 5% to 20% of total cost with the different rate depending on which category of each individual belongs to as mention above and health insurance fund will cover 80% - 95%. The Grade is determined based on the level of services and facilities, which are announced by each provincial health department. Grade-I is the hospital with the best quality services (Central Hospital – Government Hospital) followed by Grade-II (Provincial hospital – Region Hospital), and Grade-III (District hospital). If individuals have health insurance card, but they receive medical care at higher level of health facilities (pass-by) without referral line, different coinsurance rate apply depending on the category of the insured: 30% of cost for health care services at Grade III hospital (70% medical cost will be covered), 50% at Grade II hospital (50% medical cost will be covered) and 70% at Grade I hospital (30% medical cost will be covered).

Moreover, in order to avoid deficit health insurance fund, reimbursement ceiling is applied with no more than 40 times of minimum salary (1,050,000 VND x 40 times = 42,000,000 VND) around US$ 2,000.

The HCFP is approved in Decision 139 based on "Free Health Care Cards" program for the poor in October 2002 with aim to reduce spending for health and the risk of catastrophic OOP payment of three groups: the poor households defined based on official government poverty standard; vulnerable people and ethnic minorities living in mountainous areas facing many difficulties in seeking health care services. From 2006, the number of poor people who had been issued health insurance card rose rapidly, 15 million cards, accounted for more than 40% people have health insurance card and 15.8 million cards in 2008 (Ministry of Health, 2010). Poor households were defined by Decision No. 09/2011/QD-TTg issued on 30 January, 2011, applied for period 2011-2015. In rural area, poor households are households with an average income are 400,000 VND/person/month or less (4,800,000 VND/person/year). Urban poor households are households with an average income are 500,000 VND/person/month or less (6,000,000 VND/person/year).

Children under age of 6 who have received a special attention from government in health care are: issued free health care cards, provide free treatment for children under 6 and can choose the primary health care facilities from health care center to hospital in province level. This program was implemented in 2005 bases on circular 14/2005/TT BYT named: "Free care for under-six children – FCFCU6". The voluntary health insurance (VHI) scheme targets the people group whom not cover by compulsory health insurance such as students, the near poor, famers, self-employed or informal sector.

Health insurance Law has contributed to reducing the burden of medical costs for patients, improved efficiency of health insurance for the poor families, ethnic minorities poor and mountainous. Health insurance Law help Viet Nam to determine the health system based on health insurance to achieve equity, efficiency and development.

Table II-3: Health insurance participation

Year	Number of health insured people ('000,000)	Percentage of health insured population (%)
1998	9.74	12.70%
2000	10.62	13.40%
2002	13.03	16.50%
2004	18.39	21.10%
2006	36.87	43.90%
2008	37.70	43.76%
2010	52.51	60.92%
2011	57.11	65.01%

(Source: Health Statistics Yearbook, 2012)

After 16 implementing years, health insurance covers 16.5% of the population in 2002 and rise to 60.92% in 2010. In 2011, 57.11 million poor people were covered by the health insurance, accounted 65.01% of population (Ministry of Health, 2011, 2012). Coverage of health insurance increases steadily through the years from 1998 to 2011. The data on report about current Vietnam health insurance situation shows that up to 31/12/2012, Vietnam has 59.3 million people covered by health insurance; account for around 67% of population. This proportion of health insurance enrollment is still low compared with full coverage target. Based on the current data of proportion health insurance coverage in 2012 is 67%, the Ministry of Health of Vietnam committed around 70% of population will be covered by health insurance and also committed in 2020 and the coverage of health insurance will be more than 90% for achieving to universal coverage.

Enrolling health insurance program can help people reduce the economic burden when seeking health care services. In contrast, insured by health insurance does not mean people can have a peace of mind with every disease. As defined in Health insurance law, Health insurance will not pay or pay only a part of expenditure for incurable diseases or chronic diseases including cardiovascular diseases or cancer, etc., leads to high spending for health care services. For instance, there are around

100 kinds of medicine related to cardiovascular disease in reimbursed drugs can be paid by health insurance fund. For cancer, patients face with very high treatment costs with a long treatment, so it becomes an economic burden for patient even a non-poor patients. In cancer drugs group, health insurance fund pay for 50% of drug costs which is outside of the reimbursed drugs for children under 6 years old and people enroll in health insurance for more than 36 months. Financial burden of cancer patients as well as household have cancer patients is increased when 19 medicines among 56 kinds of medicines in cancer treatment that consist of injections, pills and drugs will be reduced coverage rate by health insurance from 100% to 30% - 50%. Previously, health insurance fund will cover 100% costs for above 19 kinds of medicines, but now health insurance fund only cover 30% - 50% for these medicines costs.

Health insurance aims to share the risky among community, health insurance would help to improve health equity, especially for vulnerable groups. But, it is a reality in Vietnam health insurance system that the coverage in famers, workers in the sectors of agriculture, or people lived on lower living standard face many difficulties. One of major reason is due to participants' limited perception about benefit of health insurance policy. Most of people only enroll health insurance when they have actual demand or they need health care check-up or treatment, especially people need a long-term treatment or with high medical cost such as NCDs patients (Nam Phuong, 2012).

2.4. General information about the study setting

Study was conducted in Hanoi which is the capital of Vietnam, belongs to Red River Delta, has average population is approximately 6,844.1 thousand inhabitants with total area is 3,323.6 km^2, about 8% of population of whole country is 88.78 million people (General Statistics Office of Vietnam, 2012). The average density of Hanoi is around 2,000 people/km^2, in rural area is 1,000 people/km^2, but in urban area, density reach a point 35,400 people/km^2. Hanoi is divided into 29 districts including 19 urban districts and 10 sub-urban districts.

Two earliest district of Hanoi are Hoan Kiem and Dong Da were become district in 1961 (General Statistics Office of Vietnam, 2012):

- Hoan Kiem District is a downtown and commercial center of Hanoi where Hoan Kiem Lake is located. Total area is 5.29 km^2 and population is around 147,334 people. Density of population is 33,662 people/ km^2.

- Dong Da District is one of urban district in Hanoi center wide 9.96 km2, population is around 390,000 people. Density of population is 35,341 people/ km^2.

Figure II-3: Map of Vietnam, Hanoi and urban areas of Hanoi
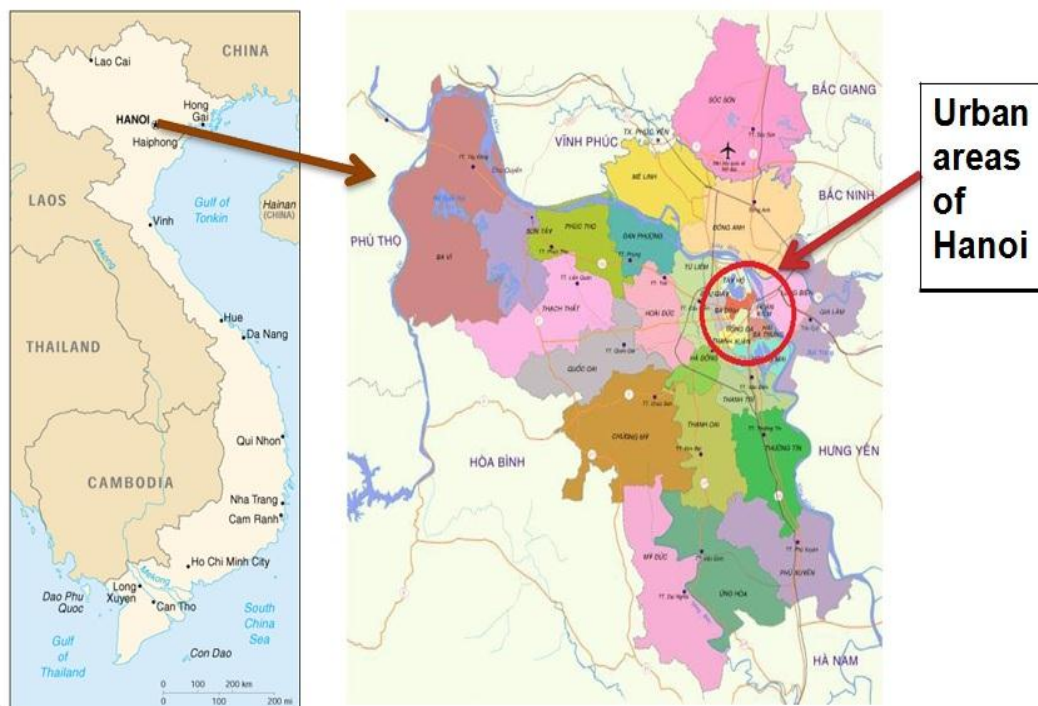
(Sources: www.chinhphu.vn)

CHAPTER III
LITERATURE REVIEW

Adam Wangstaff gave us some early information about impact of the free health care program for the poor as known HCFP through his own study in 2007 by using VHLSSs 2002 and 2004 data - after 2 years implementing HCFP. In this early quantitative study, he defined catastrophic OOP payment as OOP payment is that over 10% of households' non-food consumption. He compared OOP payment and utilization of people covered by HCFP and people are not by using propensity score matching method. Author found that although not decreasing average OOP spending on health care, HCFP still had a positive influence on reducing 3% - 4% points the risk of catastrophic OOP medical expenditure. Moreover, 32% of individuals live in household experienced catastrophic OOP spending can get benefit from HCFFP (Wagstaff, 2007). Here is a good early impact of this health care program for the poor who has socially disadvantage position in society.

The impact of health insurance on OOP payment is not only interested topic in Vietnam but also in the other countries in all over the world. China – the country which share border with Vietnam – is an example for achieving purpose is to reduce OOP health expenditure for their urban employee. Gordon G. Liu and Zhongyun Zhao did a research focus on finding out how OOP health care expenditure effect changed with China's health insurance reform – which is a series of initiatives to reform the urban healthcare systems launched and carried out in 1994. The result of this study provides a good new is the OOP of low income group declined from 107 RMB[2] to 78 RMB and the rate of OOP payment as a share of income in high and low income groups both decline, remarkably in low income groups after reforming in health insurance system. In additional, this research touched on relationship between OOP payment, health insurance and chronic diseases but NCDs is still not to be mentioned (Liu & Zhao, 2006).

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[2] Renminbi (RMB) is the official currency of the People's Republic of China

Facing high OOP health expenses causes households could be suffered catastrophic health expenditure; therefore, Government need implement a health insurance law to help households avoid suffering financial burden. The lack of health insurance is one of the major factors leads households cannot be protected on finance perspective with the high proportion of OOP payment was proved in a cross-country study analyzed data from household survey in 59 countries using multivariate OLS regression. This study found out that most developed countries can protect its citizens by improving and developing health insurance system because these countries realized that health insurance schemes play an important role in reducing financial risk arising from OOP spending on health (Xu et al., 2003).

159 studies include 68 studies in Africa and 91 which are published before the end of 2011 in Asia were analyzed in a systematic review of Ernst Spaan. Many of these studies about the impact of health insurance in Africa and Asia conclude that the effect of health insurance on financial protection for households in terms of reducing OOP health expenditures is positive, especially are Community based health insurance and Social health insurance with strong evidence (Spaan et al., 2012).

With purpose to estimate the effect of health insurance on reducing OOP payment, authors applied ordinary least squares (OLS) and two-stage least squares to analyze data from the Indonesian Family Life Survey. This study compared the impact of two large health insurance program with using some explanatory variables are income, health insurance, health status, age group and some demographic variable such as married status, gender, and educational level of household's head, residential area: urban or rural and the ethnicity. The results explored that both of these existing health insurance programs in Indonesia can help household reduce OOP health expenditure by 34% - 55% compare with non-health insurance program (Aji, De Allegri, Souares, & Sauerborn, 2013).

Looking at some research interested in relationship between burdens of OOP health expenditure associated with NCDs. One cross sectional study carried out in India on "Burden of health Healthcare Utilization and Out-of-Pocket Costs among

Individuals with NCDs in an Indian Setting" applied the data from February 2010 to April 2010 by using self-reported burden of NCDs information indicated that economic burden of NCDs in India predominantly through OOP payment. Treatment of NCDs can be a large burden of whole society, especially for the poor household and individuals. 3.2% Indians will be poverty as a consequence of the high medical costs for NCDs and 70% of them spending almost their OOP income on health care and medical bills, according to WHO (Joshi, Mohan, Grin, & Perin, 2013).

To estimate the health expenditure related to NCDs, in the world, researcher always use two methods are based on national health accounts disease distribution analysis (NHA-DDA) and cost of illness method. From a framework for reviewing data in the latest year of 13 countries which is using the NHA-DDA approach to calculate the expenditure for NCDs, the result showed that only for five major NCDs, expenditure response for over third of total health expenditure, especially in Germany with over 50%. NCDs also have a large impact not only on individual or household OOP health expenditure but also on national health expenditure. However, this paper only interested in specifying the impact on expenditure on national level rather than individual level (Charu C. Garg & Evans, 2011).

There are a large number of studies focuses on the implications on economic of NCDs conducted in India. One study in 2011 review the economic impact of NCDs in India identified that OOP expense associated with NCDs is high and have a robust impaction on catastrophic health expenditure of household. This research showed that 75% household has member with NCDs experience with catastrophic expenditure and face a high risk of falling into poverty. Additionally, NCDs has a financial burden and impact on economic growth of India, the loss in GDP due to NCDs around 5% - 10% (Thakur, Prinja, Garg, Mendis, & Menabde, 2011).

According to one household level study conducted in India used national data which covering around 200 thousand households about healthcare utilization and OOP health spending with NCDs and non-NCDs patients in household; it was founded out that OOP expenses of household for NCDs rose sharply from 31.6% in 1995-96 to 47.3% in 2004. Around 3.3% of GDP in this year in India is OOP payment

for health care services – estimated nearly 846 billion INR[3] and this fact showed us the importance impact of incident NCDs rate on financial burden of household in India (Engelgau, Karan, & Mahal, 2012).

In one study on "Burden of NCDs in India: setting priority for action" review the Indian data about NCDs was found out that financial burden of the poor and non-poor group is not disproportionately. The burden of NCDs especially financial burden in India has an increasing trend and this country is implementing many strategies for reducing OOP payment on health care. Health care expenditure of India in 2008 accounted for 4.2% of its GDP. OOP health expenditure as a share of private resources in India is very high around 74.4% as a consequence of higher treatment cost for NCDs than the other illness (Sharma, 2013).

Returning to Vietnam context, in a study used a part of Epidemiological Field Laboratory of BaVi District named Fila Bavi data belong with Health System Research Project – Hanoi Medical University, authors applied monthly repeated interview during the period July 2001 to June 2002 and discussed about communicable diseases as dominant in household medical expenditure. However, here, I just want to focus on the study's result related only to chronic NCDs. This study implied that NCDs have a not small dominant in household OOP payment and catastrophic health care expenditure. The spending for NCDs exceed 40%, accounts for around 58.6% of total health care expenditure. As defined by WHO, these proportions is not ideal (Thuan, Lofgren, Chuc, Janlert, & Lindholm, 2006).

Another interesting cross sectional study estimate the association between financial burden of household and chronic NCD in rural of Vietnam in 2010 explored that the catastrophic health expenditure and impoverishment rate of households with at least one member with two or more specific NCDs is nearly two times higher than household do not have any member with NCDs. Moreover, in this paper, authors identified in one their study's result that in general, poorer household

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[3]INR or Indian Rupees is official currency of the Republic of India

suffered the higher burden on health care expenditure more than the rich (Minh Hoang Van & Tran Bach Xuan, 2012).

In one survey conducted in major counties and cities of Taiwan use household was the unit of study aimed to provide evidence about relationship between health insurance coverage and health expenditure. Income and inpatient treatment were used as explanatory variables. Statistics results let us know that NCDs were significant related to extremely high OOP health expenditure. All of households' income groups were significant associated with OOP expenses; in particular, household in high income group had higher OOP payment. Beside, inpatient treatment also had an impact on OOP payment of households. But this study brought a special point was health insurance could not help household can remove the financial burden fully. On the other hand, authors mentioned about endogeneity in this paper that household faced with NCDs were more likely buy health insurance even they can enroll more than one types of voluntary health insurance program (Fang, Shia, & Ma, 2012).

One paper by Kankeu H.T, et al has pointed out the review on financial burden of household from NCDs in low and middle income countries. There are some researches in many countries in all over the word with many methodological ways about specific NCDs or a combination of NCDs. Each study has their own conveniences or disadvantaged such as samples or bias of self-reported when asking the direct and indirect cost, but, all of these researches explored those households had a member had NCDs when seeking medical care are imposed a substantial heavy financial burden, the poor households in low income countries suffered a heavier burden. Moreover, some studies showed spending a disproportionate amount of income add the limited health insurance coverage for NCDs lead to improve the risk of burden on poor households, defined as catastrophic health expenditure (Kankeu, Saksena, Xu, & Evans, 2013).

Catastrophic was defined by WHO as percentage of OOP payment of household compare with household's total consumption without food-expenditure with the different cut-off point at 10%, 20%, 30% or 40. However, in study of

Limwattananon with his co-author, they use the other catastrophic definition which was mention in their paper in 2007. They defined that catastrophic expenditure occurs when OOP spending equal or greater than 10% of household's total consumption which is including food and non-food expenditures (Limwattananon, Tangcharoensathien, & Prakongsai, 2007).

Figure III-1: Proportion of countries where NCD-related services and treatments are generally covered by health insurance, by World Bank income group, 2010
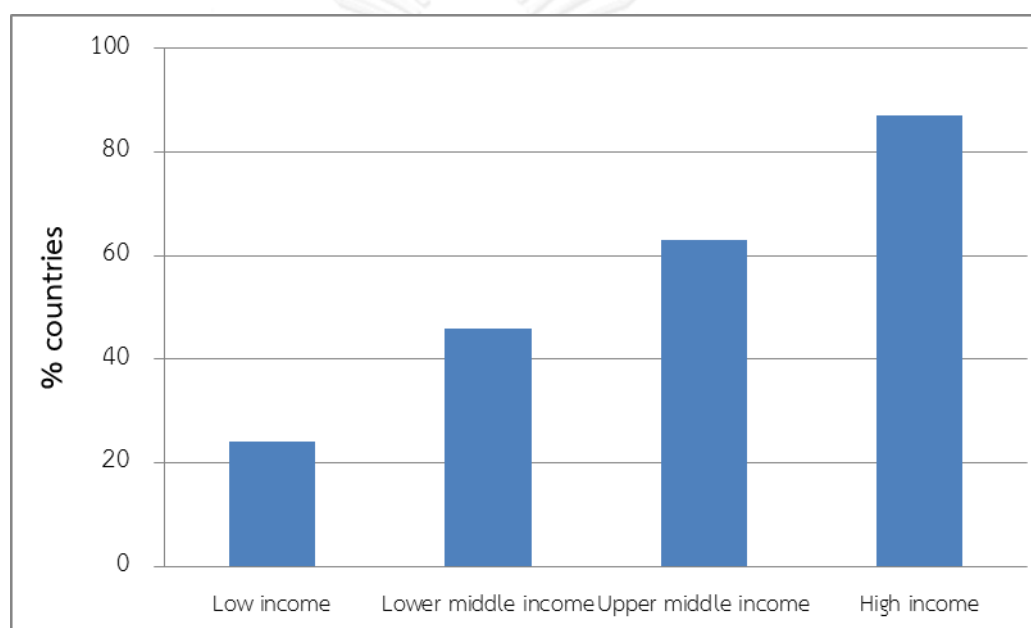
(Source: Global status report on non-communicable diseases, 2010)

In Global status report on NCDs 2010, WHO mentioned that households' OOP for health care till quite high. 5% of population takes the consequence of spending much in health care expenditure for NCDs treatment is being pushed in impoverishment. They are reduced to poverty after paying directly for seeking health care. Covering of health insurance for NCDs services is very important to these households because it can help them avoid catastrophe and impoverishment. According to latest information of WHO, low income countries where NCDs prevalence rate is high and really need health insurance cover have NCDs services and treatments covered by health insurance is nearly four times lower than high

income countries (Figure III-1) (World Health Organization, 2010a). This fact shows us that the importance of health insurance for NCDs and the coverage of health insurance for NCDs treatments and services need to be received more invest and a special attention of government.

As the knowledge was reviewed above, it is necessary to do study about the impact of health insurance on OOP health expenditure of people with NCDs and the differential impact between people with NCDs and without NCDs in individual level.

CHAPTER IV
RESEARCH METHODOLOGY

4.1.   Study design

Database is a part of a cross sectional research was conducted in the framework of the research in 2 urban districts of Hanoi in 2012 about inequalities in chronic non-communicable disease in urban Vietnam will be analyzed. The survey used both household and individual questionnaires.

Information about status of health insurance enrollment of individuals and health status of all family members, health expenditures of each member when seeking health care services, income and expenditure of households was collected aim to examine OOP spending for health by asking head of household by some following questions:

- List name of family members have health insurance card: insurance is at individuals level.
- "Over the last 12 months, has anyone in your household whether visited health facilities or had home visits by doctors for checking up/ treatment?"
- If answers of above question was "yes", follow up the questions were: 1) list the member name and the reason; 2) level medical establishments; 3) number of visit and costs for health care checks-up or non-resident treatment (outpatients services) over the past 12 months; 4) number and costs of visits for resident treatment (inpatients services) over the past 12 months?; 5) did the household afford the medical check/treatment?, If it did have some but not enough or didn't afford, how you handle it?"
- Costs/expenditures include hospital fees for check-up, treatment, medicines and others (allowances for physicians, charges for on-demand services, purchase of additional medicines, facilities, travel for caring,... relating to the visits for check-ups/treatment).

- Self-reported about NCDs status by asking head of household about each of household's member: "During last 12 months has any member of your household had any chronic disease diagnosed by a doctor or health worker?"

4.2. Sampling

This study collected data in both household and individual level in two urban districts with 15 communes: 8 communes in Dong Da districts and 7 communes in Hoan Kiem districts. Each commune has 2 residential group are slum and non-slum. Each residential group we collected data randomly in 20 households and we estimated that have 4 members in each household. Total household of this study in Hoan Kiem district is around 280 households estimated with 1,120 individuals and in Dong Da district are around 320 households with around 1,280 individuals.

4.3. Conceptual framework

Secondary data will be used to outline the effect of health insurance on individual level on reducing OOP health expenditure of NCD patients and analyze the impact of health insurance coverage rate of household has member has NCDs on financial protection.

We can calculate the health insurance enrollment rate within a household equal to the rate: number of member has health insurance card/household size.

We can calculate the means OOP health expenditure of individuals and the ratio Out-of-pocket/total consumption (OOP/TC) of individual. We calculated the ratio Out-of-pocket/total consumption (OOP/TC) of household to identify catastrophic health expenditure with cut-off point 10%. Calculate the ratio Out-of-pocket/total consumption non-food expenditure (OOP/TC non-food) of household to identify catastrophic health expenditure with cut-off point 40%

Quantile regression at different level of quantile: 25th, 50th and 75th are run to estimate factors impacts on OOP per month of individuals and the ratio OOP/TC of

individuals with explanatory variables are residential area, individual characteristics such as gender, high educational level, health seeking behavior: used inpatients services, married status, ethnicity, head of household, has any chronic NCDs diagnosed by a doctor or health worker or not, has voluntary of compulsory health insurance card. The quantile regressions are run when excluded those with OOP and the ratio OOP/TC is equal to zero.

OLS regression is used to identify the factors effect on the OOP health expenditure of individual for inpatient and outpatient health care services. Explanatory variable are residential area (slum/non-slum area), individual characteristics such as gender and educational level, married status, is a head of household, ethnicity, has any chronic NCDs diagnosed by a doctor or health worker or not, has health insurance card or do not have health insurance card and interaction between each type of health insurance and each type of NCDs.

Logit regression is used to estimate the determinants of catastrophic spending with different definition of catastrophic at cut-off point 10% and cut-off point 40%. The dependent variable are dummy variable on incurring catastrophic health expenditure are Cata10 (OOP/TP at cut-off points 10%) and Cata40 (OOP/TC non-food at cut-off point 40%). The explanatory variable are residential area, voluntary and compulsory health insurance enrollment rate within a household, education level of household's head, household has elderly people over 60 years old and children under 6 years old, NCD patients rate within a households.

Household level:

- Head of household characteristic

- Has any member has NCDs who insured or not insured by health insurance

- Total consumption expenditure of household (TC)

- Total consumption of household without food-expenditure

Individual level:

- Socioeconomic information (area, gender, educational level, has any chronic NCDs diagnosed by a doctor or health worker)

- Enroll health insurance or not

- Health care expenditure when seeking services

1. The rate of household's health insurance enrollment

2. Out-of-pocket spending in individuals and households level:

- Mean out-of-pocket for health

- OOP/TC of individuals and household

- OOP/TC-non-food expenditure of household

4.4. Some main definitions

- *Slum households*: There are many different in accessibility to health of people living in slum and non-slum areas in urban of Hanoi. Base on definition of UN, a slum/poor residential groups is defined lacking at least one or more the fowling determinants: "1) Durable housing of a permanent nature that protects against extreme climate conditions; 2) Sufficient living space which means not more than three people sharing the same room; 3) Easy access to safe water in sufficient amounts at an affordable price; 4) Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people; 5) Security of tenure that prevents forced evictions" (UN-HABITAT, 2007).

- *Residential area*: The residential area is divided by two groups based on definition of slum household mentioned above and households will be classified into slum and non-slum residential groups.

- *Household size*: The size of households is defined by asking household's head total member living and eating together and share accommodation and meals from 6 months or more over the last 12 months.

- *Household head*: The head of household in this study is the person who is the main decision maker in household.

- *Out-of-pocket payment*: OOP payment is the cost spending for health services paid by households directly when households or individuals received the health services. Costs include coinsurance, hospital fees and others such as allowances for physicians, charges for on-demand services, purchase of additional medicines, facilities, travel for caring,... relating to the visits for check-ups/treatment. Moreover, OOP payments do not include health insurance reimbursements. (World Health Organization, 2005).

- *Household's consumption expenditure*: Money of households spending for goods and services and also the value of home-made or exchanged products (World Health Organization, 2005).

- *Catastrophic*: We based on two definitions that was mentioned in previous chapter about catastrophic health expenditure:

○ Catastrophic expenditure occurs when OOP payment of household equal or greater than 10% of household's total consumption (including food and non-food expenditures) (Limwattananon et al., 2007; Wagstaff, 2007).

○ Catastrophic expenditure occurs when total OOP payment of household equal or exceed than 40% of household's total consumption without food expenditure.

4.5. Method of analysis

OLS and quantile regression are used to analysis

4.5.1. Health insurance coverage rate in a household

Household's health insurance enrollment status is transferred from individual's health insurance enrollment information by taking the number of member enroll health insurance divided by the household size.

HI rate = member with health insurance card/ household size

VHI rate = member with voluntary health insurance/household size

CHI rate = member with compulsory health insurance/household size

4.5.2. OOP health expenditure of individuals, the ratio OOP/TC of individuals and quantile regression

The advantage of quantile regression compares with classical regression techniques was mentioned in study of Tanya O'Garra and his co-author (O'Garra & Mourato, 2007):

Tobit model aims to estimate linear relationships effect across the distribution of dependent variable when there is either left- or right-censoring in the dependent variable. In this study, Tobit model generally estimate relationships between variable means when there is left-censoring in the dependent variable is OOP per month of individuals. However, Tobit regression can be biased due to the Heteroskedasticity.

Quantile regression can estimate about the effect of explanatory variable on dependent variable along the entire length of conditional distribution and when individuals' OOP has distribution is skewed tail and outliers. The quantile regression has an advantage and more favorable than Tobit because this regression can explore more statistical information about the effect of explanatory variable on dependent variable when the variable OOP health expenditure and ratio OOP/TC of individuals does not have a normal distribution.

Quantile regression was formulated by collected the concept from Roger Koenker and Kevin F. Hallock (Roger Koenker & Hallock, 2001):

Variable **Y** be a valued random variable with cumulative distribution function

$$F_Y(y) = P(Y \leq y)$$

The τth quantile of Y is:

$$Q_Y(\tau) = F_Y^{-1}(\tau) = \inf \{y : F_Y(y) \geq \tau\}$$ Where $0 < \tau < 1$

The τ sample quantile, which minimization problem and we estimate the linear conditional quantile function, Q (τ |X=x) = x'β (τ) for any quantile $0 < \tau < 1$ as following

$$\hat{\beta}_\tau = \arg \min_{\beta \in R^k} \sum_{i=1}^{n} (\rho_\tau(Y_i - X\beta)).$$

The τth regression quantile is $\hat{\beta}_{(\tau)}$

In OLS model, the coefficient of each independent variable indicates the average change in OOP payment of individuals by one unit change in that explanatory variable. But the quantile coefficients explore the change in a particular quantile of OOP by one unit change in the regression. This provides the information to compare how different percentiles of OOP may be more affected by certain factors than other percentiles (the change in size of the coefficients).

The **dependent variable** is OOP health expenditure of individual and the ratio OOP/TC of individuals

The **independent variables** are:

- Residential area: individual living in slum or non-slum residential group (slum residential area = 1)
- Individual characteristic including gender (male = 1); educational level (highest education is equal or greater than high school => highedu = 1)
- Inpatient treatment is dummy variable, individual use inpatient treatment =1
- NCD is self-reported individual information about NCD, individual has NCD which is diagnosed by a doctor of health worker = 1
- Voluntary health insurance is individual information whether individuals enroll voluntary health insurance program
- Compulsory health insurance is individual information whether individuals enroll compulsory health insurance program
- Non - health insurance: individual who do not enroll any type of health insurance program (omitted from the equation)
- Ethnicity (Kinh): individuals is "Kinh" = 1 ("Kinh" is the name of one type of Vietnam's ethnicity)
- Married status: individuals get married =1
- People is a household's head: individual is a head of household =1

The model of individual's OOP health expenditure is presented by below equation:

OOP individual = f (residential area, gender, educational level, inpatient treatment, NCD, Voluntary HI, Compulsory HI, ethnicity, married, head of household)

Or:

$$Y = \beta_0 + \beta_1 \, Slum + \beta_2 \, Male + \beta_3 \, Highedu + \beta_4 \, Inpatient + \beta_5 \, NCD + \beta_6$$
$$Voluntary \; HI + \beta_7 \; Compulsory \; HI \; \beta_8 \; Ethnicity + \beta_9 \; Married + \beta_{10}$$
$$Household's \; head + \varepsilon$$

Table IV-1: List of variable, expected sign of coefficients and explanation

Definition	Name	Type of Variable	Expected sign	Explanation
Residential area (slum residential area = 1)	Slum	Dummy	+	Individual living in non-slum residential area with lower income and less awareness about diseases, hence, they are likely pay more for OOP expenditure
Gender	Male	Dummy	+	Male are higher risk group with NCDs by using tobacco or alcohol, so they seem pay more for health care expenditure
Educational level	Highedu	Dummy	+	The higher level of education, the more they care for their health and they will spend more for health care services
Inpatient treatment	Inpatient	Dummy	+	Individual using inpatient treatment are likely to pay higher medical expenditure because using inpatients treatment means many related cost will be arises such as higher doctor fee,

				cost for bed/days, etc.
Voluntary Health insurance	Voluntary HI	Dummy	+/-	Individual has voluntary health insurance has more/less OOP payment depend on financial protection capacity of health insurance
Compulsory Health insurance	Compulsory HI	Dummy	-	Individual has compulsory health insurance has less OOP payment because compulsory health insurance can protect for users when seeking health care services
Ethnicity ("Kinh")	Ethnicity	Dummy	-	Individual is "Kinh" has higher awareness about diseases and take care about health. Therefore, they seem spend less for OOP than other ethnicity background.
Married status	Married	Dummy	-	Individuals who got marred will pay more attention on other area of family so they seem pay less for OOP spending
People is a household's head	Household's head	Dummy	-	Individuals is head of household could less spending for health care. It might be because of he/she needs to spend for other activities within a family so

				they less care about health spending
Chronic NCDs	NCD	Dummy	+	People with disease, they obviously need drugs and treatment for their diseases so they are more likely facing higher OOP health expenditure

4.5.3. OOP per year for Outpatient and Inpatient services of individuals

The **dependent variable** is OOP health expenditure for outpatient and inpatient services per year.

The independent variables are: Residential area, Individual educational level, people is a household's head, married status, ethnicity, voluntary health insurance, compulsory health insurance are defined as in the previous part. In additional, there are some following independent variables and interaction between Voluntary health insurance and Compulsory health insurance with each type of NCDs in below Table IV-2. The interaction between health insurance and type of NCDs is equal to 1 when individuals with any type of NCDs and be insured by health insurance, and equal to 0 if individuals with NCDs who are not insured by health insurance or individuals without NCDs but enroll health insurance.

Table IV-2: Description of variable

Variable	Description
VHI. Hypertension	1 if individuals have voluntary health insurance with Hypertension
VHI. Cardiovascular disease	1 if individuals have voluntary health insurance with Cardiovascular disease

VHI. Obstructive pulmonary, asthma	1 if individuals have voluntary health insurance with Obstructive pulmonary and asthma
VHI. Diabetes	1 if individuals have voluntary health insurance with Diabetes
VHI. Cancer	1 if individuals have voluntary health insurance with Cancer
VHI. Others	1 if individuals have voluntary health insurance with Other diseases[4] (omitted from the equation)
CHI. Hypertension	1 if individuals have compulsory health insurance with Hypertension
CHI. Cardiovascular disease	1 if individuals have compulsory health insurance with Cardiovascular disease
CHI. Obstructive pulmonary, asthma	1 if individuals have compulsory health insurance with Obstructive pulmonary and asthma
CHI. Diabetes	1 if individuals have compulsory health insurance with Diabetes
CHI. Cancer	1 if individuals have compulsory health insurance with Cancer
CHI. Others	1 if individuals have voluntary health insurance with Other diseases (omitted from the equation)
Hypertension	1 if individuals with Hypertension
Cardiovascular	1 if individuals with Cardiovascular disease
Obstructive pulmonary, asthma	1 if individuals with Obstructive pulmonary and asthma disease
Diabetes	1 if individuals with Diabetes
Cancer	1 if individuals with Cancer
Others	1 if individuals with Other disease

4.5.4. OOP/TC of households and Catastrophic expenditure of households

The logit regression is used to estimate the determinants of catastrophic expenditure are presented by the below equation:

[4] Others disease such as: Hepatitis, Osteoarthritis, Goiter, Renal impairment, Gout, etc.

Cata = f (residential area, educational level household's head, voluntary health insurance enrollment rate, compulsory health insurance enrollment rate, elderly people, children under 6, inpatient treatment, NCD rate)

Or:

$$Y = \beta_0 + \beta_1 \, Slum + \beta_2 \, High \; education \; head + \beta_3 \, voluntary \; HI \; rate + \beta_4 \, Compulsory \; HI \; rate + \beta_5 \, Elderly + \beta_6 \, Children \; under \; 6 + \beta_7 \, Inpatient + \beta_8 \, NCD \; rate + \varepsilon$$

The **dependent variables** are dummy variable on incurring catastrophic spending Cata10 and Cata40 with different definitions:

Cata10 = 1 indicate that OOP of household is greater than 10% of total consumption of household, household with catastrophic health expenditure.

Cata40 = 1 if OOP of household is greater than 40% of total non-food consumption of household, indicate that household incur catastrophic health expenditure.

Table IV-3: List of variable, expected sign of coefficients and explanation

Definition	Name	Type of Variable	Expected sign	Explanation
Residential area (slum residential area = 1)	Slum	Dummy	+	Household in slum residential area with lower income and less awareness about diseases, can higher chance to face catastrophic spending

Head of household with high education	High education head	Dummy	-	The higher level of education of household's head, the less chance household facing catastrophic
Voluntary health insurance enrollment rate	Voluntary HI rate	Continuous	-	The higher rate of voluntary health insurance enrollment rate, the less chance household face catastrophic spending
Compulsory health insurance enrollment rate	Compulsory HI rate	Continuous	-	The higher rate of compulsory health insurance enrollment rate, the less chance household face catastrophic spending
Household has elderly people	Elderly people	Dummy	+	Household have elderly – the high risk group can be more incur catastrophic health spending
Household has children under 6	Children	Dummy	+	Household have children under 6 years old – the high risk group can be more incur catastrophic
Used inpatient health care	Inpatients	Dummy	+	Household have people used inpatient

services				services with many related cost will be arises such as higher doctor fee, cost for bed/days, etc can be more occur catastrophic spending
NCD rate	NCD rate	Continuous	+	More member, higher risk with NCD, households will have more chance to face catastrophic

CHAPTER V

DATA DESCRIPTION

An overview and some major information of data used in this study will be described in this chapter. Total households in dataset are 614 households with 2,409 individuals were collected information in 2012. This chapter will summarize statistic results some main selected variables that we reckon these variables affect households' expenditure and concern with our questions and objectives in this study.

Table V-1: Description some main characteristics of household, 2012

Variable	Mean	SD	Min	Max
Households size (person)	4.71	1.88	1	11
Number of children under 6 in household	0.48	0.71	0	3
Number of elderly in household (over 60)	0.91	0.86	0	4
Number of household's member enroll voluntary health insurance	0.53	0.94	0	6
Number of household's member enroll compulsory health insurance	3.20	2.00	0	11
Number of NCD patients*	0.77	0.79	0	4

* People who are diagnosed with NCDs by a doctor or health worker

Table V-1 gives us to have some information about households and individuals in study setting. Number of household's member ranges from 1 to 11 people. The average of household size in study setting was 4.71 persons while the average of number of children less than 6 years old and elderly (over 60 years old) were quite high compare with the mean of household size, were 0.48 and 0.91, respectively. The reason is typical Vietnamese families have four members include parents, one or two children and some families living with elderly persons: their mother/father or their parents, some traditional Vietnamese families living together with more than two or three generations. In study setting, we have only 1 household living in slum residential area have 11 members (Table A-1). Mean of number of NCD

patients in a household was 0.77 persons. There are some families have up to 4 household members with NCDs. On average, a household has 0.53 people enroll voluntary health insurance and mean of number of household's member enroll compulsory health insurance was 3.20 people.

Table V-2: Description of Out-of-pocket payment of individual and a household

Unit: 1,000VND (Thousand Vietnam Dong)

Variable	Slum	Non-slum	Total
	Mean	Mean	Mean
OOP for outpatient of individual*	65.72	61.15	63.27
OOP for inpatient of individual*	45.47	90.40	69.54
Total OOP of individual*	**111.18**	**151.55**	**132.81**
Total OOP of household*	**752.06**	**413.48**	**594.93**
Total household expenditure*	9955.99	17478.71	13987.47
Total expenditure per person*	2542.42	3692.51	3158.76
OOP individual / TC individual**	**0.044**	**0.047**	**0.047**
OOP household / TC household**	**0.040**	**0.050**	**0.046**

* OOP payment and expenditure are per month

** TC individual: Total consumption of individual; TC household: Total consumption of household

In a month, individual spent 132.81 thousand VND (US$ 6.3) OOP health spending and total household spent 594.93 thousand VND (US$ 28.33) OOP spending for health care in average. The households and people living in non-slum residential area seems have OOP for health higher than who live in slum area in health expenditure. The mean of total household's expenditure per month in study setting was 13987.47 thousand VND (US$ 666.07) and mean of expenditure per person was 3158.76 thousand VND (US$ 150.42). However, the statistic result shows that these figures are of different levels and very unequal in each area. The mean of total expenditure of non-slum household and slum household were 17478.71 thousand VND (US$ 832.32) and 9955.99 thousand VND (US$ 474.09), respectively. In total,

mean of the ratio OOP individual / TC individual was 0.047 and OOP household / TC household was 0.046.

The proportion of households living in non-slum and slum area in this study was 49.19% and 50.81% (Table V-3). However, the household has head is a man in this study was 311 households accounted 50.65%. The number of household has head with high education that the highest qualification of household's head was at high school level or higher was 352, accounted 57.33% in total household in study setting. Among households have head with high educational level, 200 households in non-slum area accounted 56.82% and 152 households in slum area, 43.18%.

Table V-3: Distribution of some characteristics of households

Characteristics		Frequency	Percentage
Residential area	Non-slum	302	49.19%
	Slum	312	50.81%
Household has head is a man	No	303	49.35%
	Yes	311	59.65%
The head of household has high educational level[5]			
	No	262	42.67%
	Yes	352	57.33%
In which:	Non-slum	200	56.82%
	Slum	152	43.18%

Some statistic of people with and without NCDs which classified among area group: slum versus non-slum residential area and among enrollment health insurance status will be showed in table V-4 below:

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[5] The head of household has high educational level means the highest qualification of the household's head was at high school level or higher. The household's head has low education means the highest qualification of household's head was at secondary school or lower.

Table V-4: Status of Non-communicable diseases patients

Variable	NCDs		Non-NCDs	
	Frequency	Percentage	Frequency	Percentage
Location (Residential area)				
Non-slum	269	20.84%	1022	79.16%
Slum	181	16.19%	937	83.81%
Enroll health insurance				
No	68	13.91%	421	86.09%
Yes	380	19.96%	1524	80.04%

In Table V-4, the proportions of NCD patients in non-slum area are 20.84% and higher than in slum area 16.19%. Besides, we can see the adverse selection actual situation in this study setting when NCD patients are more likely enrolling health insurance than the others who do not have any NCDs with percentages were 19.96% compare with 13.91%. Among NCDs patients, 380 individuals enrolled health insurance while only 68 people do not enroll health insurance.

Table V-5: Health insurance coverage rate within a household

Variable	Mean	SD
Total	0.79	0.28
Type of health insurance		
Voluntary health insurance rate	0.12	0.23
Compulsory health insurance rate	0.67	0.31
Location		
Non-slum	0.85	0.23
Slum	0.73	0.32

The mean of health insurance coverage rate within a household in average was 79%, which is higher than the coverage in 2012 in the whole country (67% of population) (Ministry of Health, 2012), in which: mean of coverage rate was 12% among voluntary health insurance and the mean of compulsory health insurance enrollment rate was 67%. There is a large difference on mean of proportion of

health insurance coverage between voluntary and compulsory health insurance rate. According to the Health Insurance Law, in 2012, agricultural group is added in obligated to buy health insurance group, therefore, groups enroll compulsory health insurance were employees, employers, civil servants, pensioners, social protection groups, poor, minorities, elderly, dependents of army officer, soldiers, children under 6, near poor, students, pupils and famers. Groups which were obligated to buy health insurance and enroll compulsory health insurance are larger than the remaining groups that are not obligated to buy. Hence, the average of compulsory health insurance enrollment rate was 67% – higher than the voluntary health insurance coverage rate was 12%. Households living in non-slum area have the higher mean of health insurance coverage (was 85%) than household lived in poor area (was 73%).

There are differences in percentage of people and mean of times when people using inpatient and outpatient facility when seeking health care services classified by health insurance enrollment; people with NCDs, living area and type of health facilities people visited have been showed in Table V-6 and Table V-7 below.

Table V-6: Percentage of people seeking Inpatient and Outpatient services

Variable	Inpatient services	Outpatient services
	Percentage (%)	Percentage (%)
Individual is a NCD patient		
No	49.70	57.70
Yes	50.30	42.30
Individual enroll health insurance		
No	11.31	14.37
Yes	88.69	85.63
Location		
Non-slum	57.40	59.72
Slum	42.60	40.28
Type of health facilities		

Government Hospital	52.66	32.43
Region Hospital	28.99	32.59
Private Health Facility	6.51	15.74
Others*	11.83	19.24

* Others such as: Health collaborator, Commune health center, Traditional physicians, individual medical services.

50.30% NCDs patients used inpatients health care services and 42.30% NCDs patients used outpatient services. Individuals with NCDs have trend to used health care services in inpatients health care services than whom without NCDs. The proportion of individuals with health insurance used health care services both inpatient and outpatient is larger than the non-insured group, which was 88.69%, among inpatients services and 85.63% among outpatient services. The disadvantage group is likely visited for health check or non-resident treatment less than the non-slum group was 40.28% compare 59.72%.

About type of medical establishment has patients visited: when people use outpatients services, people seem prefer Region and Government Hospital and percentage of people chose Region Hospital was 32.59% and Government Hospital was 32.43%, Private health facilities are private hospital or private clinics is lowest was 15.74%. It can be explained because citizens believe that in Government Hospital and Region Hospital, they can receive the best quality services like better quality of physicians and nurses and better technology or medical equipment

Table V-7: Health care seeking behavior - Inpatient and Outpatient services

Variable		Inpatient services	Outpatient services
		Mean (times)	Mean (times)
Individual is a NCD patient			
	No	0.06	0.62
	Yes	0.37	3.48
Individual enroll health insurance			
	No	0.05	0.51

Yes	0.14	1.32
Location		
Non-slum	0.12	1.23
Slum	0.12	1.07
Type of health facilities		
Government Hospital	0.57	3.09
Region Hospital	0.36	4.11
Private Health Facility	0.16	2.98
Others*	0.25	4.91

* Others such as: Health collaborator, Commune health center, Traditional physicians, individual medical services.

In general, number of visits in inpatient and outpatient services of NCDs patient and people who have health insurance were higher than the remaining groups. Mean of times of NCDs patients for using inpatient services was 0.37 times per year and of people who have health insurance visit for resident treatment was 0.14 times. In this table, the NCDs patients and people insured seemed to seek for both inpatient and outpatient care higher than the remaining groups in number of visits. It is completely understandable when people have chronic diseases they will seek health care services more than the others.

The mean of times when people choose type of medical establishment has they visited quite similar with situation in previous specification showed in Table V-6. For outpatient services, people have mean of times for visiting health facilities such as health collaborator, commune health center or individual medical services more than choose Government Hospital. It can be explain because services in higher level like Government hospital or Region Hospital sometime do not meet with the expectation of patients like imported drugs which is out of national essential drugs list or no unpredictable waiting time or overcrowding in national health facilities and its consequences make patients sometime received the stressful behavior or negative attitudes of health care staff such as frustrating and grumpy. However, when people must use inpatient services, they prefer using Government hospitals with the

mean was 0.57 times; follow by Region Hospital such as District or Provincial Hospital than the other type of health facilities. With the same reason explained above, when seeking inpatient health services, citizens still believe that in Government hospital, they can receive better services with high quality of physicians and nurses, better technology or medical equipment.

Table V-8: Non-parametric test of mean OOP payment classified by NCDs[6]

Unit: 1,000VND (Thousand Vietnam Dong)

Variable	Mean OOP of individual per month	
NCDs	No	75.65935
	Yes	381.630
Hypertension	No	106.2194
	Yes	415.7246
Cardiovascular diseases	No	106.265
	Yes	816.9074
Chronic respiratory and asthma	No	126.2201
	Yes	544.2697
Diabetes	No	126.5187
	Yes	343.1857
Cancer	No	128.2099
	Yes	920.5357
Others*	No	109.7162
	Yes	375.9549

* Others disease such as: Hepatitis, Osteoarthritis, Goiter, Renal impairment, Gout, etc.

Table V-8 is non-parametric test of mean OOP health expenditure classified by type of NCDs. NCDs patients have OOP health spending higher than individuals without NCDs. 6 groups of NCDs are hypertension, cardiovascular disease, chronic respiratory/asthma, diabetes, cancer and others disease such as hepatitis,

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[6] Due to the distribution of variable OOP of individual per month is not a normal distribution (See Figure A-1 at Appendix)

osteoarthritis, goiter, renal impairment, etc. Mean OOP payment of patients with each type of NCDs was higher than whom without any NCDs. Cancer and cardiovascular patients have highest OOP health expenditure among 6 groups of diseases are 920.535 thousand VND (US$ 43.8) for cancer and 816.907 thousand VND (US$ 38.9).

Table V-9: Non-parametric test of mean OOP payment's determinants

Unit: 1,000VND (Thousand Vietnam Dong)

Variable		Mean OOP of individual per month	P-value
Gender	Male	122.23	0.0009
	Female	142.56	
Location	Non-slum	151.55	0.0133
	Slum	111.18	
NCD	No	75.66	0.0000
	Yes	381.63	
Inpatient services	No[7]	55.48	0.0000
	Yes	1157.86	
Outpatient services	No	55.48	0.0000
	Yes	304.98	
Health insurance	No	74.02	0.0019
	Yes	148.23	
Level of education			
	Secondary school or lower	115.88	0.1143
	High school or higher	148.25	
Type of health facility			
	Government Hospital	602.41	0.0001
	Region Hospital	316.61	

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[7] People who do not used any inpatient or outpatient services still have OOP expenditure because they still spend for health such as: buy some medicine for ill or get injured like cough, fever, headache, vomiting, etc.

Private Health Facility	384.28
Others*	320.86

* Others such as: Health collaborator, Commune health center, Traditional physicians, Individual medical services.

We can see the distribution of variable OOP of individual per month is not a normal distribution (See Figure A-1 at Appendix), so we use non-parametric test (Table V-9) to compare and find the differences of independent variables with dependent variable OOP of individual per month. The results show that there are differences on mean of OOP of individual per month in each groups: gender, residence area, people with NCDs, patients use inpatient and outpatient services, health insurance enrollment and type of medical establishment (except in educational level); and these differences are statistically significant with p-value of Kruskal Wallis test are less than 0.05. Health spending of people who do not used any inpatient or outpatient health care services are quite low, mean of OOP of people who do not used inpatient services and outpatient services was only 55.48 thousand VND (US$ 2.64) per month. For those who do not use any inpatient or outpatient health care services means that they use self-treatment.

CHAPTER VI
RESULTS AND DISCUSSION

      This chapter will show the main results of this study associated with the study's objectives and the determinants of OOP health expenditure of individuals, OOP/TC of individuals and catastrophic health expenditure of household with different definition cut off point, 10% and 40%, and its determinants. In additional, the discussion about the study, the results and the limitations of study will be presented in this chapter also.

6.1.   Out-of-pocket health expenditure of individuals and determinants

Table VI-1: Quantile Regression of OOP per month of individuals[8]

Explanatory variables	Coefficients of Tobit Regression (SD)	Coefficients of Quantile Regression at different quantiles (Std. Err)		
		25th	50th	75th
Slum	-113.304	-8.333	6.250	29.167
	(96.274)	(9.484)	(23.549)	(60.934)
Male	-118.472	0.000	10.417	29.167
	(94.517)	(9.466)	(23.349)	(60.099)
High education	-11.086	**25.000****	35.417	**125.000****
	(109.59)	*(10.395)*	(24.765)	*(63.659)*
Inpatient treatment	**2335.15****	**83.333****	**381.25****	**791.667****
	(147.289)	*(10.493)*	*(26.136)*	*(66.681)*
NCDs	**1023.07****	8.333	**77.083****	**187.500****

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[8] We excluded those with OOP = 0

	(123.578)	(10.203)	*(25.519)*	*(67.805)*
Voluntary health insurance[9]	225.474	8.333	-14.583	-120.833
	(167.222)	(17.131)	(41.191)	(105.577)
Compulsory health insurance[9]	-33.650	**-33.333****	**-54.167***	**-162.499***
	(128.695)	*(13.709)*	*(32.477)*	*(83.778)*
Ethnicity ("Kinh")	-529.155	**-791.67*****	**-2391.67*****	**-2187.5*****
	(425.338)	*(39.642)*	*(104.007)*	*(235.17)*
Married	**-185.899****	-16.667	-16.667	-12.500
	(76.089)	(10.807)	(26.109)	(67.150)
Household's head	153.565	-8.333	-6.250	12.500
	(119.259)	(10.123)	(25.623)	(68.016)
Constant	820.208	858.333	2493.75	2487.500
	(477.241)	(42.381)	(111.045)	(253.88)
Number of observations	2196	557	557	557
Pseudo R2	0.0437	0.0294	0.0793	0.1268

***: Significant at 1% significant level

**: Significant at 5% significant level

*: Significant at 10% significant level

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[9] Omitted group is non – health insurance group

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity:

Ho: Constant variance

Variables: slum male highedu inpatient ncd voluntaryhi compulsoryhi ethnicity married householdhead

chi2 (10)   =   59.46

Prob > chi2 =   0.0000

The coefficient of Tobit regression show the independent variables significantly determine OOP per month of individuals are used inpatient health care services, NCDs and married status at 1% and 5% significant level. However, the result of Breusch-Pagan test for heteroskedasticity indicates that the estimation of Tobit regression was biased due to the Heteroskedasticity (p<0.05) so we used quantile regression for our estimation about OOP per month of individuals.

The results in Table VI-1 show the estimated coefficients of quantile regression at different quantiles on OOP payment of individual per month at 95% of confidence interval. In general, people have NCD which is diagnosed by a doctor or health worker have OOP spending significantly higher than people do not have NCD. It is understandable when people with chronic disease, they obviously need drugs and treatment for their diseases, even some people need to use surgery services, so their spending for health will be increased. The difference were significantly different at 5% and 10% significant level (p<0.05 and p<0.1) at 50th and 75th quantiles. The OOP health expenditure of people who used inpatient health services was significantly higher than those who do not use inpatient health care services in all quantiles at 1% significant level. Using inpatients treatment means many related cost will be arises such as higher doctor fee, cost for bed/days, travel cost of family member, etc. "Kinh[10]" tend to spend less than other ethnicity background, significantly different. Individuals with higher level of education are likely pay more for health expenditure than the other with lower level of education in all quantiles; the different was statistically significant at 25th and 75th quantiles level. Due to high educational level, people's knowledge and awareness will be higher, especially

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[10] "Kinh" is the name of one type of Vietnam's ethnicity

about health care; people with high level of education will spend more for their health care than other with lower educational level.

At 25th, 50th and 75th quantiles, the coefficients of compulsory health insurance indicate that compulsory health insurance can protect for individuals, can reduce OOP health expenditure individuals, they will pay less than those who do not have health insurance, and these differences are significant at 5% and 10% significant level. Moreover, the magnitude of coefficients is larger at the higher percentiles, which indicate that Compulsory health insurance is more effective for those with higher health expenditure.

Table VI-2: OOP per year for Outpatient and Inpatient services of individuals with Voluntary Health Insurance, with robust Standard Errors [11]

Explanatory variables	OOP for Outpatient services		OOP for Inpatient services	
	Coefficient	Std. Err	Coefficient	Std. Err
VHI. Hypertension	1035.293	1026.857	-4030.56	3561.294
VHI. Cardiovascular disease	2819.71	2144.529	-5881.603	3996.798
VHI. Obstructive pulmonary, asthma	-1266.022	1256.72	2371.169	3748.165
VHI. Diabetes	-2371.026	2203.431	**5464.22***	2882.702
VHI. Cancer	-981.394	5162.79	98305.59	69667.72
Hypertension	42.2328	378.474	779.802	1042.707
Cardiovascular disease	**2426.605****	994.202	**7654.88****	3605.645
Obstructive pulmonary, asthma	1074.486	738.61	1652.567	1925.705
Diabetes	**1528.6*****	819.242	-1298.27	1478.012

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[11] Omitted group is groups of individual without NCDs and do not have VHI

Cancer	**5957.85****	2687.193	2375.75	2548.902
Others disease	**1242.84*****	356.077	**1785.938**	1107.36
Voluntary Health Insurance	**728.295***	439.344	**853.276***	471.747
Slum	220.293	163.129	**-350.823***	203.3867
Married	-23.339	224.715	290.838	312.519
High education	-54.8502	181.9771	-8.862	235.947
Household's head	156.267	250.045	-210.76	526.402
Ethnicity	-3708.8	2327.47	-2362.764	2304.035
Constant	3921.72	2320.732	2492.385	2325.404

Number of observations	2355	2355
F(16, 2338)	5.09	2.49
Prob. > F	0.000	0.0007
R-squared	0.0756	0.2054
Root MSE	3932	6602.5

***: Significant at 1% significant level

**: Significant at 5% significant level

*: Significant at 10% significant level

Table VI-2 above is OLS regression with robust Standard errors, indicates the difference of OOP payment for outpatient and inpatient health care services and affection of voluntary health insurance. As results have shown previous part, using inpatient service lead higher OOP payment, therefore, people in slum area tend do not want to use inpatients services and seem spend less on inpatient health care services than non-slum residential group significantly.

Looking at each type of NCDs, people with NCDs in general have higher OOP payment with coefficient is positive. Especially, cardiovascular disease and cancer were two type of disease which had a significant effect on OOP health expenditure of individuals. As Table VI-2 shows that in general, people with NCDs have OOP payment for both non-resident and resident treatment higher than ones without NCDs. Individuals with other diseases have higher OOP for outpatient services than those without these NCDs with positive coefficient were 1242.84 and the difference was significant at 1% significant level. Cancer and cardiovascular patients face to the higher OOP spending on health with the highest coefficient were 5957.85 (outpatient services) for cancer compare with individuals without Cancer, 2426.605 (outpatient services) and 7654.88 (inpatient services) for cardiovascular disease compare with individuals without cardiovascular. For diabetes disease, the coefficient was 1528.6 for outpatient services. These differences are statistically significant. It explained by the problem of current situation of NCDs which we mentioned in previous chapter. These diseases have high costs for drugs and medical treatment and cost for surgery is very high and more expensive than the other NCDs. People with chronic diseases tend to buy voluntary health insurance for reducing their OOP health expenditure. Voluntary health insurance here still has not help to protect individuals from high OOP health expenditure compare with those who not enroll health insurance and those who enroll compulsory health insurance.

Table VI-3: OOP per year for Outpatient and Inpatient services of individuals with Compulsory Health Insurance, with robust Standard Errors [12]

Explanatory variables	OOP for Out-patient services		OOP for Inpatient services	
	Coefficient	Std. Err	Coefficient	Std. Err
CHI. Hypertension	**-1921.34****	884.417	1523.031	2814.689
CHI. Cardiovascular disease	-672.528	1807.99	4914.085	4279.587

[12] Omitted group is groups of individual without NCDs and do not have CHI

CHI. Pulmonary, asthma	-1796.991	1978.159	-8804.99	5867.109
CHI. Diabetes	2311.27	1565.433	**-4394.98***	2453.958
CHI. Cancer	2948.506	4373.772	-49793.55	43441.5
Hypertension	**1684.39****	828.236	-943.862	2593.143
Cardiovascular disease	**3554.99****	1423.72	**3156.121****	1538.028
Obstructive pulmonary, asthma	2269.58	1887.042	8697.896	5663.414
Diabetes	-476.179	1261.138	**2781.42***	1615.09
Cancer	3695.385	2962.126	52154.24	43337.39
Other diseases	**1230.83*****	351.458	**1848.06***	1100.85
Compulsory Health Insurance	**-522.246****	212.0602	**-425.631***	245.565
Slum	165.034	158.091	**-443.869***	253.8315
Married	-98.8237	225.151	77.1634	314.141
High education	-16.02157	191.829	252.663	273.8543
Household's head	148.558	247.604	-310.429	542.087
Ethnicity	**-3792.42***	2296.05	-2493.49	2341.84
Constant	4487.066	2269.96	3037.48	2400.47

Number of observations	2355	2355
F(17, 2337)	5.17	2.22
Prob. > F	0.000	0.0028
R-squared	0.0764	0.1343
Root MSE	3930.2	6891.5

***: Significant at 1% significant level

**: Significant at 5% significant level

*: Significant at 10% significant level

Table VI-3 is OLS regression with robust Standard errors, shows the difference of OOP payment for outpatient and inpatient health care services per year and impact of compulsory health insurance. People living in slum area seem spending less for inpatient services than non-slum residential group. This result here is the same with what we found and explained in the previous specification showed in Table VI-2.

Looking at each type of NCDs, people with NCDs in general have higher OOP payment with coefficient is positive than those without NCDs. Hypertension, cardiovascular disease and diabetes had a significant positive effect on OOP health expenditure of individuals. Patients with hypertension normally use outpatient services more than inpatient services therefore this disease have positive impact on OOP for outpatient health care services. Diabetes has significant positive effect on OOP for inpatient services. It can be explained because diabetes patients can be threatened by the acute and chronic symptom. The treatment cost for diabetes can be a combination of many factors. Additionally, for those who need to use inpatients services, cost for the complications of this disease is 2 to 4 times higher compare with those without diabetes including drugs, equipment, clinical laboratory testing (Van Son, 2012). Cardiovascular disease has a significant positive effect on OOP for both outpatient and inpatient services. These differences are statistically significant at different significance level.

Compulsory health insurance has significant protection with hypertension when patients seek outpatient health care services and with diabetes patients when they use inpatient health care services than hypertension patients and diabetes patients who do not enroll compulsory health insurance (including patient not enrolls any type of health insurance and enrolls in voluntary health insurance). Compare between OOP for outpatient health care services of hypertension patients insured and not insured by compulsory health insurance. Total of coefficients of hypertension and interaction between CHI and hypertension is less than 0 indicates that this type of health insurance can help for hypertension patients to reduce their OOP spending compared with patients who are not insured by compulsory health

insurance. With the same tendency in OOP for inpatient services, total of coefficients of diabetes and interaction between CHI and diabetes is less than 0 indicates that this type of health insurance can help for diabetes patients to reduce their OOP spending compared with patients who are not insured by compulsory health insurance when seek inpatient services.

The coefficient of compulsory health insurance is negative relative for both outpatient and inpatients health services, respectively. This proves that individual enroll compulsory health insurance can be protected by insurance when seek both non-resident and resident treatment. Compulsory health insurance help to reduce OOP health expenditure, people who enroll compulsory health insurance will pay less than others who do not have this type of health insurance and these differences are statistically significant. The magnitude of coefficient of OOP for outpatient and inpatients services indicating that compulsory health insurance more effective for outpatient services than inpatient services.

The sign of voluntary health insurance in Table VI-2 is positive and compulsory health insurance in Table VI-3 is negative in result part could suggest the adverse selection[13] situation among those who only enroll voluntary health insurance when they have demand or need to use for health care check-up or treatment. As mention about benefit of people enroll health insurance in previous chapter, when people seek health care services at registed primary facility level, the insured people can be exempted 100% cost if total health care check-up or treatment cost is no more than 15% of minimum salary/wages. If the reimbursement is greater than 15% of minimum salary/wages, patients have to co-payment from 5% to 20% of total cost with the different rate for different categories of the insured and health insurance fund will cover 80% - 95%. For the pass-by insured people without

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[13] In order to avoid deficit health insurance fund, reimbursement ceiling is applied with no more than 40 times of minimum salary (42,000,000 VND – US$ 2,000). While cost for surgery of some diseases like cardiovascular or cancer can be 200 million – 300 million VND (around US$ 9,500 – 15,000). Therefore, health insurance still cannot protect for patients

referral line, patients must pay coinsurance rate: 30% of cost for health care services at Grade III hospital, 50% at Grade II hospital and 70% at Grade I hospital. (The definitions of different Grad of hospital were mentioned at previous chapter).

Health expenditure of NCD patients – high-risk group is naturally higher than normal so whether these patients have health insurance their expenditure for health is still high even very high. Moreover, NCDs patients always tend to visit higher level health facility like Government hospital because they believe that drugs in higher level will be better, so the coverage of health insurance fund is only 30% of treatment cost for patients. These are the reason explained for the adverse selection actual situation, only when do patients have disease they buy voluntary health insurance, therefore voluntary health insurance could protect these patients to reduce only a part of their OOP for health care, the spending for health care services still very high.

6.2. The ratio of individuals' OOP health expenditure and total consumption (OOP/TC of individuals) and its determinants

Table VI-4: Quantile Regression of the ratio OOP/TC of individuals[14][15]

Explanatory variables	Coefficients of Quantile Regression at different quantiles (Std. Err)		
	25th	50th	75th
Slum	-0.00153	0.01307*	0.02384
	(0.0027)	(0.0079)	(0.0180)
Male	0.00019	-0.00071	0.00776
	(0.0027)	(0.0078)	(0.0178)

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[14] We excluded those with OOP/TC of individuals =0

[15] Omitted group is non – health insurance group

|			
High educational level	-0.00051	0.00519	0.01633
	(0.003)	(0.0083)	(0.019)
Used inpatient services	**0.05047***	**0.17881***	**0.34671***
	(0.0030)	(0.0087)	(0.0197)
NCDs	0.00409	**0.01641***	**0.06788***
	(0.0028)	(0.0085)	(0.02)
Voluntary health insurance	**-0.00866***	0.01171	-0.01916
	(0.0048)	(0.0137)	(0.0307)
Compulsory health insurance	**-0.01868***	**-0.02533****	**-0.04192***
	(0.0038)	(0.0109)	(0.0246)
Ethnicity ("Kinh")	**-0.25511***	**-0.40178***	**-0.63580***
	(0.0113)	(0.0346)	(0.073)
Married status	-0.00207	-0.00798	-0.03044
	(0.0031)	(0.0087)	(0.0202)
Household's head	-0.00429	0.00887	0.02609
	(0.0029)	(0.0085)	(0.0203)
Constant	0.28485	0.44547	0.74201
	(0.0121)	(0.0369)	(0.0785)
Number of observations	557	557	557
Pseudo R2	0.0324	0.0911	0.1734

***: Significant at 1% significant level

**: Significant at 5% significant level

*: Significant at 10% significant level

In Table VI-4, we can see that people living in slum residential area has higher ratio OOP/TC than people living in non-slum area and the difference was significant at 50th quantile at 10% significant level (p<0.1). It complicatedly reasonable because individual living in non-slum residential area with lower income and less awareness about diseases, hence, they are likely pay more for OOP expenditure. People used inpatients health care services have higher ratio OOP/TC than those who do not use inpatient services. "Kinh" have the ratio OOP/TC lower than others ethnicity background. These differences are significant at all quantile level. Individual with NCDs always have higher ratio OOP/TC than whom without NCDs, these differences are significant at 50th and 75th quantiles. At 25th quantiles, voluntary health insurance statistically significant can help to protect for individuals with the negative sign of coefficients compare with those who do not enroll any type of health insurance. For compulsory health insurance in all quantiles, the sign of coefficients are negative, it is obvious to say that compulsory health insurance have a financial protect for individuals, can help to reduce the ratio OOP/TC of individuals at 1%, 5% and 10% significant level compare with individuals group who do not insured by any type of health insurance.

6.3. The ratio of OOP health expenditure and total consumption of households (OOP/TC) and Catastrophic health spending

Figure VI-1: Histogram of OOP/TC of household
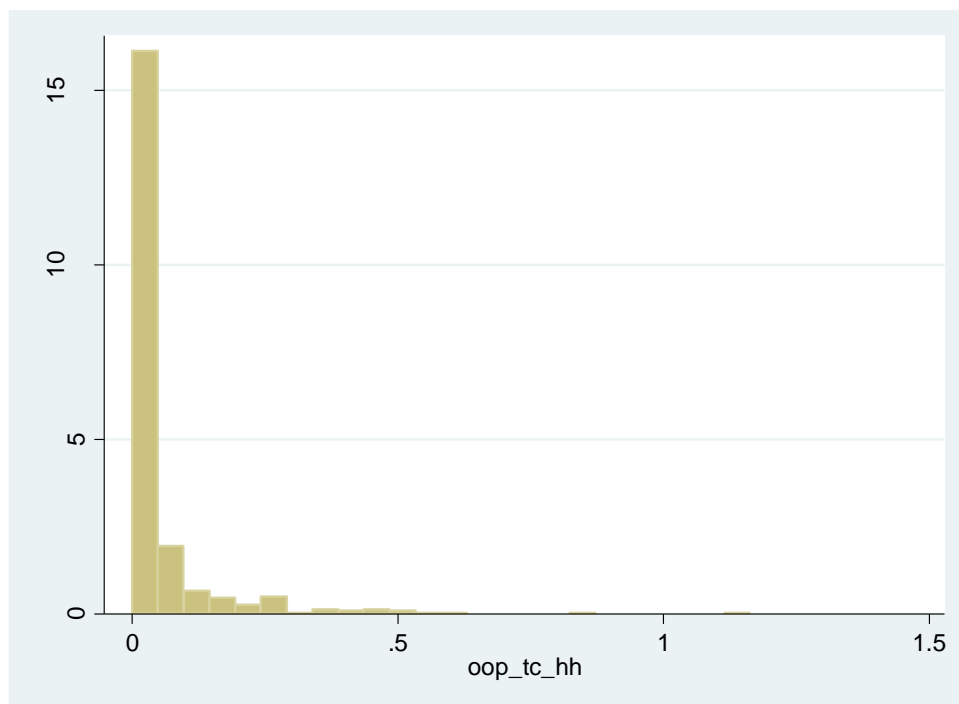
There were 250 households with zero out-of-pocket health care spending in our dataset, accounted for 40%. Figure VI-1 show the ratio of OOP/TC of household does not have a normal distribution, but right-skewed distribution with outliers.

As mention in previous chapter, catastrophic expenditure occurs when OOP payment of household equal or greater than 10% of household's total consumption (including food and non-food expenditures) (Limwattananon et al., 2007). As defined by WHO, catastrophic expenditure occurs when OOP payment of household equal or exceeds 40% of its total consumption exclude food expenditure (non-food expenditure consumption). Coefficient estimates for logit regression of catastrophic health expenditure at cut-off point 10% and 40% are presented in the Table VI-5 below:

Table VI-5: Logit Regression of catastrophic spending

at cut-off point 10% and 40%

Explanatory variables	Coefficient Cata10	Coefficient Cata40
Slum	0.7985**	0.5758
Household's head with high education	-0.2773	-0.0944
Voluntary health insurance enrollment rate	1.3977**	1.6692*
Compulsory health insurance enrollment rate	-0.3793	-0.2098
Elderly people	-0.2112	-0.0619
Children under 6	-0.4081	0.1843**
Inpatients service	2.6511***	2.876***
NCD rate	0.9770*	0.4947
Constant	-3.8251	-4.2945
Number of observation	614	614
LR chi2(8)	103.98	55.13
Prob > chi2	0.000	0.000
Pseudo R2	0.2301	0.2359
Log likelihood	-173.9381	-89.2674

***: Significant at 1% significant level

**: Significant at 5% significant level

*: Significant at 10% significant level

The Table VI-5 above shows the results of logit regression for determinants of Catastrophic of household compare between at 10% and 40%.

The independent variables have significant effects on catastrophic 10% at 95% confidence interval are: residential living area, the NCDs patients rate in a household, voluntary health insurance enrollment rate in a household and household have patients used inpatient health care services The main finding of model indicates households lived in slum area were higher chance facing catastrophic expenditure than ones living in non-slum area. The household with

higher rate of people with NCDs had significantly more likely facing catastrophic health expenditure and higher ratio. The rate of household's members enroll voluntary health insurance has a positive effect on the chance of household facing catastrophic health expenditure. This fact can be explained because of adverse selection actual situation, it could because of those with high health expenditure are more likely to buy voluntary health insurance and voluntary health insurance only helps to reduce a part of health care expenditure for household. The percentage of households exceeding this threshold 10% is about 12.05%. The average of predicted probabilities for Catastrophic at threshold 10% was 12%. The logit model correctly predicted 88.4% of the observations' probability and the rest are misclassified.

The characteristics significantly have impact on catastrophic 40% are: household has children under 6 years old and household have patients used inpatient health care services. Household with children under 6 years old and household with patients used inpatient health care services more facing catastrophic spending. The average of predicted probabilities for Catastrophic at threshold 40% is only 4.27%, the actual frequency for Catastrophic 40% was 4.72%. The logit model correctly predicted 94.95% of the observations' probability and the rest are misclassified.

6.4.   Discussion

6.4.1.   Current situation of Health insurance enrollment

The mean of health insurance coverage rate within a household in this study setting is 79% which is higher than the coverage in 2012 in the whole country (67% of population) (Ministry of Health, 2012). This proportion in these two districts is higher than the proportion of the whole country might be explained by the perception of people living in urban area, they can access more mass media to know and understand about health insurance easier than who lived in rural area. Moreover, some policy such as free health insurance card for the poor, minorities, for children under 6 years old and for elderly people; free health care services with 100% cover for soldiers, dependents of army officer can makes the proportion of health

insurance coverage rate in these two districts was higher compare with the whole country.

About different socioeconomic characteristics, the mean of health insurance coverage rate within a household was 85% in non-slum residential area and 73% in slum residential area. Some people are living in slum area and working in informal sector and do not care about health insurance; some of them believe that the frequencies of their illness or injury is low and health insurance is not important for them. Moreover, informal sector group which is not covered by compulsory health insurance do not buy health insurance. That is the reason explained why health insurance enrollment rate in slum residential area is lower than non-slum area.

6.4.2. Mean OOP payment, the OOP/TC of individual and its determinants

The findings in this study were there are differences on mean OOP health expenditure of individuals and the ratio OOP/TC of individuals compare people with and without NCDs, ands between different socio-economic characteristics. The regressions exclude those with OOP and ratio OOP/TC is equal to zero. In these regressions, we did not put two variables are NCDs and age together because of server multicollinearity between these variables. The elder people they are, the higher chance they get chronic diseases. Therefore, we excluded age variable from equations.

The result of quantile regression of individual OOP that excluded those with OOP equal to zero in this study is the same with the result of study conducted in Indonesia of Aji et al. Health insurance, ethnicity and educational level have significant related to OOP health expenditure (Aji et al., 2013). People with different ethnicity background have a different tend to spend for health expenditure. Educational level also has a positive impact on OOP expenses and ethnicity has a negative impact on OOP health expenditure and the ratio OOP/TC of individual. The study indicated that people with high educational level - means the highest

qualification of people was at high school level or higher – spent for health expenditure more than people with lower educational level.

People with NCDs will have higher OOP payment and ratio OOP/TC in both inpatient and outpatient health care services in all level of quantile; these differences were significant only in 50th and 75th quantile level. It is completely understandable when NCD patients need to pay more than whom without NCDs with the positive sign of coefficients. The increasing of OOP expenditure of NCDs patients was predicted in many studies in many countries for example in research in India (Engelgau et al., 2012) or in Vietnam (Thuan et al., 2006).

As a consequence of higher OOP expenditure of using inpatient services, people lived in slum area seemed spend less on inpatient health care services than non-slum residential group, they tended to delay their healthcare checkup or treatment. Non-medical costs like facilities, travelling or accommodation ... could be a big financial burden even when they get free health insurance, but co-insurance 5% and other.

Looking at OOP expenditure classified by type of NCDs and OOP for inpatients and outpatient health care services, each type of health insurance have a different impact on OOP for individuals. Cardiovascular disease and cancer always become a reason makes OOP payment for both inpatient and outpatient services higher. About the interaction of health insurance and NCDs: For outpatient services, compulsory health insurance can protect for hypertension patients, help these patients to reduce their OOP when seeking non-residential treatment with the difference at 5% significant level. Compulsory health insurance can help to protect patient with hypertension for outpatient services because of the characteristics of this disease. Hypertension patients normally need to check-up health care and take medicine so they only need to use outpatient services mainly, only with serious situation they need to use residential treatment. Beside, compulsory health insurance can help to reduce OOP for diabetes patient when seeking inpatient services significantly. Nowadays in Vietnam, pancreas transplant surgery can help diabetes patients reduce their treatment by using usual medicine and cost for pancreas transplant surgery is

cheaper and more effect than using medicine during lifetime (Lan Anh, 2014). In additional, compulsory health insurance will subsidize for a part of pancreas transplant surgery, so diabetes patients can reduce their OOP health spending.

About financial protection of health insurance, the finding in this study is quite similar with some other studies in some other countries like some countries in Africa and Asia (Spaan et al., 2012), in China (Liu & Zhao, 2006) or in some developed countries: USA, Australia, India (Xu et al., 2003). In particular in this study, compulsory health insurance can help individual to reduce both OOP health spending and the ratio OOP/TC of individual compare with non-health insurance people. Voluntary health insurance only can help to reduce the ratio OOP/TC of individual with significant at 25th quantile level. Additionally, inpatient treatment had a significant impact on high OOP payment with the same result with research of Fang et al. (Fang et al., 2012). People with chronic disease used inpatient health care services will be paying more for medical cost than who do not use inpatient services such as fee for doctors, higher cost for drugs, fee for bed per day, etc.

The study found out that comparing financial protection of compulsory health insurance with voluntary health insurance for both inpatient and outpatient health care services. Voluntary health insurance cannot protect for patient but compulsory health insurance can help to reduce OOP payment statistical significantly. The sign of voluntary health insurance in Table VI-2 is positive and compulsory health insurance in Table VI-3 is negative in result part could suggest the adverse selection situation among those who only enroll voluntary health insurance when they have demand and need to use for health care check-up or treatment. Moreover, in order to avoid deficit health insurance fund, reimbursement ceiling is applied with no more than 40 times of minimum salary (42,000,000 VND – US$ 2,000). While cost for surgery of some diseases like cardiovascular or cancer can be 200 million – 300 million VND (around US$ 9,500 – 15,000). Therefore, health insurance still cannot protect for patients.

6.4.3. The rate of incurring catastrophic health expenditure and its determinants

About residential living area, the finding in this study is consistent with one cross-sectional study conducted in Thai Nguyen Province, Vietnam in 2010 (Minh Hoang Van & Tran Bach Xuan, 2012) and India in 2013 (Sharma, 2013). The financial burden of the household in slum and non-slum group is not disproportionately. The household living in slum area suffered the higher burden on health care expenditure and more likely incur catastrophic health spending more than household lived in non-slum area. This difference was statistically significant at threshold 10%. Using the same way to calculate (estimates OOP payments > 10% total expenditure), the percentage of households exceeding this threshold 10% is about 12.05% quite similar with study of Donnell, O. O., & et al. in 2005 in 6 countries: Bangladesh, Hong Kong, India, Thailand, Sri Lanka and Viet Nam found that this percentage at cut-off point 10% was 15% in Vietnam (Donnell et al., 2005).

Number of elderly and children under 6 years old in household have the positive significant associated with probability of household incur catastrophic expenditure. This finding consistent with some other studies (Donnell et al., 2005; Li et al., 2012; Somkotra & Lagrada, 2009). However, only household has children fewer than 6 significantly associated with higher probability of catastrophic at cut-off point 40% and the remaining differences were not significant. It might be explained by the difference in the sample, this study conducted with a sample only 614 households while study of Smokotra with his co-author used national data and research of Li et al. undertaken with a sample of 55,556 households in China.

Chronic NCDs is one of determinants makes household incur catastrophic health expenditure. Households with NCDs patients are more likely facing catastrophic spending. This finding was no differences with results in India while 75% household has member with NCDs experience with catastrophic expenditure (Thakur et al., 2011) or in one study in Vietnam found out that household with at least one member with NCDs has catastrophic expenditure rate two times higher than household do not have any member with NCDs (Minh Hoang Van & Tran Bach Xuan,

2012). It means that if increasing 1 % of NCDs rate within a household, it can increase chance facing catastrophic health expenditure of households. The difference on catastrophic rate of household with and without NCDs patients was significant at cut-off point 10%. In study of Minh HV in 2012, the proportion of catastrophic expenditure at cut-off point 40% among household with NCDs patient was 14.6% while in this study, this percentage was only 4.27%, it might be a reason why the difference at cut-off point 40% was insignificant.

6.4.4. Limitation of the study

This study tried to explore the situation of health insurance coverage, the different on OOP spending of individual with and without NCDs among different socio-economic characteristics and aimed to find whether health insurance can help NCDs patients to reduce their OOP health expenditure. Due to use the secondary data for analysis, there are some following limitations in this study.

Firstly, it is impossible to avoid recall bias when research team asked about total cost for health check-up or treatment of individuals as well as of households over past 12 months. Costs include hospital fees and others such as allowances for physicians, charges for on-demand services, purchase of additional medicines, facilities, travel for caring, etc. relating to the visits for check-ups/treatment. Therefore many people cannot recall exactly the total cost. Although some people took a note about the cost when he/she or their family members seek health care services, they still said that these cost they answered was not correctly, it is only their estimation.

The study used variable "total consumption" so it is also has a recall bias when interviewees list their consumption they spent for some follow items/activities listed in questionnaire during past month and past year, especially for food expenditure. Therefore, household's total consumption source might not be an exactly figure.

In additional, self-reported disease is one of this study's limitations. Missing disease group and under-reported group is a consequence of self-reported diseases.

Some people with disease but they do not want to let other know or even they do not know they get disease.

Due to not available data, we could not mention on copying strategies[16] of households when they seek health care services and spend for health expenditure or households face catastrophic health expenditure.

Moreover, in this study, we could not use data to handle the endogeneity bias[17] of voluntary health insurance enrollment and the OOP health expenditure of individuals, and when people with NCDs are more likely enroll voluntary health insurance.

In this study, we use non-food expenditure instead of capacity to pay as defined by WHO (World Health Organization, 2009) due to level of data. When using capacity to pay we need to identify through a poverty line and poverty line is defined: "Poverty line is defined as the food expenditure of the household whose food expenditure share of total household expenditure is at the 50th percentile in the country" (World Health Organization, 2005) and this line only be identified in national data level. However, level of data in this study is not national level so we cannot identify capacity to pay.

Lastly, as the dataset used for the study was conducted in only two urban districts in Hanoi of Vietnam, the findings could only provide a clear situation about these districts, part of the situation of Hanoi; the results could not be generalized for the whole city or the whole country.

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[16] How do households handle if they didn't afford for medical check/treatment cost? By sell products/assets, borrow with/without interest, withdraw saving or drop treatment.

[17] Endogeneity can arise as a result of measurement error; auto regression with auto correlated errors, simultaneity and omitted variables. Broadly, a loop of causality between the independent and dependent variables of a model leads to endogeneity

CHAPTER VII

CONCLUSION AND RECOMMENDATION

7.1. Conclusion

The Health insurance Law was implemented to achieve equity, efficiency and development on Vietnam health system, help to reduce OOP payment for individuals and households. Although the trend for OOP health spending in Vietnam is a gradual downward from 64.31%, the decreasing trend of OOP payment on health is unstable and these figures on OOP payment on health in recent are around 56% to 62% in period 2006 -2011. This current situation of OOP proportion is still quite higher than the ideal figures that recommended by WHO as mention above 40%.

The purpose of this study is to review current situation of health insurance coverage in study setting and estimate OOP health spending of individual with and without NCDs. Additionally, the impact of health insurance on OOP payment for individuals, especially for NCDs patients is estimated. The secondary data from two urban districts with information of 2409 individuals and 614 households was analyzed. We employed OLS, quantile and logit regression for estimate the impact of residential area, Chronic NCDs; enroll health insurance status and some individuals and households' characteristic on OOP health spending of individuals and households.

One of the main finding of this study is the mean of coverage rate of health insurance in study setting was 79%. Educational level of individuals, ethnicity background and health seeking behaviors, disease status and enrollment health insurance status were statistically significant effect on OOP payment. NCD patients suffer a higher burden on OOP health expenditure than those without NCDs. Classified by type of NCDs, individuals with cardiovascular disease and cancer suffer the highest OOP spending for both outpatient and inpatient health care services. For health insurance, compulsory health insurance can be protecting for individuals, help them to reduce their OOP health spending.

The incidence of catastrophic health expenditure (at 10% of household's total consumption) was 12.05%. Residential living area, voluntary health insurance enrollment rate within a household, used inpatients health care services and NCD rate within a household were significant impact on catastrophic health expenditure. Households living in slum area were more likely facing with catastrophic expenditure than one living in non-slum residential area. Households with higher rate of NCD patients within a household were more likely facing with catastrophic spending.

7.2. Recommendation

According to main findings on this study, I would like to suggest some following policy recommendation:

- First for achieving Universal coverage, because of some adverse selection on enrolling voluntary health insurance, Government need have some more solutions to ensure the implementation of health insurance coverage equality and equity in sharing the risky among community

- Invest in improving the health information system to provide more information about NCDs and management of NCDs in community to raise people's awareness and knowledge about their health for prevention NCDs with reduce tobacco and alcohol consumption, sufficient physical activity and have the healthy diet. Reduce morbidity by NCDs leads reduce individuals and households' OOP health expenditure.

- We also suggest Government invest in providing information about health insurance, benefit packet of health insurance and about financial protection advantage of health insurance. It can help people understand clearly about the aims to share the risky among community, help to improve health equity of health insurance. Hence, we can reduce the adverse selection actual situation among community; enhance impact of health insurance's financial protection.

- Government should have more payment mechanisms and payment schemes in health insurance in order to help NCDs patients, especially cardiovascular and cancer patients with significantly higher spending for health.

- Household living in slum area need to be received a special attention from government in health care to reduce chance facing catastrophic health expenditure.

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APPENDIX

Table A-1: Distribution of household size in study setting

Household size	Frequency	Percentage	Cumulative
1	27	4.4	4.4
2	121	19.71	24.1
3	114	18.57	42.67
4	146	23.78	66.45
5	102	16.61	83.06
6	65	10.59	93.65
7	18	2.93	96.58
8	8	1.3	97.88
9	7	1.14	99.02
10	5	0.81	99.84
11	1	0.16	100
Total	**614**	**100**	

Table A-1 shows the distribution of household size in study setting. Most of households have three to six members – 427 households accounted 59.55% of total households in both slum and non-slum residential area. In contrast, we have 1 households in poor area have 11 family members.

Figure A-1: Histogram of OOP per month of individual
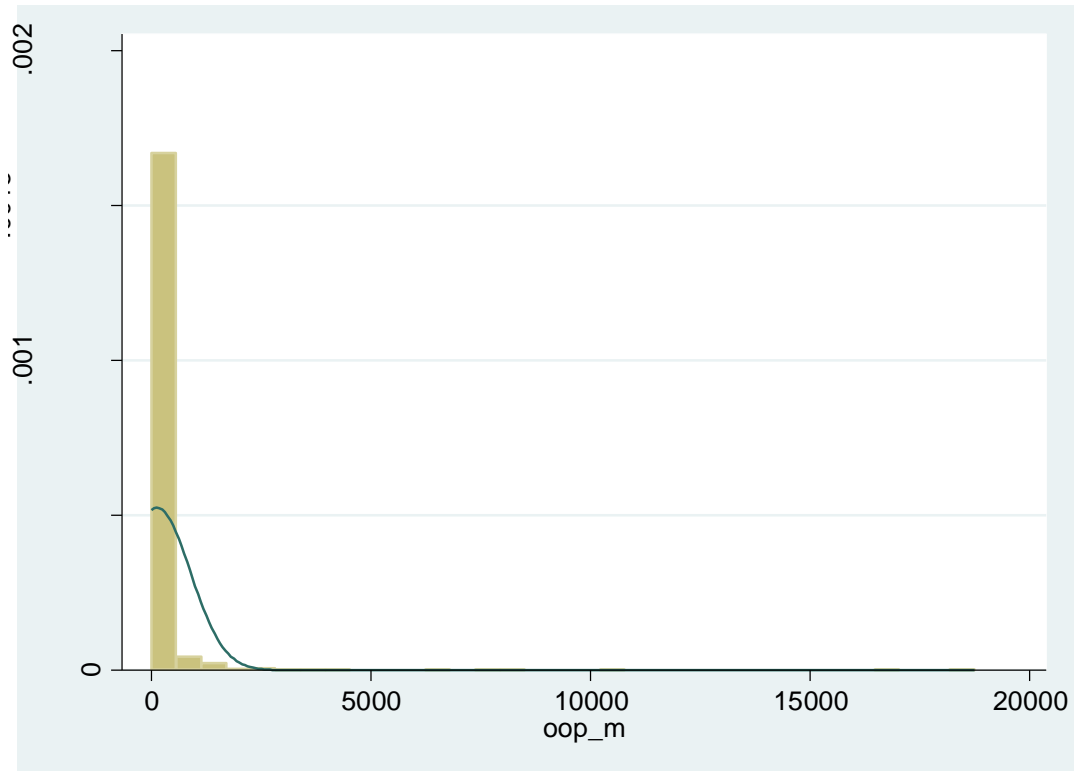
      Due to Figure VI-1 above, we can see the distribution of variable OOP of individual per month is not a normal distribution so we use non-parametric test (Table VI-1) to compare and find the differences of independent variables with dependent variable OOP of individual per month.

Table A-2: OLS estimation for OOP per month, with robust Standard Errors

OOP of individual per month	Coefficient	p-value	95% Confidence Interval	
Constant	31.7878	0.249	-22.2806	85.8561
Slum	-16.0567	0.681	-65.4066	33.2931
Male	-5.7508	0.829	-57.8727	46.3711
Inpatient services	**1034.07*****	*0.000*	681.868	1386.272
People with 1 NCD	**77.8657***	*0.087*	-11.4349	167.1663
People with more than 1 NCDs	**335.7203****	*0.025*	42.6436	628.797
Health insurance	13.79118	**0.486**	-25.0569	52.6392
Household's head	-3.5982	0.931	-84.8719	77.6753
Number of observations	2393			
F (7, 2385)	8.74			
Prob. > F	0.000			
R-squared	0.1473			
Root MSE	704.21			

***: Significant at 1% significant level

**: Significant at 5% significant level

*: Significant at 10% significant level

The results in Table A-2 indicate the differences on OOP health expenditure between people have at least one NCD and people have more than 1 NCDs. Patients used inpatients or outpatients' health care services were higher than other who did not used significantly. Individuals with one NCD pay for health expenditure higher than people without any NCDs. Patients have more than 1 NCDs have OOP health expenditure were much higher than whom without any NCDs. These differences were statistically significant at 5% and 10% significant level.

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