# DIFFERENCES IN HEALTH CARE UTILIZATION
# IN BAVI DISTRICT, VIETNAM, 2002 – 2011

Mrs. Nghiem Nguyen Minh Trang

A Thesis Submitted in Partial Fulfillment of the Requirements

for the Degree of Master of Science Program in Health Economics and Health Care Management

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| By | Mrs. Nghiem Nguyen Minh Trang |
| Field of Study | Health Economics and Health Care Management |
| Thesis Advisor | Kannika Damrongplasit, Ph.D. |
| Thesis Co-advisor | Professor Chitr Sitthi-amorn, M.D., Ph.D. |

Accepted by Faculty of Economics, Chulalongkorn University in Partial Fulfillment of the Requirements for Master's Degree

…………………………….Dean of the Faculty of Economics

(Associate Professor Chayodom Sabhasri, Ph.D.)

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……………………………Chairman

(Chantal Herberholz, Ph.D)

……………………………Thesis Advisor

(Kannika Damrongplasit, Ph.D)

……………………………Thesis Co-advisor

(Professor Chitr Sitthi-amorn, M.D., Ph.D)

……………………………Examiner

(Sawarai Boonyamanond, Ph.D.)

……………………………External examiner

(Associate Professor Wattana Suwansang Janjaroen, Ph.D.)

เฮียม เหงียน มินห์ ตรัง: ความแตกต่างในการใช้บริการการดูแลสุขภาพ ในอำเภอแบวี ประเทศเวียดนาม ในปี   2545 – 2554. อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ดร. กรรณิการ์ ดำรงค์พลาสิทธ์,  อ.ที่ปรึกษาวิทยานิพนธ์ร่วม: ศ.ดร.นพ.จิตร สิทธิอมร, 96หน้า

การใช้บริการการดูแลด้านสุขภาพของกลุ่มทางเศรษฐกิจและสังคมที่แตกต่างกันเป็นปัจจัยสำคัญในขั้นตอนการวางนโยบาย การตระหนักรู้ถึงรูปแบบของการใช้บริการการดูแลสุขภาพสามารถช่วยผู้กำหนดนโยบายประเมินการเข้าถึงการให้บริการด้านการดูแลสุขภาพ,    การประเมินการตอบสนองของผู้ให้บริการสุขภาพกับความต้องการของผู้รับบริการและความสามารถในการปรับตัวเข้ากับการให้บริการดูแลสุขภาพในสถานการณ์จริง   การเข้าใจถึงความแตกต่างในการใช้ประโยชน์จากการดูแลสุขภาพของประชากรและภาวะเศรษฐกิจ-สังคมที่แตกต่างกันสามารถช่วยลดช่องว่างระหว่างคนรวยและคนยากจนในการใช้ประโยชน์จากการบริการสุขภาพ และ ยังสามารถเพิ่มความเสมอภาคทางสุขภาพในสังคมได้

การศึกษามีจุดมุ่งหมายที่การประเมินความแตกต่างในการใช้ประโยชน์การดูแลสุขภาพในกลุ่มประชากรและทางเศรษฐกิจและสังคมที่แตกต่างกันใน อำเภอแบวี, ประเทศเวียดนาม  ในช่วงปี 2545 – 2554

การศึกษาครั้งนี้  วิเคราะห์ข้อมูลจาก 45,326 คน ใน 11,056 ครัวเรือน ที่มีลักษณะประชากรและภาวะเศรษฐกิจ-สังคมของพวกเขา  ในปี 2545, 2550 และ 2554 โดยใช้สถิติเชิงพรรณนาและสมการถดถอยโลจีสติกในการวิเคราะห์ข้อมูลแนวโน้มและจำแนกความสัมพันธ์ระหว่างปัจจัยทางด้านประชากรศาสตร์และภาวะทางเศรษฐกิจ-สังคม  ต่อชนิดของการใช้ประโยชน์การบริการดูแลสุขภาพต่างๆ รวมถึงการดูแลรักษาตนเอง    ,  การใช้บริการการดูแลสุขภาพที่ศูนย์สุขภาพชุมชน โรงพยาบาลอำเภอ โรงพยาบาลจังหวัด/ศูนย์  และ คลินิกเอกชนต่างๆ

คลินิกเอกชนและการดูแลรักษาตนเองที่บ้านเป็นที่นิยมมากที่สุดในอำเภอแบวี  ในปี 2545, 2550 และ 2554  และมีความแตกต่างอย่างมีนัยสำคัญในการใช้ประโยชน์การดูแลสุขภาพในกลุ่มประชากร และภาวะเศรษฐกิจ -สังคมที่แตกต่างกัน คนรวยมีแนวโน้มที่จะใช้บริการมากขึ้นในการดูแลสุขภาพที่โรงพยาบาลจังหวัด / ศูนย์ ขณะที่คนยากจนดูแลรักษาตัวเองที่บ้านบ่อยครั้งมากขึ้น  เพศชายมีการใช้บริการการดูแลสุขภาพอย่างเป็นทางการในโรงพยาบาลจังหวัด / ศูนย์ โรงพยาบาลอำเภอและคลินิกเอกชนเพิ่มขึ้นมากกว่าเพศหญิง คนที่มีการศึกษาที่สูงขึ้นและคนที่แต่งงานแล้วมีแนวโน้มที่จะใช้การบริการสุขภาพในระดับทุติยภูมิและตติยภูมิสูงขึ้น ชาวไร่ชาวนามีความคุ้นเคยกับการรักษาตนเอง ดังนั้นควรพยายามปรับปรุงการเข้าถึงการให้บริการด้านการดูแลสุขภาพในระดับสูงสำหรับคนยากจนและคนที่มีชนชั้นต่ำกว่า

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ปีการศึกษา  2555                                                                       ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก ...................
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#5575813729 MAJOR HEALTH ECONOMICS AND HEALTH CARE MANAGEMENT

KEYWORDS: HEALTH CARE UTILIZATION/ QUINTILE/ DEMOGRAPHIC FACTORS/ BAVI

NGHIEM NGUYEN MINH TRANG: DIFFERENCES IN HEALTH CARE UTILIZATION IN BAVI DISTRICT, VIETNAM, 2002 – 2011. ADVISOR: KANNIKA DAMRONGPLASIT, PhD., CO-ADVISOR: PROF. CHITR SITTHI-AMORN, M.D., PH.D., 96 PP

Health care utilization of different socio-economic groups is a very important factor for the policy-making process. Being aware of the model of health care utilization can help policy makers to evaluate the accessibility to health care services, evaluate the responsiveness of the health sector to people's needs and thus can adapt the health care services to the real situation. Capturing the differences in health care utilization of different demographic and socio-economic groups can help to narrow the gap between the rich and the poor in health care utilization, and thus can improve the health inequity in the society.

The study aims at evaluating the differences in health care utilization among different demographic and socio-economic groups in Bavi district, Vietnam in the period of 2002 – 2011.

This study analyzed a panel data of 45,326 individuals in 11,056 households with their demographic and socio-economic information in 2002, 2007 and 2011. Descriptive statistics and binary logistic regression for panel data were applied to capture the trend and distinguish the associations between demographic and socio-economic factors with the use of different types of health care services including self-treatment, the use of health care services at communal health centers, district hospitals, provincial/central hospitals and private clinics.

Private clinics and self-treatment were used most commonly in Bavi in 2002, 2007 and 2011. There were significant differences in health care utilization among different demographic and socio-economic groups. Rich people tended to use more health care services at provincial/central hospitals while poor people treated themselves at home more frequently. Males used more formal treatment at provincial/central hospitals, district hospitals and private clinics than females. People with higher educational level and married people tended to use more tertiary and secondary care. Famers were more familiar with self-treatment. Therefore, more efforts should be made to improve the accessibility to health care services at higher level for the poor, and for people belonging to lower social classes.

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

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Co-advisor's Signature:………

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| | |
|---|---|
| CHC | Communal Health Center |
| CI | Confidence Interval |
| CVD | Cardiovascular diseases |
| Dist. Hos. | District Hospitals |
| FilaBavi | Field Laboratory of Bavi |
| GSO | General Statistics Office |
| Prov. Hos. | Provincial/Central Hospitals |
| Stand. Err | Standard Errors |
| WB | World Bank |
| WHO | World Health Organization |

# CHAPTER I
# INTRODUCTION

## 1.1. Problem and Significance

The research topic on equity in health, in which health care utilization is one important aspect, has become popularized all over the world. The number of papers on health equity published on international journals has been on the increasing trend. It was noticed that the number of articles on health equity published on Medline had increased by 260% in 2005 in comparison with 1980 from 1,206 articles per 10,000 articles to 4,313 in 2005 (Owen, Eddy, Adam, & Magnus, 2008). In fact, it reflects that health related issues for vulnerable groups, especially the poorest group have drawn more attention from national governments and international donors of many countries. To some extent, it shows that the gap in health outcomes, health status, health care utilization and out-of-pocket payment between the rich and the poor is getting enlarged.

According to the World Bank Group, health care utilization is one of the four dimensions of health equity (Owen et al., 2008). Accessibility to health care services, health care seeking and using behaviors of people in different areas and with different living conditions are of the most important factors determining the level of inequity in the health sector. The gap in accessing and using health services between the rich and the poor has raised a serious question to the authority. Health care utilization of different socioeconomic groups is a very important factor for the policy-making process. Being aware of this model can help policy makers to evaluate the accessibility to health care services, evaluate the responsiveness of the health sector to people's needs and thus can adapt the health care services to the real situation (Tipping, 2000). Moreover, knowledge on health care seeking behaviors can help to better off the situation of early diagnosis and effective treatment as well as patients' compliance to the treatment guidelines, contributing to the decrease of morbidity and mortality rate (Tipping, 2000).

Many studies suggested strong associations between health care utilization and socio-economic factors. The health care utilization model was a major content of the Vietnamese national health survey in 2001 – 2002. Within the 4 weeks between the

two interviews conducted within the framework of the survey, nearly 40% of citizens had used different health services. The rate was higher in female than male, in rural areas than in urban areas, in children and the elderly than in other age groups. The proportion of no treatment during sick episodes accounted for 4%, higher in the poor than the rich. During sick episodes, approximately 73% of respondents bought drugs for selftreatment without health check; 17% used outpatient services at public health facilities. Health care utlization is different geographically and socioecomically (MoH & GSO, 2003). Obviously, health care utilization has a tight association with socio-economic factors (Garrido-Cumbrera et al., 2010; Shaikh & Hatcher, 2005).

As other developing countries, inequities in health care utilization become problematic issues facing Vietnamese health sector. The Ministry of Health and Vietnamese government have been trying to provide comprehensive health care services for vulnerable groups, especially for the poor in order to improve the health inequity in the whole country (Malqvist, Hoa, & Thomsen, 2012).

The shifting from low-income countries to middle-income countries also has both positive and negative impacts on the epidemiological changes. Vietnam is in the epidemiological transactional period with much improvement in socioeconomic conditions leading to changes in morbidity patterns as well as demands for health care services. To ensure the equity in health care, the government has issued several policies to support these groups in accessing and using health care services such as the Decision no 139 regarding health care for the poor, decision regarding free health care for children under 6, policy regarding free health care for the elderly, or policy regarding 50% subsidy for the near-poor group, etc. All these changes in health policies have had certain influence on health care utilization, especially of several vulnerable groups like the poor, women, children and the elderly (Trieu et al., 2010). These policies have been implemented nationwide. However, in Vietnam, there so far has not been much research conducted on the same population to see whether the implementation of these health related policies could contribute to the improvement of equities in health and health care utilization or not.

In developed countries, almost all the information needed is systematically collected and followed up in national health surveys and registration system. As a

matter of fact, the policy-makers can get access to the systematic information and it would be easier for them to adjust their policies and thus to improve the situation of the health sector as well as to enhance health outcomes. However, unlike developed countries, the shortage of information on health care utilization from the community level is challenging the health sector of developing countries including Vietnam (Peter, 1997). Moreover, most of the studies on health care utilization in Vietnam are cross-sectional studies and focus on certain fields in the health sector like maternal and child health care, diabetes, cardiovascular diseases, etc. Furthermore, the computed statistics are mostly reported at the health-care facility level, which may not be as adequate as those at the community level and do not reflect the actual situation in health care utilization. The Epidemiological Field Laboratory of Bavi (FilaBavi) has conducted surveys on socioeconomic conditions, living and health related events since 1999 (N. T. Chuc & Diwan, 2003). Therefore, the field site has a reliable longitudinal dataset on socio-economic and demographic factors as well as health care seeking and using behaviors of people under surveillance. In the current context of Vietnam, the longitudinal study on socioeconomic factors, health care utilization of different population groups is essential to comprehensively assess differences in health care utilization among different socio-economic Vietnamese people.

## 1.2. Research Question

### 1.2.1. General question

What is the difference in health care utilization among various demographic and socio-economic groups in Bavi district, Hanoi, Vietnam during the period of 2002 to 2011?

### 1.2.2. Specific questions

- What is the difference in the use of different types of health care services among different wealth index quintile groups from 2002 to 2011?
- What is the difference in the use of different types of health care services among different socio-demographic groups from 2002 to 2011?

## 1.3. Research Objectives

### 1.3.1. General objective

To evaluate the differences in health care utilization among different demographic and socio-economic groups in Bavi district, Hanoi, Vietnam in the period of 2002 – 2011.

### 1.3.2. Specific objectives

- To analyze the association between socio-economic conditions and health care utilization in Bavi from 2002 to 2011.
- To identify the difference in the use of different types of health services among wealth index quintile groups in the same period of time.
- To identify the difference in the use of different types of health services among socio-demographic groups from 2002 to 2011.

## 1.4. Scope Of The Study

This study was conducted in the framework of the Epidemiological Field Laboratory of Bavi (FilaBavi), Bavi District, Hanoi, Vietnam. Bavi is a district in the North of Vietnam, 60 km west from the center of Hanoi, the capital of Vietnam. The study used panel data of FilaBavi in 2002, 2007 and 2011 for analysis.

## 1.5. Possible Benefits

This is one of the very few longitudinal studies on health care utilization in Vietnam. The study will provide an overview about people's health care seeking behaviors and utilization in the long period of time. As a result, a picture of health care utilization will be captured. During the period from 2002 to 2011, a series of important policies related to health insurance for vulnerable groups were issued. The differences in the use of health care services before and after the issuance of the policies will be recorded. Therefore, the study is expected to provide the following benefits to the society:

- Policy-makers may use the results of the study to adjust policies to response to people's needs in health care.
- Policy-makers may improve the accessibility to health care services, especially for the poor.
- The study may help policy-makers to improve equities for the vulnerable groups in health care utilization

# CHAPTER II
# BACKGROUND

## 2.1.  General information:

Vietnam is a country located in Southeast Asia with the area of 330,957.6 km$^2$ and the population of 87,840 thousand people (GSO, 2011). With the development policies since the "Doi moi" (Reform) Period in 1986, Vietnam economy has boosted up, turning from the low-income country to the lower-middle-income country with GDP of $124 billion in 2011 (WB, 2011). The GDP per capita has been increasing incredibly fast since 1986, and in 2011, the GDP per capita growth rate was 4.79% (WB, 2011).

*Figure 1. GDP per capita growth*
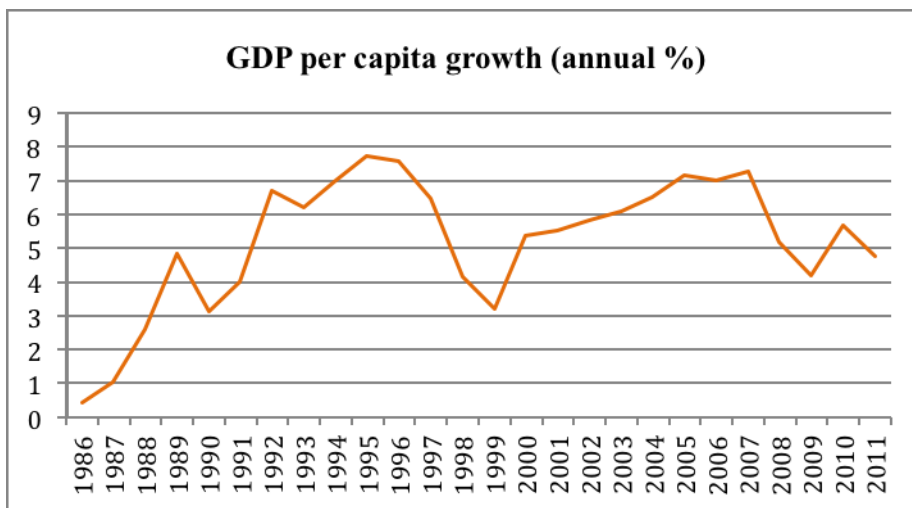


Source: World Bank, 2011

Together with the development of the economy as well as the improvement of the society thanks to the market opening policy, the living standard of Vietnamese people has been changing dramatically, leading to the fact that the health of Vietnamese people has also been improved considerably. Life expectancy at birth of Vietnamese people increased fast, from 72.8 in 2002 to 74.8 years old in 2010. Infant mortality rate reduced considerably from 24.5 per 1,000 live births in 2002 to approximately 17.3 in 2011.

*Table 1. Vietnam Health Factsheet*

| Indicator Name | 2002 | 2007 | 2010 | 2011 |
|---|---|---|---|---|
| Birth rate, crude (per 1,000 people) | 17.1 | 17.1 | 16.7 | |
| Death rate, crude (per 1,000 people) | 5.3 | 5.2 | 5.2 | |
| Health expenditure per capita (current US$) | 22.6 | 58.4 | 82.9 | |
| Life expectancy at birth, total (years) | 72.8 | 74.2 | 74.8 | |
| Mortality rate, infant (per 1,000 live births) | 24.5 | 20.4 | 18.1 | 17.3 |
| Mortality rate, neonatal (per 1,000 live births) | 15.9 | 13.6 | 12.3 | 11.9 |
| Mortality rate, under-5 (per 1,000 live births) | 31.3 | 25.6 | 22.6 | 21.7 |
| Population growth (annual %) | 1.2 | 1.1 | 1.0 | 1.0 |
| Population, total | 79,538,700 | 84,221,100 | 86,927,700 | 87,840,000 |
| GDP per capita (current US$) | 441 | 843 | 1,224 | 1,407 |

Source: World Bank Databank

## 2.2. Health care delivery system:

Vietnam health sector has been developed since the 1940s, gradually adapting itself to meet people's increasing demands. Basically, Vietnamese health sector is divided into two main sectors, public and private health sector. There are 4 managerial levels in the public sector: central, provincial, district and communal levels. The communal health centers have been served as primary health care delivery centers, district hospitals as secondary care and provincial/central hospitals as tertiary care level.

In recent years, the government of Vietnam and the Ministry of Health have paid much attention to the development of primary health care to improve the referral

system, the situation of overcrowding in central and provincial hospitals and to reduce workload for health care staff at higher level hospitals. There are many reasons causing overcrowding in provincial/central hospitals of which the unawareness of people and the low quality of communal health centers are two main causes. Therefore, the health sector has made lots of efforts to improve the situation by improving the quality of primary health care at grassroots level. The number of communal health centers meeting the national standards is also on the increasing trend, from 38.5% of the total number of communal health centers in 2006 to approximately 80% in 2010 (JAHR, 2010).

The Health Statistics Yearbook of Vietnam in 2008 showed that under the Ministry of Health, there were totally 44 central hospitals, 383 provincial hospitals, and 1,366 district hospitals together with 10,866 communal health centers. The coverage of communal health centers accounted for 98.6% of total number of communes nationwide.

The number of treatment beds was allocated to different health care delivery system of Vietnam. In 2008, the number of beds at communal health centers accounted for 22% (45,994 beds), 29% for district hospitals, 41% for provincial hospitals and just 8% for central hospitals. The number of beds per 10,000 people has been rising, from 16/10,000 in 2002 to 20.5/10,000 in 2010. To some extent, it can be said that Vietnam health care delivery system has been expanding and the quality of health care has been improving to meet people's demands in health care.

Since the "Doi moi" period, the private health sector of Vietnam has been developing considerably fast. In 2009, reported by the Medical Service Administration Department, Ministry of Health, in the whole area of Vietnam, there were more than 30,000 private health centers including 100 private hospitals with more than 6,000 beds and 300 polyclinics (MOH, 2010).

Regarding the pharmaceutical issues, domestic pharmaceutical companies could provide only 50% of the needs for drugs in the whole country. The remaining 50% had to be imported from other countries like Singapore, France, India, etc. with the value of 1,098 million US dollar. However, the pharmaceutical market of Vietnam still faced challenges due to the fact that they had to rely much on imported active substances from other countries, accounting for 90% of all active substances used for

producing drugs (GSO, 2010). The government of Vietnam as well as the Ministry of Health has paid much attention to the purchase of equipment for the health sector. Modern equipment has been purchased and set up in hospitals nationwide, but most of them are equipped for central and provincial hospitals (JAHR, 2010).

## 2.3. Health care financing:

In 1986, after "Doi moi" period, the policy on user fee was introduced in the whole country in order to improve the efficiency of the health system as well as to encourage the development of private health sector.

In Vietnam, out-of-pocket payment is still the main source of health care financing. In 2005, out-of-pocket payment for health care services accounted for 67% of total health expenditure, 16% from government spending, only 9% from health insurance.

*Figure* 2*. Vietnam health care financing composition, 2005*
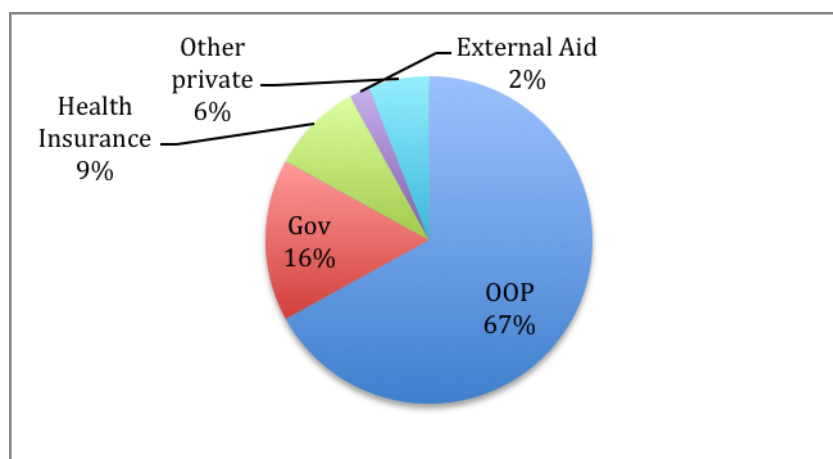


Source: National Health Account, 2008

The proportion of out-of-pocket payment in the total expenditure has been decreasing, however still stays high, at the rate of 57.6% in 2010.

*Figure 3. Out-of-pocket health expenditure (% of total health expenditure), 1999 –*
   *2010*
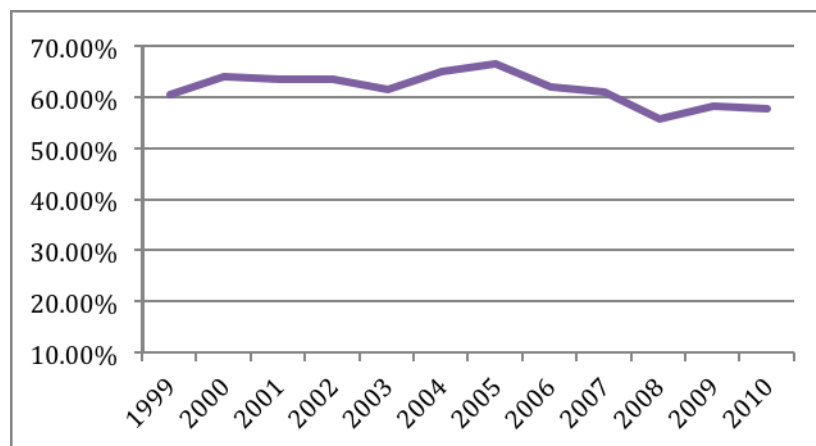


Source: World Bank Database

The proportion of total health expenditure in GDP has been witnessing an increasing trend, increasing from 5% in 1999 and reaching almost 6.84% in 2010. This proportion is higher than many countries in the region like Malaysia, China, Indonesia or Thailand. Similarly, heath expenditure per capita is also rising year by year, from $22.6/capita in 2002 to $82.9/capita in 2010 (World Bank, 2011).

*Figure* 4*. Total health expenditure (% in GDP), 1999 – 2010*
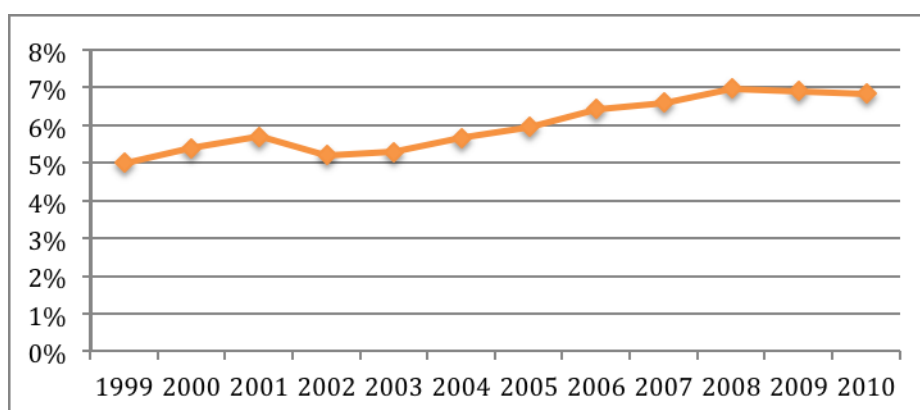


Source: World Bank Database

In 1992, the National Social Health Insurance scheme was enforced aiming at recruiting more resources for the public sector, contributing to alleviating poverty in the whole country as well as to reducing catastrophic spending on health care. There

are two main types of health insurance in Vietnam, namely compulsory health insurance scheme for employees working for the government and private companies with more than ten employees and voluntary health insurance scheme for all remaining population. People covered by health insurance would get free primary health services at public health facilities registered with the Vietnam Social Security. In case of bypassing to higher-level health facilities, the co-payment rate of the health insurance owners is 80% of the total hospital fees. The coverage of health insurance in the whole population of Vietnam is increasing year by year. The coverage rate was only 28% in 2005, increased to 43% in 2007 and up to 61% in 2010 (JAHR, 2010).

Although there exists many challenges with the payment method of user fee, it is still the most common payment mechanism in Vietnam. Capitation is only applied for primary health care at communal health centers. In 2008, the Law on health insurance was introduced to consolidate the application of health insurance nationwide, heading to universal coverage by 2014.

## 2.4. General information about Bavi district, the study setting:

The study was conducted in Bavi district, Ha Tay province. Bavi is 60 km west of Hanoi, the capital of Vietnam. The total area of Bavi is 410 km$^2$ with the population of approximately 260,000 inhabitants (in 2010). Most of Bavi inhabitants are Kinh ethnic group (91%), the major ethnic group of the whole country, Muong ethnic minority (8%) and the remaining belongs to other ethnic minorities of Dao, Tay, Hoa and Khme (N. T. Chuc & Diwan, 2003). The district consists of 32 communes located in delta area, riverside, midland and mountainous areas, reflecting almost all of the geographical characteristics of the country, especially the rural areas of Vietnam. Therefore, Bavi district was selected to set up the field laboratory.

According to Table 2, the population growth of Ha Tay province was 2.03% in 2005. The income per capita per month of Ha Tay province was 580,000 VND ($29) in 2006, of which the income of the poorest group was only 196,000 VND ($9.8). This income rate is pretty high in comparison with the rate of rural area, which is only 506,000 VND ($25), but still lower than the average income of the whole country. Being in the same trend as the whole country, the poverty rate of households in Ha

Tay Province is also witnessing decreases year by year, from 12.4% in 2006 to 11.8% in 2007. The crude birth rate of Ha Tay province in 2005 was 18.2 per 1,000 people and the crude death rate was 5.5 per 1,000 people. The infant mortality rate was 20.6 per 1,000 live births in 2005 (GSO, 2011).

*Table 2. Factsheet of urban and rural areas of Vietnam and of Ha Tay province, 2006*

| Statistics | Vietnam | Urban | Rural | Ha Tay |
|---|---|---|---|---|
| Monthly income/capita (VND) | $31.8 | $52.9 | $25.3 | $29 |
| Poverty rate (%) | 16.0 | 3.9 | 20.4 | 12.4 |
| Crude birth rate (per 1,000 people) | 18.6 | 15.6 | 19.9 | 18.2 |
| Crude death rate (per 1,000 people) | 5.3 | 4.2 | 5.8 | 5.5 |
| Infant mortality rate (per 1,000 live births) | 17.8 | 9.7 | 20.4 | 20.6 |

Source: National Yearbook, GSO, 2011

In the whole area of Bavi district, there is only one district hospital, 32 communal health centers, 3 regional polyclinics together with 200 private health facilities including private clinics, pharmacies, drug stores and traditional healers (Hoa NQ et. al., 2009). In the whole area of Bavi district, there were approximately 100,000 people with health insurance registering to have health care in the only one district hospital. On average, one day the district hospital of Bavi welcomed around 400 to 500 visits, thus the district hospital of Bavi has been facing the problem of overcrowding.

Provincial/central hospitals are normally located in big cities, which are quite far from Bavi district. The district hospital of Bavi is located in Tay Dang town, Bavi district. The farthest area is 40 km away from the hospital. 32 commune health centers

are equally districted to 32 communes of Bavi. 200 private health facilities are scattered in the region. Therefore, the nearest health care centers to almost all households in the district are communal health centers or private health facilities.

## 2.5. Major related health policies, 2002 – 2011:

Improvement in health equity and accessibility to health care services is one of the overall goals of almost all health system worldwide and Vietnam is not an exceptional case. Heading to equity in health for all population groups in the country, Vietnamese government and the Ministry of Health have issued several related policies aiming at enhancing the use of health care services at public health facilities for vulnerable population groups including the poor, the elderly, children and the near-poor group. During the period from 2002 to 2011, several important policies and regulations related to health care were introduced nationwide.

The Decision number 139/2002/QĐ-TTg by the Prime Minister issued in 2002 regarding the establishment of Health Care Fund for the Poor was one of the considerable efforts of Vietnamese government in general and of the health sector in particular. The Health Care Fund for the Poor was a not-for-profit fund, directly established and managed by provincial authorities, aimed at improving affordability for the poor when they sought for health care services. The poor would have primary health care services at the communal level free of charge. In case of hospitalization, hospital fee at public health facilities for the poor would be covered by the fund. The most important financing source for the fund was government budget, accounting for 75% of the total budget of the fund. The remaining 25% was from local budget, international and domestic donors.

To simplify procedures for the poor in accessing to public health care services and enjoying benefits from the fund, the government decided to provide health insurance cards for the poor free of charge. Since then, they have been able to avoid time-consuming procedures and to access to free health care services with health insurance cards.

Another attempt of the government contributing to the improvement of health equity for vulnerable groups was the policy on free health care for children under 6

years of age introduced in 2005 by the Ministry of Health. This policy has been applied in all public health facilities at all levels of the health sector. Children under 6 are allowed to use any health care services free of charge provided that they follow the referral system of the public sector. In case of emergency, they are treated at any public hospital without having to pay for hospital fee.

In 2008, on the process heading to the universal coverage, the government of Vietnam issued the policy regarding the subsidy for the near poor group. When purchasing health insurance, the near-poor group are subsidized with 50% of the premium. With health insurance cards, they would be able to get benefits from health insurance as other population groups.

With regards to the health insurance scheme of Vietnam, there have been also changes during this period of time (2002 – 2011). In the period from 2005 to 2007, there was no ceiling payment rate for the health insurance card owners. That's why health insurance fund faced serious fund deficits in these three years. In 2008, the Law on Health Insurance was introduced to consolidate all regulations and policies related to health insurance in the whole country. The ceiling payment rate was issued and applied at all level of the health sector, except for primary health care. Health insurance premium has also been changing over time. In 2002, the premium was only 50,000 VND, increased to 60,000 VND in 2006, 80,000 VND in 2007, 130,000 VND in 2008 and reached 394,000 VND in 2010. Before 2010, the co-payment rate in purchasing health insurance cards was 3% of the basic salary, however, in 2009, the relation on increasing the co-payment rate to 4.5% was issued and took effect since 2010 (JAHR, 2010).

# CHAPTER III
# LITERATURE REVIEW

## 3.1. Health care utilization and economic and socio-demographic factors:

### 3.1.1. Health care utilization:

It was defined that health care seeking behavior is the process of making decision of what health care services to be used no matter what services are under public or private sector, traditional or modern medicine. The decision of whether to use health care services or self-treatment or no action at all is also taken into account in the health care seeking behaviors. Health care utilization is a common term used in the health sector, however, its meaning is not as broad as health care seeking behavior. Health care utilization is the final step in the decision making process of which health care service to be used (Shaikh & Hatcher, 2005).

Health care seeking and using behaviors have long been considered one of the most important factors and evidences for the policy making process in order to improve equities in health and access to health care services for people all around the world (Shaikh & Hatcher, 2005; Toan, Trong, Hojer, & Persson, 2002). Getting to know the use of health care services and its underlying factors in each illness episode would help to evaluate the levels of responsiveness of the health sector towards people's needs, and then services are adjusted correspondently in order to improve affordability and accessibility for all population groups, and particularly for vulnerable groups such as the elderly, the poor, children, or women (Shaikh & Hatcher, 2005).

Several studies showed differences in health care seeking behaviors and utilization of health care services among different socio-economic groups (Adamson, Ben-Shlomo, Chaturvedi, & Donovan, 2003; Garrido-Cumbrera et al., 2010; Malcom, Gill, & Henry, 2000) or in different geographical areas (Chibwana, Mathanga, Chinkhumba, & Campbell, 2009; Waweru, Kabiru, Mbithi, & Some, 2003). The ratio of health care expenditure to income of the poor and non-poor group is even more differentiated than in the use of health care services (Malcom et al., 2000). The poor often have to deal with poverty trap due to the fact that they are often reluctant to seek for health care services at the first phase of the illness episode and just do only when

the illness becomes more serious. As a matter of fact, poor people have to suffer higher fee often from hospitals rather than at lower level health care facilities like commune health centers (Margaret, Göran, & Timothy, 2001). This problem has been head-aching for the government and the leadership of the health sector in many countries as it prevents the country from reaching the equity in access and utilization of health care services for vulnerable groups.

Many studies have pointed out the changes in health care seeking and using behaviors in different time periods (Garrido-Cumbrera et al., 2010; Imhoff et al., 2004; Vegda et al., 2009) and under the impacts of new health policies (Gotsadze, Bennett, Ranson, & Gzirishvili, 2005; Mubyazi et al., 2006; Yanagisawa, Mey, & Wakai, 2004). The trend of health care utilization changes over time, causing challenges to the health system of many countries (Deressa, Ali, & Hailemariam, 2008; Shaikh & Hatcher, 2007). Some studies also showed that health care utilization has a close relationship with mortality rate, especially of children (D'Souza, 2003; Howlader & Bhuiyan, 1999).

### 3.1.2. *Health care utilization and demographic factors:*

Many papers all over the world focus on health care utilization and how economic and socio-demographic factors impact the utilization of health care services. Many different models have been applied to identify the effects of economic and socio-demographic factors on health care utilization. Most of the models applied include major demographic factors like age, gender, educational level, occupation, and distance to the nearest health center (Barata, Ribeiro, de Moraes, Flannery, & Vaccine Coverage Survey, 2012; Dachs et al., 2002; Demeter, Reed, Lix, MacWilliam, & Leslie, 2005; Duong, Binns, & Lee, 2004; Glazier, Creatore, Agha, Steele, & Inner City Toronto Time Trends Working, 2003; Gulliford et al., 2010; Kevany et al., 2012; Kind, Dolan, Gudex, & Williams, 1998; Lemstra, Mackenbach, Neudorf, & Nannapaneni, 2009; Zuckerman, Waidmann, Berenson, & Hadley, 2010). The only difference in common models is the economic factor. In some papers, they included the variable of quintile groups classified by households' income (Barata et al., 2012; Demeter et al., 2005; Glazier et al., 2003; Lemstra et al., 2009), some by

expenditure (Dachs et al., 2002; Zuckerman et al., 2010) and some by households' properties (Duong et al., 2004; Kevany et al., 2012) as the economic factor to assess its impact on the use of health care services.

- ***Health care utilization and educational level:***

According to one study conducted in Vietnam on the utilization of delivery services, it was found out that women who had graduated from secondary schools or higher decided to give birth at health facilities rather than women with lower educational level (OR = 1.87; 95% CI = 1.09 - 3.44). In this study, multivariate logistic regression analysis was employed to identify the associations between delivery choices and socioeconomic factors (Duong et al., 2004).

Another cross-sectional study on heath care utilization decided by mothers of children with diarrhea conducted in rural Vietnam using prevalence ratios identified that mothers with lower educational level tended not to use health care services for consultation or treatment for their children (Hong, Dibley, & Tuan, 2003).

One study conducted in Indonesia with the method of mixed logit model indicated that people who had lower educational level (from elementary school downward) did not have much opportunity to use private health care services. However, those with college or university degrees had significantly more chance to access to private clinics. And thus, the role of education level in the decision of using private health services was very important (Erlyana, Kannika, & Glenn, 2011).

- ***Health care utilization and age***:

In one study on "Socio-economic and ethnic inequalities in diabetes retinal screening", Gulliford et. al. applied logistic regression analysis to estimate the association between the use of screening and socio-economic factors. The study found out that people at the age of 18 – 34 and the elderly with 85 years old or over had the highest rate of non-attendance for screening at 32% and 28% respectively (Gulliford et al., 2010).

- ***Health care utilization and gender***:

One study on health equity in a mountainous area of Vietnam showed that there was not much difference in the use of health care services between males and females. However, total expenditure for health care services of males was higher than that of females (Toan et al., 2002).

Vlassoff et al. indicated in their papers that there was significant difference in health seeking behaviors between men and women. Women were not much aware of their health status due to the limited knowledge and shortage of information and women often used less modern health care services than men when they were ill (Vlassoff, 1994). According to Ketan Vegda and his colleagues, women often used family physician visits while men used specialist visits, emergency visits and surgical services more frequently than women. In hospitalization rate, there was no difference between males and females (Vegda et al., 2009).

- ***Health care utilization and occupation***:

It was identified by one study conducted on health care utilization in Zimbabwe that 71% of people under the study sample using health services were employed (p-value = 0.0000). Only the rate of utilization of traditional health services was the same with employed and unemployed people under the survey (p-value = 0.0000) (Kevany et al., 2012).

- ***Health care utilization and distance to the nearest health care center***:

It was identified that distance to the health care center also impacted the utilization of health care services. People who stayed far away from the health care center tended to use public health services less (adjusted OR=0.28; 95% CI 0.15± 0.51) (Toan et al., 2002).

According to Erlyana et. al. (2011), distance to health care centers had certain impacts on health care utilization of people in rural Indonesia. Every one percent increase in the distance to health facilities would reduce the probability of using health care services of public health center, nurse/midwife and private clinic by 0.218%, 0.08% and 0.134% respectively.

### 3.1.3. *Health care utilization and economic factors:*

In terms of economic factors, different approaches have been considered like income, expenditure or assets. However, the very popular method is to classify the population into different quintile groups basing on economic information. There have existed different methods of classifying quintile groups based upon the information on income, expenditure or properties of the households. In the Demographic Household

Survey comparative report, Shea Oscar Kiersten pointed out the pros and cons of each method (Shea Oscar Rutstein, 2004).

Household income has been used commonly as an indicator to assess the economic status of households. However, income does not bring accuracy to the results for a variety of reasons. Household members do not report accurate income because they may not remember their income, or some people do not want the other members to know about their income, or people often under-report their income level. The income levels of some households, especially in the rural areas, differ seasonally, monthly, weekly or even daily (Shea Oscar Rutstein, 2004). As a matter of fact, it is very difficult to get accurate information on the income of households.

Another approach to assess the economic status of one household is based on the consumption expenditure of the household. Although, it is considered a proxy for the household income, there are still some problems with this approach. The household's expenditure is decided by different people, thus it is quite difficult to collect accurate information on expenditure of the whole household. Expenditure composes many sources like food, education, health, transportation, etc. There is a wide range of the number of members at different ages in different households, thus their expenditure may be different (Shea Oscar Rutstein, 2004). Therefore, using household's expenditure may not provide an accurate picture of economic status of the whole population.

Wealth index calculation to classify quintile groups has some advantages over other remaining approaches and it can correct some problems caused by income and expenditure based quintile. It is easier to collect information on properties of households by conducting interview with household members and by observing both the properties and the housing conditions. Thus, the information will bring more accurate results. Moreover, the properties do not change frequently as income or expenditure (Shea Oscar Rutstein, 2004). Therefore, quintile division with wealth index calculation has been used more commonly, especially in the national program or in longitudinal studies.

Almost all studies all over the world concluded that there is big gap in health care utilization between the richest and the poorest groups. Income and expenditure both have certain impacts on the utilization of health care services. The factor of

income played a very important role in the decision of choosing private health services or not when they got ill (Erlyana et al., 2011).

One study conducted in Zimbabwe explored that among 2,874 interviewees, those of middle to high quintile group tended to use all kinds of health care services more than the lower quintile groups. The proportion of people in middle or high quintile group using private clinics was 65%; church-based services was 61%, 67% for traditional medicine, and other kinds of services was 66% (with p-value = 0.009). Most of the lower quintile groups tended to seek for consultation and treatment at public health services (with p-value = 0.009) (Kevany et al., 2012).

### 3.1.4. *Methodology:*

In most of the studies conducted on health care utilization and health care seeking behaviors reviewed, the most popular method employed to distinguish the use of different types of health care services was logistic regression analysis. In one study conducted in Vietnam on the use of delivery services, Duong et al used multivariate logistic regression analysis to identify the associations between delivery choices and socioeconomic factors (Duong et al., 2004). In another study conducted in Indonesia, the method of mixed logit was employed to identify the relationship between socioeconomic factors with the utilization of health care services in urban and rural areas of Indonesia (Erlyana, 2010). Logistic regression analysis was also applied by Gulliford to estimate the associations between the use of diabetes retinal screening and socio-economic factors (Gulliford et al., 2010). In some other papers, researchers only used descriptive statistics to describe the differences in the use of health care services of different socio-economic groups (Hong et al., 2003 & Toan et al., 2002).

## 3.2. Research studies on health care utilization in Vietnam:

In Vietnam, inequities exist in every corner of the health sector, from maternal health care utilization (Goland, Hoa, & Malqvist, 2012), access to and utilization of health care services in the mountainous areas (Toan et al., 2002), in the utilization of perinatal services (Nga et al., 2010), etc. The issue of inequity in health care utilization has gradually attracted more attention of the government, the Ministry of

Health as well as researchers. More attention has been paid on health care utilization, and differences in health care utilization among different socio-economic groups because by truly understanding them, the health sector can improve the responsiveness towards people's needs and then improve the accessibility to health care services for the whole population, especially for vulnerable groups in the society (Shaikh & Hatcher, 2005).

In Vietnam, a number of studies on inequities in health care utilization have been conducted. However, the researchers focused mostly on their fields of specialty, or just cross-sectional studies on health care seeking and using behaviors (Goland et al., 2012; Malqvist et al., 2012; Nga et al., 2010; Toan et al., 2002). So far, very few studies have been conducted to find out the trend in health care seeking and using behaviors of people for a long period of time. In other words, there have been very few longitudinal studies on health care seeking and using behaviors in Vietnam.

As other developing countries, Vietnam is in serious shortage of information for health policies and planning related to the people's health, especially at the community and grassroots level (Giang & Peter, 2003). In the period from 1987 to 1993, the trend of health care utilization seemed to decrease. However, the reliability of the data sources was in doubt due to the fact that data collection system was not good enough. Furthermore, they only covered the utilization in formation that occurred in public health services but not private ones (WB, 1995). As a result, the trend reported could not provide a thorough picture of utilization of health care services in public, private or even self-treatment of the whole population.

There have always been existed differences in the utilization of health care services among different socioeconomic groups, especially between the rich and the poor. It was reported that self-medication was the most popular selection of all groups when they had to deal with sick episodes and the rate was considerably high among the poorest group (Giang & Peter, 2003; Toan et al., 2002; WB, 1995).

During 2002 to 2011, the Ministry of Health of Vietnam issued several policies aiming at improving accessibility to health care services and equities for Vietnamese people like the Decision No 139/2002/QĐ-TTg by the Prime Minister regarding health care for the poor, the Circular No 14/2005/TT-BYT by the Ministry

of Health regarding free health care for children under 6 years of age or the Law on Health Insurance issued in 2008. However, in Vietnam there has not been much research about the changes in health care utilization of people after these legal documents were issued. Several studies on the impacts of Health Care Fund for the Poor showed that Health Care Fund for the Poor had initially helped to increase the utilization of services, reducing catastrophic payment for health care (Adam, 2007; Thanh, Lofgren, Phuc, Chuc, & Lindholm, 2010), but not yet reduced the out-of-pocket payment for health care services (Adam, 2007).

# CHAPTER IV
# RESEARCH METHODOLOGY

## 4.1. Conceptual Framework:

Wealth index quintile groups, age, sex, marital status, occupation, education level, distance from the household to the nearest health center are expected to have certain impacts on the use of health care services.

*HCU = f (quintile, age, sex, marital status, occupation, education level, distance from the household to the nearest health center)*

It is expected that the rich will use more health care services at higher-level health facilities than the poor. In terms of sex, females may use health care services less than males. For those who are married, the health care utilization rate may be higher than that of those who are single, divorced or widowers. People who have higher education level are expected to use more health care utilization than those with lower education level. People who live near the health center may use health care services more frequently than those who stay far from the health center. As for the age of individuals, children and senior citizens may use more health care services than the adolescents and middle-aged group. Therefore, the association between health care utilization and the age variable may have a U-curve shape. As for occupation variable, farmers and unemployed people may use less health care services than people with other types of occupation.

The study will describe the use of different health care services as well as their changes over time in Bavi district, Vietnam from 2002 to 2011. Health care utilization of people and its association with the economic and socio-demographic factors will be identified. The rate of utilization of self-treatment, health care services at provincial/central hospitals, district hospitals, communal health centers and private clinics among different wealth index quintile groups will then be computed.

**Economic and socio-demographic factors**:
- Wealth index quintile group
- Gender
- Age
- Occupation
- Educational level
- Marital status
- Distance to the nearest health center

**Health care utilization in Bavi district, Vietnam (2002 – 2011)**

- Rate of utilization
- Self-treatment vs. communal health centers vs. district hospitals vs. provincial/central hospitals vs. private clinics

## 4.2. Study design:

This is a longitudinal retrospective study, conducted in Bavi district, Hanoi Vietnam from 2002 to 2011.

## 4.3. Data source:

### 4.3.1. *The establishment of the Epidemiological Field Laboratory of Bavi (FilaBavi):*

"Doi moi" period is a very important landmark in the development of Vietnam. It was initiated in December 1986 by the Resolution of the Sixth Party Congress of the Communist Party of Vietnam (Vietnam, 1986). Then in March 1989,

the government of Vietnam decided to intensify "Doi moi" process with comprehensive actions in all sectors of the country, including the health care sector. The new task for the health sector was to mobilize more resources for health, to enhance the responsiveness of the health services and to improve health equity in the provision of health care sector (N. T. Chuc & Diwan, 2003).

In the new era of research in order to provide evidence for the policy making process to response to new requirements of the health sector, the need for the health system research was identified and the field site as the installation of research studies was required. As other developing countries, due to serious problems of lacking health related information, especially at the community level, it is a big challenge for the government and the health sector to make efficient and proper policies, plans or strategies in order to improve quality of care, both in preventive and curative treatment. As mentioned above, Vietnam health sector was facing the challenges of the shortage of data from the community and the weak data collection system of the government (Giang & Peter, 2003; WB, 1995). Cross-sectional studies contribute to identify some specific problems, but they cannot provide a longitudinal overview about people's health at the communities (Byass et al., 2002). The demographic surveillance site was really in urgent need for the Vietnamese health sector in the context of epidemiological and economic transition. As a matter of fact, the Field Laboratory of Bavi (FilaBavi) was established in 1998 in Bavi District, Ha Tay Province, Vietnam (N. T. Chuc & Diwan, 2003). In 1998, FilaBavi became a full member of the International Network for the Demographic Evaluation of Populations and Their Health (INDEPTH). INDEPTH is a global network of members who conduct longitudinal health and demographic evaluation of populations in low- and middle-income countries (LMICs). INDEPTH aims to strengthen global capacity for Health and Demographic Surveillance Systems (HDSSs), and to set up multi-site research to guide health priorities and policies in LMICs, based on up-to-date scientific evidence (www.indepth-network.org).

### *4.3.2. Surveillance design and routine activities:*



Epideiological Field Laboratory in District Bavi
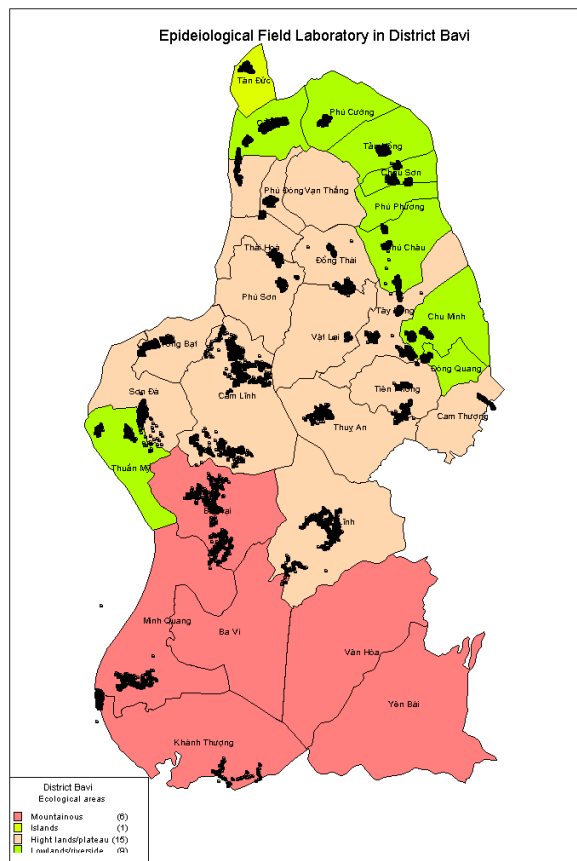
*Figure 5. Map of Bavi District and FilaBavi*

The whole district of Bavi was classified into 352 clusters. The probability proportional to population size sampling technique in each unit was applied to select 67 clusters in delta, riverside and mountainous areas involving in the demographic surveillance of FilaBavi. Initially, the total surveyed population was 51,024 inhabitants of 11,089 households in 1999 (N. T. Chuc & Diwan, 2003). In 2011, the population covered by FilaBavi increased to more than 52,000 residents in 14,592 households.

There are totally 6 groups of interviewees in charge of conducting surveys in these 69 clusters in FilaBavi. The lowest educational level of these surveyors is high school. In each group, there is one supervisor who is responsible for checking and

revising all questionnaires collected by surveyors. Totally FilaBavi has 42 surveyors and 6 supervisors in charge of conducting surveys in 69 clusters covered by FilaBavi.

Routine activities of FilaBavi include re-census survey conducted every two years with the baseline survey in 1999 and quarterly follow-up surveys. The surveyors visit households to implement face-to-face interviews with designed questionnaires. Re-census surveys concentrate on household information and follow-up surveys focus on individual information. In re-census survey, information about housing conditions, properties, income, expenditure, and geographical location of the household is collected. The information on housing conditions and properties of the households are used to classify the households into five quintile groups basing on the wealth index calculation. In follow-up surveys, the information about in-migration, out-migration, illness, marriage, birth, and death is collected. The supervisors check all of the questionnaires and will ask the surveyors to come back to the households to take missing information if it happens. The supervisors conduct re-interview with 10% of the forms. Five percent of the questionnaires will be checked by the researchers of FilaBavi. Twenty percent of the questionnaires will be desk-checked before being entered (N. T. Chuc & Diwan, 2003; Hoa, 2010).

Up to December 2011, FilaBavi has completed one baseline survey, six re-census (R1 – R6) and fifty follow-up surveys (F1 – F50). Apart from conducting every quarterly follow-up surveys and re-census surveys every two years, FilaBavi is also a venue to conduct many sub-studies of researchers within the program like studies on maternal and child health care, antibiotics resistance, post-partum depression, sexually transmitted diseases, epilepsy, traffic injuries, tuberculosis, hypertension and non-communicable diseases, etc. (N. T. K. Chuc, 2012).

*Table 3. Routine activities of FilaBavi, 1999 - 2011*

| -- Specific studies -- Specific studies -- Specific studies -- | | | | YEAR |
|---|---|---|---|---|
| Baseline survey | | F1 | F2 | 1999 |
| F7 | F8 – **R1** | F9 | F10 | 2001 |
| F11 | F12 | F13 | F14 | 2002 |

| -- Specific studies -- Specific studies -- Specific studies -- | | | | YEAR |
|---|---|---|---|---|
| F15 | F16 – **R2** | F17 | F18 | 2003 |
| F19 | F20 | F21 | F22 | 2004 |
| F23 | F24 – **R3** | F25 | F26 | 2005 |
| F27 | F28 | F29 | F30 | 2006 |
| F31 | F32 – **R4** | F33 | F34 | 2007 |
| F35 | F36 | F37 | F38 | 2008 |
| F39 | F40 – **R5** | F41 | F42 | 2009 |
| F43 | F44 | F45 | F46 | 2010 |
| F47 | F48 – **R6** | F49 | F50 | 2011 |

*\* F: follow-up survey (collect individual information on vital events)*

*R: re-census survey (collect household information on housing conditions, properties, income, expenditure)*

Source: Annual Progress Report of Health System Research Project, Vietnam 2011

Data will then be entered into computers by Microsoft Access software by three office staffs and one field manager in FilaBavi. Each household has their own household code. Each individual also has his or her own code. The code will not change over time. New members and new households will have new codes for household and individual.

## 4.4. Data used for analysis and main definitions:

### 4.4.1. Data used for analysis:

In January 2013, I was permitted by the Steering Committee of the Epidemiological Field Laboratory to use the longitudinal data of FilaBavi in the three years of 2002, 2007 and 2011 for this study. The data analysis will be conducted from

the year 2002 due to the fact that from 1999 to 2001, FilaBavi was in the very beginning period and it was still in the development and completion process. Therefore, the data collection and entry system was not completed. In the beginning of 2012, data collection mechanism of FilaBavi was changed, the dataset was not similar to that of the previous years and thus the year 2011 is taken as the last year and 2007 is used as the middle year of the time period to assess the changes in health care utilization over time. The data will be used for analysis is at individual level followed in the three time periods 2002, 2007 and 2011, including:

- *Individual information*: age, sex, education level, occupation, marrital status
- *Household information*: quintile groups classified by wealth index calculation and distance from the household to the health care center, year of surveys.
- *Individual information about health care utilization*: self-treatment or utilization of communal health centers, district hospitals, provincial/central hospitals and private clinics in the sick episodes.

The main explanatory variable is *wealth index quintile* groups, which is available in the dataset. The variable of quintile groups were classified on the basis of housing condition and household properties because wealth index calculation has some advantages and accuracy upon quintile classification basing on income or expenditure as mentioned in the literature review part (*Part VI, 2.3. Health care utilization and eocnomic factors*). Within the framework of FilaBavi, the surveyors visit the households and conduct face-to-face interviews to get information on properties and housing condition. They also have to observe the houses to get more accurate information. Meanwhile, quintile classification basing on income or expenditure has some problems like under-reported income or diversified spending sources, etc. Therefore, it is very difficult to collect accurate information on income or expenditure (Shea Oscar Rutstein, 2004).

Bavi is a rural district located in the north of Vietnam with the main occupation of farming, accounting for 81% of the economic activities (N. T. Chuc & Diwan, 2003). Even though the proportion of farmers is on the decreasing trend, farming still remains the major source of income of people in this region (Thoa, 2011). Lots of farmers in the area are self-supported with their farming products. Therefore, it is very difficult to collect their real income or expenditure in monetary

units as they may have income and expenditure on food equal zero. Apart from the problem of under-reported income, the income from farming differs seasonally, and thus the income measured during the survey conducted at one period of time may not reflect the true income level. That's why wealth index is more appropriate to be applied in this study rather than income or expenditure information in classifying quintile groups.

The information on housing condition and properties of households was used to calculate wealth index for the households. The data to be used includes type or roof, type of wall, type of floor, floor area, source of light, main water sources, type of latrine, the availability of bathroom, the availability of durable assets in the households like radio, fridge, TV, fan, telephone, personal computer, air conditioner, car, motorbike, etc. (Table 3).

*Table 4. Information on housing condition and household's properties*

| Category | Components |
|---|---|
| **Type of roof** | Beton roof; brick/zine roof; leaves/straw roof |
| **Type of wall** | Bamboo tile with straw/earth; wooden; stone; laterite; bapanh brick; raw dried brick; brick |
| **Type of floor** | Soil floor; lime/mortar ground; lay bricks; cement; ceramic/enameled tile |
| **Floor area** | |
| **Source of light** | Electricity; Fuel; Other |
| **Main water sources** | Lake/pond; river/stream; water running from a course of a stream; rain water; dug well; drilled well; running water |
| **Type of latrine** | Bucket; no latrine; sulabh; in pig style; semi septic tank; biogas; DVCL |
| **Bathroom** | With or without |
| **Properties (durable assets)** | *With or without:*<br>- Radio cassette<br>- Refrigerator<br>- TV<br>- Video cassette/CD /VCD/ DVD player |

- Fan

- Sewing machine

- Wardrobe

- Rice cooker, kitchen equipment

- Gas cooking plate

- Telephone

- Mobile phone

- Personal computer

- Air conditioner

- Hot water (for bathing)

- Bicycle

- Motorbike

- Tractor, motorboat

- Car/bus/truck

- Water pump

- Machine for rubbing rice, for crushing, grind

- Buffalo, cow, goat

- Others (specify)

The wealth index of the households was developed based on Principal Component Analysis:

$$PC_i = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_n X_n$$

***Where:***    $X_1, X_2, X_3, X_4, \ldots, X_n$ are asset variables

$\beta_1, \beta_2, \beta_3, \beta_3, \ldots, \beta_n$ are principal component coefficients

Principal component analysis (PCA) program was used to calculate the weight of asset variables. It analyzed the pattern of correlations between the possessions of assets and assigned weights to asset variables based on their relation to each other. All variables included in the PCA were recoded into binary variables. A common method to select the component is on the basis of its eigenvalue. The component with eigenvalue greater than one will be selected. The assets, which are distributed more unequally among households, are given more weight in PCA. Variables with low standard deviations would be assigned a low weight by PCA. The factor weight was

calculated; then the asset variables are multiplied by their weights and summed to get the household's wealth index value.

The wealth index of the households was used to classify all households under the surveillance into five quintile groups namely 1st quintile groups as the poorest, 2nd quintile group, 3rd quintile group, 4th quintile group and 5th quintile group as the richest group.

### *4.4.2. Main definitions:*

- A household includes all members (even one person) who eat together for at least 3 months or persons just moving to that house but going to live there for more than 3 months.

- Self-treatment is that the sick person uses the available medicines at home or purchased medicines from drug sellers without medical examination or any advices.

- Private healthcare includes healthcare services provided by physicians in the private clinics/policlinics, which were established by retired doctors or doctors in the hospital working after official time.

- Commune health stations, district hospitals and provincial/central hospitals are different levels of public health care services, which are managed by the Government as other developing countries.

## 4.5. Data description:

The dependent variable, Y, captures the use of health care services (self-treatment, health care at provincial hospitals, district hospitals, communal health centers or private clinics). Explanatory variables include *quintile* which will be divided into five dummy variables (1st quintile group, 2nd quintile group, 3rd quintile group, 4th quintile group and 5th quintile group), a dummy variable of *sex* (male and female), a dummy variable of *occupation* (farmers and others), a dummy variable for *marital status* (married and unmarried), a dummy variable for *educational level* (university and no university), a continuous variable of *distance,* together with

categorical dummy variables for **age groups** ( age05, age0622, age2365 and age66) and dummy variables of **time** (2002, 2007 and 2011).

*Table 5. Variable description*

| Variable | Description |
|---|---|
| Y | 1 if using certain health care services (self-treatment/provincial or central hospital/ district hospital/ communal health center/ private clinics) |
| Quintile 1 | 1 if belonging to the poorest quintile group (omitted from the equation) |
| Quintile 2 | 1 if belonging to the second quintile group |
| Quintile 3 | 1 if belonging to the third quintile group |
| Quintile 4 | 1 if belonging to the forth quintile group |
| Quintile 5 | 1 if belonging to the richest quintile group |
| Sex | 1 for male and 0 for female |
| Farmer | 1 if mainly do farming and 0 for having other jobs or unemployed (omitted from the equation) |
| Employee | 1 if working and getting salary from employers and 0 otherwise |
| Non-working | 1 if being elderly, jobless, students or small and 0 otherwise |
| Other occupation | 1 if having other types of occupation and 0 otherwise |
| Married | 1 if married and 0 for being single, widowed or divorced |
| Under-graduate | 1 if having training from university, college or professional school and 0 otherwise (omitted from the equation) |
| High school | 1 if getting the highest education level at high school and 0 otherwise |
| Secondary | 1 if getting the highest education level at secondary school and 0 otherwise |
| Primary | 1 if getting training at primary schools, being able to read and write or being illiterate and 0 otherwise |

| Variable | Description |
|---|---|
| Distance | Continuous variable (measured in km) |
| Age05 | 1 if age is from 0 to 5 years old |
| Age0622 | 1 if age is from 06 to 22 years old |
| Age2365 | 1 if age is from 23 to 65 years old |
| Age66 | 1 if age is 65 years old and above (omitted from the equation) |
| Year2002 | 1 if under the year 2002; 0 otherwise (omitted from the equation) |
| Year2007 | 1 if under the year 2007; 0 otherwise |
| Year2011 | 1 if under the year 2011; 0 otherwise |

## 4.6. Data analysis:

Data were entered by Microsoft Access Software. The health care using behaviors of residents covered by the field site will be analyzed in the association with the economic and socio-demographic factors to see the differences in the health care utilization of different socio-economic groups. Data about health care utilization in three years of 2002, 2007 and 2011 will be used to describe the changes and the trend in health care utilization of people living in Bavi district, Hanoi, Vietnam from 2002 to 2011. STATA software version 11.1 will be employed to implement data analysis.

The dataset used for analysis is a longitudinal one containing data on the same individuals over the three years of 2002, 2007 and 2011. Any households or individuals who were not followed in these three years would be excluded from the study.

*Table 6. In-migration and out-migration in FilaBavi over time*

| Year | Total | Rate | In-migration | Out-migration |
|---|---|---|---|---|
| 2002 | 3,989 | 8% | 1,696 | 2,293 |
| 2007 | 4,176 | 8.1% | 1,729 | 2,447 |
| 2011 | 3,496 | 6.6% | 1,612 | 1,884 |

Due to the fact that the dependent variable of health care utilization is a discrete choice variable, panel data's binary logistics regression is employed to study

(i) the decision to use health care services at provincial/central hospitals

(ii) the decision to use health care services at district hospitals

(iii) the decision to use health care services at communal health centers

(iv) the decision to use private health care services

(v) the decision to use self-treatment

We can compute the marginal effects of each demographic and socio-economic variable on the probability of using each of the health services mentioned above. The statistical significance is determined at p-value < 0.05, which is applied to assess the significance of the impact of independent variables on health care utilization.

The models used in the data analysis is as followed:

$$Y_{it} = \begin{cases} 1 \rightarrow \text{use of certain type of health care services if } Y^*_{it} > 0 \\ 0 \rightarrow \text{not use of that health care service if } Y^*_{it} \leq 0 \end{cases}$$

**Latent variables:**

$$Y^*_{it} = \alpha + \beta X_{it} + \gamma_i + \varepsilon_{it}$$

Where: *i stands for cross-sectional unit*

*t stands for time*

$\gamma_i$ *is individual specific effects*

$\varepsilon_{it}$ *is idiosyncratic error system*

To be specific, the equation for the binary logistic models is:

$$\Pr[(Y_{it} = 1)] = F\ (\text{ß}_0 + \text{ß}_1 \textit{Quintile2}_{it} + \text{ß}_2 \textit{Quintile3}_{it} + \text{ß}_3 \textit{Quintile4}_{it} + \\ \text{ß}_4 \textit{Quintile5}_{it} + \text{ß}_5 \textit{Sex}_i + \text{ß}_6 \textit{Employee}_{it} + \text{ß}_7 \textit{Non-working}_{it} + \\ \text{ß}_8 \textit{Other\_occupation}_{it} + \text{ß}_9\ \textit{High\_school}_{it} + \text{ß}_{10}\ \textit{Secondary}_{it} + \\ \text{ß}_{11} \textit{Primary}_{it} + \text{ß}_{12} \textit{Distance}_{it} + \text{ß}_{13} \textit{Age05}_{it} + \text{ß}_{14} \textit{Age0522}_{it} + \\ \text{ß}_{15} \textit{Age2365}_{it} + \text{ß}_{16} \textit{Married}_{it} + \text{ß}_{17} \textit{Year2007}_i + \text{ß}_{18} \textit{Year2011}_i \\ + \gamma_i + \varepsilon_{it})$$

Binary logit regression for panel data is used for the estimation. In particular, it is assumed that $\gamma_i$ has a random effect. Marginal probabilities (Marginal Effect) will be applied to evaluate the magnitude of the impact of each factor on the dependent variable.

# CHAPTER V
# RESULT AND DISCUSSION

As mentioned in Chapter IV of Method, only those who were followed up in three years of 2002, 2007 and 2011 would be included in the study. Thus, after data was merged, only 11,056 households with 45,326 individuals were included in the study and their demographic and socio-economic characteristics were analyzed to see their association with the utilization of different health care services in three years of 2002, 2007 and 2011. This chapter will show the results of the study and discuss about the results with the aim of showing the association between demographic and socio-economic characteristics with the utilization of different health care services among different population groups.

## 5.1. Individuals' characteristics

As mentioned above, 11,056 households with 45,326 individuals were followed up in 2002, 2007 and 2011. Their sickness episodes and utilization of health care services were collected four times each year. There are totally 159,921 sick episodes recorded in the study.

Among 159,921 times of using health care services, the rate of health care services utilization of males was lower than that of females (41% vs. 59%). In this study, the rate of people graduating from university, college or professional school was pretty low, only accounted for 5.3%. Most of people in the study aged from 23 to 65 years old. Farming is major occupation in Bavi district and it is also the case of the study, the number of people doing farming accounted for 36% of the whole population under the surveys. Households were classified into five quintile groups basing on their properties and information on wealth index quintile groups was generalized for all household members meaning that all members in one household would be classified in the same quintile group as the household. That's why the proportion of each quintile was not exactly 20%.

*Table 7. Descriptive statistics for selected variables*

| Characteristics | Frequency | Percentage (%) |
|---|---|---|
| **_Gender_** | | |
| Male | 64,856 | 40.56% |
| Female | 95,065 | 59.44% |
| **_Educational level_** | | |
| Under-graduate | 8,449 | 5.28% |
| High school | 12,816 | 8.02% |
| Secondary | 56,332 | 35.22% |
| Primary | 82,324 | 51.48% |
| **_Marital status_** | | |
| Married | 78,520 | 49.10% |
| Single, widowed, divorced | 81,401 | 50.90% |
| **_Occupation_** | | |
| Farmers | 57,610 | 36.02% |
| Employee | 9,852 | 6.16% |
| Non-working | 79,390 | 49.64% |
| Others | 13,062 | 8.18% |
| **_Age groups_** | | |
| 0 - 05 | 22,604 | 14.13% |
| 06 - 22 | 33,455 | 20.91% |
| 23 - 65 | 75,531 | 47.23% |
| > 66 | 28,341 | 17.72% |
| **_Wealth index quintile groups_** | | |
| Q1 | 30,146 | 18.85% |
| Q2 | 33,104 | 20.70% |
| Q3 | 33,294 | 20.82% |
| Q4 | 32,800 | 20.51% |
| Q5 | 30,577 | 19.12% |

Table 9 and table 10 below show the occupation and educational level of different quintile groups. Non-working group consisted of the elderly, small children, students and jobless people, thus the proportion of non-working people was the highest among all quintile groups. The proportion of the richest people working as employees was the highest among all quintile groups, accounted for 9.8% while that of the poorest was the lowest, accounted for only 4.3%. The rate of the richest working as farmers was the lowest among all quintile groups (26.3%).

*Table 8. Occupations of people belonging to different quintile groups*

| Occupation | Q1 | Q2 | Q3 | Q4 | Q5 |
|---|---|---|---|---|---|
| Farmers | 37.95% | 38.4% | 39.6% | 37.2% | 26.3% |
| Employee | 4.3% | 5.1% | 5.5% | 6.2% | 9.8% |
| Non-working | 51.4% | 50.5% | 48% | 48.2% | 50.3% |
| Other occupation | 6.3% | 5.9% | 6.8% | 8.3% | 13.6% |

According to table 10, the education background of people belonging to different quintile groups was diversified. The majority of the poorest people had the highest education level of primary school or were illiterate, accounted for 69.2% while the proportion of the poor having high educational background was very low, just 1.3% for undergraduate and 3.2% for high school. The higher the economic class was, the higher the proportion of people having high educational background (undergraduate and high school). The proportion of people having highest education background of primary school was lowest among the richest group, accounted for 39.1%. Meanwhile, the rate of people in the $5^{th}$ quintile group having high educational level was the highest among all quintile groups, accounted for 13.5% for undergraduate and 13.4% for high school.

*Table 9. Educational level of people belonging to different quintile groups*

| Edu. level | Q1 | Q2 | Q3 | Q4 | Q5 |
|---|---|---|---|---|---|
| Undergraduate | 1.3% | 2.4% | 3.5% | 6% | 13.5% |
| High school | 3.2% | 5.9% | 7.6% | 10% | 13.4% |
| Secondary | 26.3% | 35.9% | 39.1% | 39.8% | 34.1% |
| Primary | 69.2% | 55.7% | 49.8% | 44.1% | 39.1% |

Table 11 shows that only 1.98% of farmers had high educational background while the rate of employees having under-graduate background was pretty high (30.69%). The proportion of employees who had educational background of primary school was very low.

*Table 10. Educational level of people with different types of occupations*

| Occupation | Undergraduate | High school | Secondary | Primary |
|---|---|---|---|---|
| Farmers | 1.98% | 8.43% | 59.44% | 30.15% |
| Employee | 30.69% | 16.35% | 43.29% | 9.67% |
| Non-working | 4.14% | 5.17% | 14.47% | 76.22% |
| Other occupation | 7.59% | 17.16% | 48.54% | 26.71% |

## 5.2. Utilization of health care services

### 5.2.1. *Overview about the use of various health care services over time*

There are obviously differences in the use of various health care services in each year, and among three years of 2002, 2007 and 2011. In general, almost all people under the surveillance used one of the health services during their sick episodes. Private clinics were used most commonly by the population under surveillance, accounting for 54.95%, 33.24% and 41.53% in 2002, 2007 and 2011, respectively. The use of self-treatment was also common in these three years in Bavi. The rate of using provincial hospital was pretty low, accounted for approximately 3.18% in the study.

*Figure 6. Proportion of the utilization of different health care services*
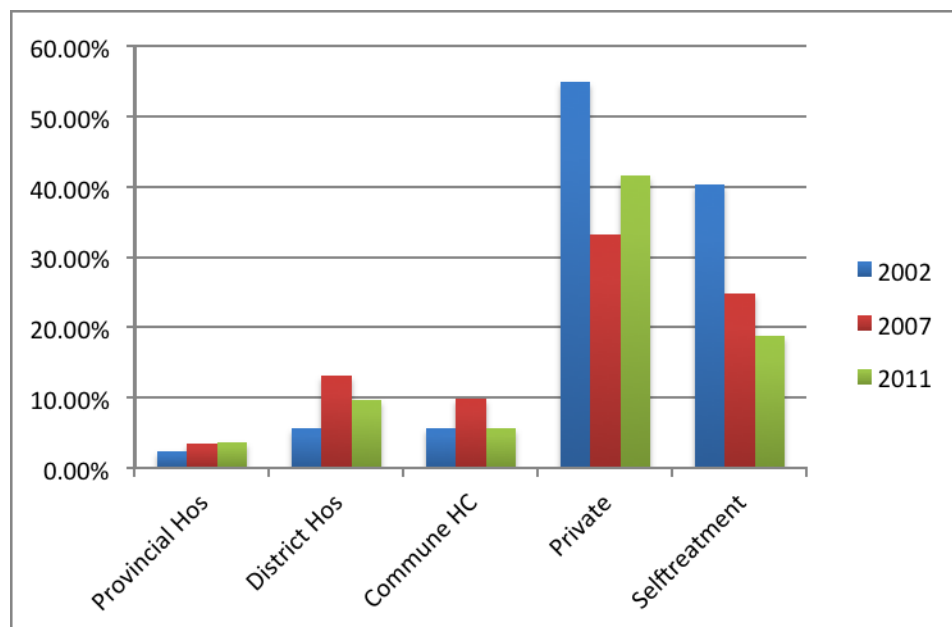


The study found out that private clinics and self-treatment were the top two choices of health care service users in FilaBavi while communal health centers were not commonly used. It happened firstly because the availability of private health facilities in the area was increasing very fast, from only 3 drug stores and some private practitioners in 1999 to approximately 200 private health facilities in 2009 (Giang KB, 2003 & Hoa NQ, 2009). Together with the availability of private health facilities was the accessibility to drugs. Drugs were available for all people who wanted to buy providing that they had enough money. People could buy drugs without prescription from the drug stores, and even from private clinics.

Moreover, it can't be denied that the quality of communal health centers was not as good as that of private clinics. Communal health centers was not comparable to the private health facilities in terms of staffs' attitude and drug availability. Last but not least, the reason for the common use of private clinics was that users would not have to wait for a long time in private clinics as in district hospitals. There is only one district hospital in the region, that's why it always faced the problem of overcrowding. People coming to the district hospital had to wait for such a long time. Therefore, it would be better for them to use health care services of private clinics.

The trend in the use of self-treatment was decreasing, from 40.27% in 2002 to only 18.87% in 2011. In comparison with the year 2002, the use of private clinics in 2007 and 2011 was lower. The reason for this decrease may be due to the policies of the health sector aiming at improving health status and quality of care for people all over the country, especially for vulnerable groups like free health care for the poor issued in 2002, free health care for children under 6 issued in 2005 and 50% subsidy in purchasing health insurance for the near-poor group issued in 2008. These policies might play an important role in encouraging people to use more health care services at public health facilities instead of private clinics as these policies were applied only in public health facilities. According to the Joint Annual Health Report 2010 by the Ministry of Health, the proportion of the poor enjoying benefits from the policy on free health care for the poor increased year by year. In 2006, the number of health insurance cards delivered to the poor was 15 million cards, accounting for 40% of the number of people owning health insurance cards. That number increased to 15.8 million cards in 2008 (JAHR, 2010).

Another reason contributing to the reduction in the rate of self-treatment was the improvement in health information and communication to the community. People seemed to be more aware of their health and impacts of self-treatment on their health and even their lives. However, the rate of self-treatment users was still high in comparison with other service users. As mentioned above, it was too easy for people to get access to drugs, both geographically and availably. Thus, it is important for the health sector to control drug selling activities of pharmacies and private clinics in order to reduce the common use of self-treatment in the community, aiming at improving the situation of drug resistance for the whole country.

The rate of using communal health centers and district hospitals increased from 5.69% and 5.70% in 2002 to 13.2% and 9.95% in 2007, respectively. However, the rate of using these two services decreased in 2011. There are several possible causes for this problem. The increase in the use of primary and secondary care in the public sector in 2007 may be partially thanks to the support from the government. In 2002, the Health Care Fund for the Poor was established and in 2006, health insurance cards were delivered free of charge for poor people. In 2005, the policy on free health care for children under 6 was issued and introduced widely in the whole country.

However, in 2009, the government issued the circular (No 10/2009/TT-BYT dated August 14, 2009) referring to the increase in the co-payment rate for public health care services for those who did not follow the referral system. The aim of that policy was to improve the efficiency of referral system in the health sector of Vietnam, to improve the situation of overcrowding in higher-level hospitals, and to prevent people from bypassing to higher-level health facilities. Additionally, in 2009, the circular on increasing the co-payment rate in health insurance scheme from 3% to 4.5% of basic salary was applied nationwide. It might lead to the reduction in the proportion of people purchasing voluntary health insurance. That may explain why the proportion of district hospital users in 2011 reduced in comparison with in 2007.

### 5.2.2. *Health care utilization among socio-demographic groups*

Table 12 below shows the rate of using each of the health care services among people with different socio-demographic factors. Private clinics seemed to be the most common choice of all people in the study, no matter they were males or females, with high educational level or not, no matter they were old or young, farmers or not, married or unmarried. Self-treatment was the second most popular choice of people in FilaBavi involved in the study.

In this study, males tended to use more official health care services including provincial hospital, district hospital, communal health centers and private clinics rather than females. By contrast, the proportion of females not using any kind of treatment or just using drugs available at their houses was higher than that of males.

People with higher educational background, particularly people with training from university, college or professional schools tended to use services at provincial/central hospitals and district hospitals more frequently than those with other educational background.

Health care services at provincial/central hospitals were used more by married people and people in the age from 23 to 65 years old. Meanwhile, self-treatment was quite popular among farmers and people aged 66 and above. For children under 6, the rate of using health care services was pretty high in comparison with other age

groups. District hospital, communal health centers and private health facilities were among the top priorities of children under 6 when they sought for health care services.

*Table 11. Health care utilization of different demographic groups*

| | Prov. Hos | Dist. Hos | CHC | Private clinics | Self treatment |
|---|---|---|---|---|---|
| *<u>Gender</u>* | | | | | |
| Male (N = 64,856) | 3.77% | 11.12% | 7.90% | 45.33% | 24.79% |
| Female (N = 95,065) | 2.77% | 8.39% | 6.75% | 42.17% | 31.51% |
| | | | | | |
| *<u>Edu. Level</u>* | | | | | |
| Under-graduate (N = 8,449) | 8.53% | 15.74% | 5.82% | 30.57% | 29.34% |
| High school (N = 12,816) | 5.06% | 8.72% | 6.12% | 40.21% | 26.86% |
| Secondary (N = 56,332) | 3.65% | 9.11% | 5.43% | 41.66% | 29.66% |
| Primary (N = 82,324) | 2% | 9.25% | 8.75% | 46.5% | 28.43% |
| | | | | | |
| *<u>Marital status</u>* | | | | | |
| Married (N = 78,520) | 4.23% | 9.89% | 5.36% | 39.84% | 31.91% |
| Unmarried (N = 81,401) | 2.16% | 9.12% | 9% | 46.93% | 25.77% |
| | | | | | |
| *<u>Occupation</u>* | | | | | |
| Farmers (N = 57,610) | 2.91% | 8.16% | 5.24% | 41.86% | 34.69% |
| Employee (N = 9,852) | 6.55% | 12.7% | 5.21% | 34.1% | 24.43% |
| Non-working (N = 79,390) | 2.64% | 9.96% | 9.16% | 46.97% | 24.97% |
| Others (N = 13,062) | 5.23% | 10.28% | 5.6% | 35.96% | 28.98% |

| | Prov. Hos | Dist. Hos | CHC | Private clinics | Self treatment |
|---|---|---|---|---|---|
| ***Age*** | | | | | |
| Age05 (N = 22,604) | 1.38% | 12% | 14.33% | 51.73% | 15.66% |
| Age0622 (N = 33,445) | 2.14% | 7.66% | 7.70% | 49.36% | 23.12% |
| Age2365 (N = 75,531) | 4.18% | 9.55% | 5.14% | 39.01% | 32.17% |
| Age66 (N = 28,341) | 3.17% | 9.55% | 6.51% | 41.71% | 36.93% |

### 5.2.3. *Health care utilization among different quintile groups*

In general, people belonging to the richest quintile group used more services at provincial/central hospitals more frequently than the poorest group. By contrast, the poorest used more self-treatment and no health care services more than the richest group. The proportion of the poor visiting private clinics, district hospitals and communal health centers for treatment was higher than that of the richest group.

*Table 12. Health care utilization of different quintile groups*

| Health services | Q1 | Q2 | Q3 | Q4 | Q5 |
|---|---|---|---|---|---|
| Prov/Cen Hos | 2.05% | 2.33% | 2.76% | 3.64% | 5.17% |
| District Hos. | 10.64% | 9.18% | 9.16% | 9.16% | 9.46% |
| Communal HC | 7.76% | 8.20% | 7.65% | 6.40% | 6.01% |
| Private Clinics | 41.60% | 45.80% | 45.98% | 42.84% | 40.62% |
| Self-treatment | 31.80% | 27.50% | 27.94% | 29.18% | 27.69% |

*Figure 7. Health care utilization of different quintile groups*
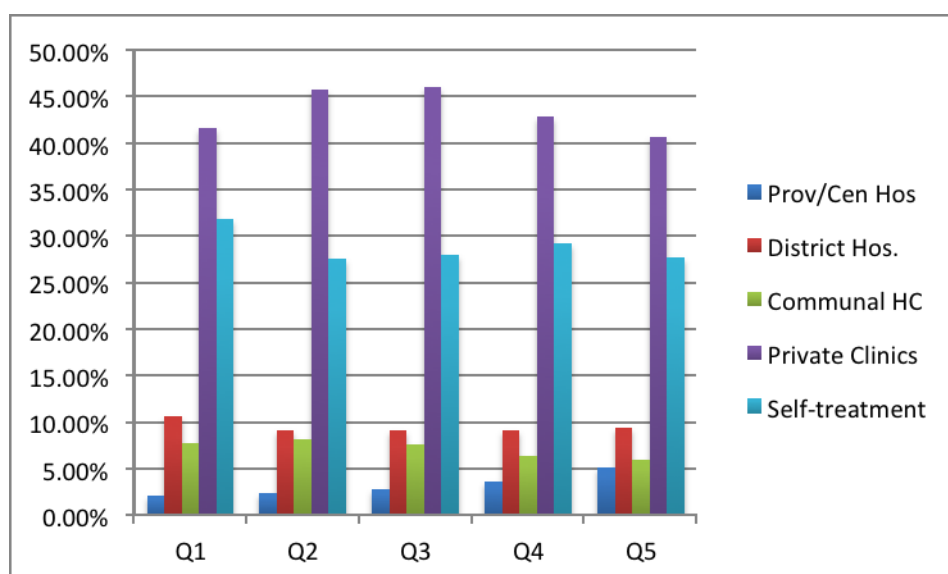


The proportion of people using health care services at provincial/central hospitals was highest among the richest group. The higher the economic class was, the higher rate of using health care services at provincial/central hospitals. In 2002, the richest group used provincial/central hospitals almost three times higher than the poorest group. The use of health care services at provincial/central hospitals of all quintile groups had an increasing trend, except for the richest group in the period from 2007 to 2011. In 2011, the proportion of provincial/central hospital users among the rich was only two times higher than that among the poorest group (*see Figure 8*). The considerable increase in the use of health care services at higher-level hospital of the poor over time might be due to the government's attempt in improving accessibility to health care services for the poor in the whole country.

*Figure 8. The use of health care services at provincial/central hospitals among different quintile groups*
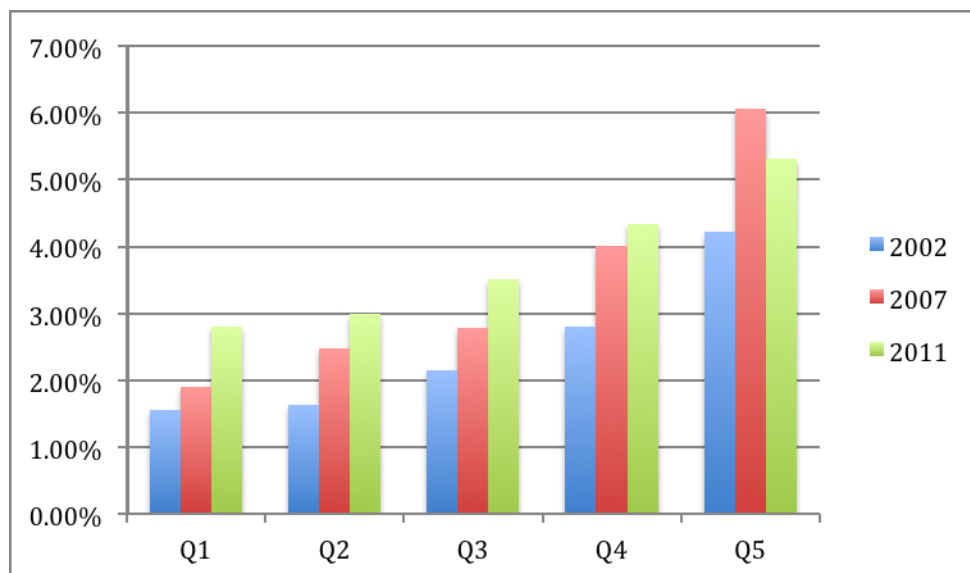


A contrast picture to the utilization at provincia/central hospitals was seen in the use of self-treatment. The poorest group treated themselves at home the most among different economic groups. The gap in using self-treatment between the richest group and the poorest group was obviously captured. However, there was not much different in the use of self-treatment among the second, third and forth quintile groups. Obviously, self-treatment was witnessing a decreasing trend among all five economic groups (**see Figure 9**). The very important reason explaining for this trend was the policies of the government regarding to enhancing people not to use self-treatment without any consultation from health staff.

*Figure 9. The use of self-treatment among different quintile groups*
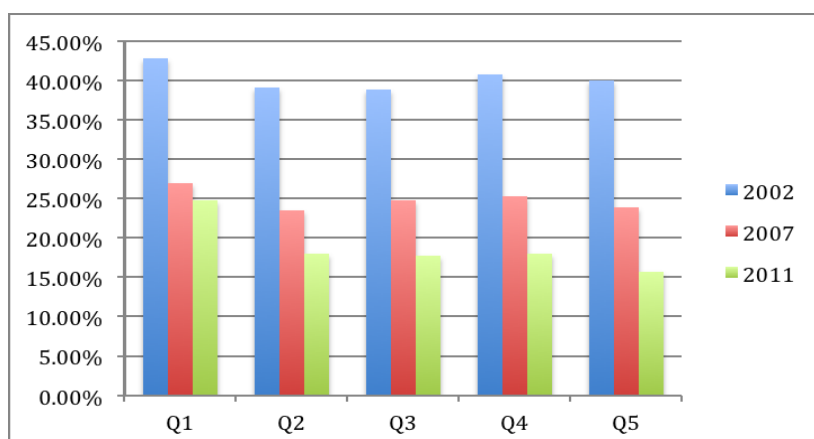
The use of private clinics was the most popular among all quintile groups. Figure 10 showed that there were differences in the use of private clinics in different periods of time, but there was not much difference among different quintile groups (***see Figure 10)***. The reduction in the use of private clinics of all quintile groups in 2007 could be explained by the dramatic increase in the use of district hospitals and communal health centers in 2007 thanks to the government's policies. As mentioned above, the two policies of free health care for the poor and free health care for children under 6 were introduced and applied nationwide, but these policies were only effective in public health facilities. Therefore, in 2007, the rate of using private clinics reduced. The proportion of private clinic users increased in 2011 in comparison with the year 2007 due to some changes in health related policies like the increase in the co-payment of health insurance premium as well as increase in the co-payment rate of hospital fee taken effect since 2010. Therefore, people tended not to use public health facilities as much as in 2007, so the rate of people using private clinics increased again in 2011.

***Figure 10. The use of private clinics among different quintile groups***
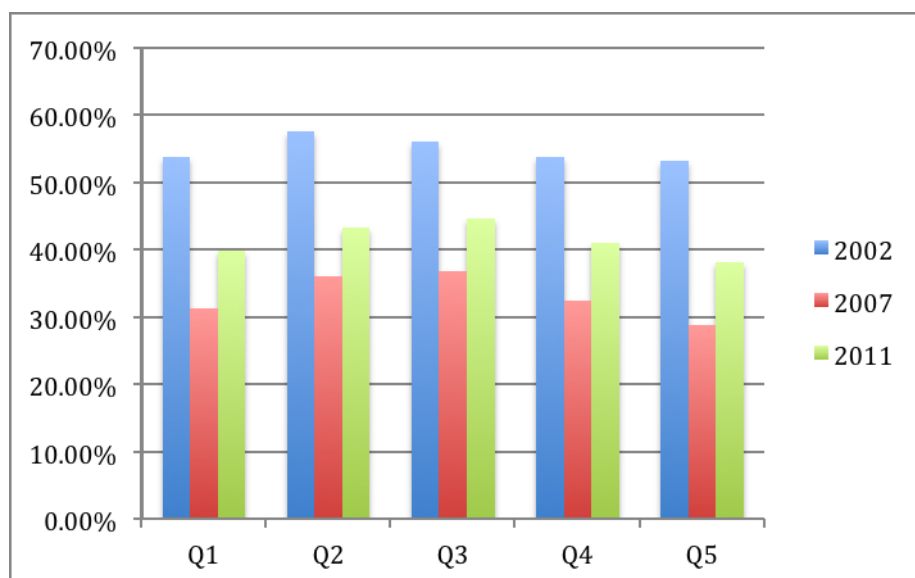


The highest rate of using primary health care at communal health centers among was captured in 2007. The proportion of people using communal health centers was not much different between 2002 and 2011. The differences in the use of

this kind of health care services was recognized between the two poorest groups and the three highest quintile groups.

*Figure 11. The use of communal health center among different quintile groups*
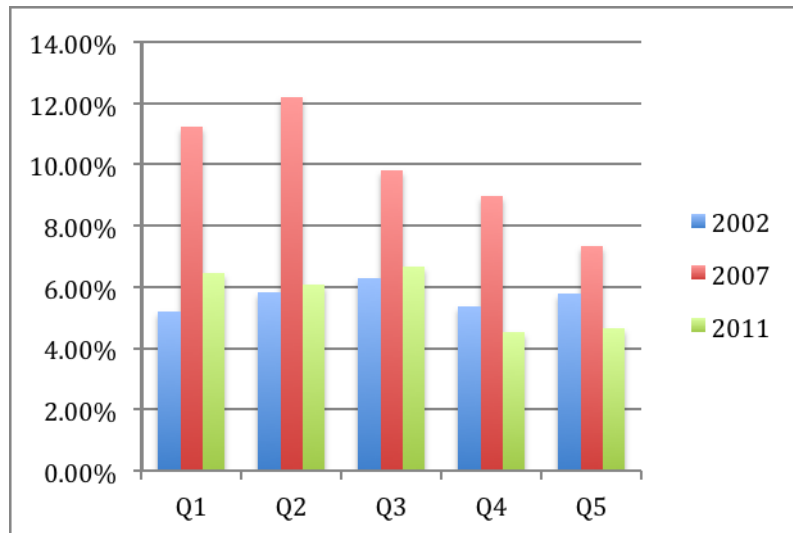


Witnessing the same situation as the use of primary health care services, the highest proportion of district hospital users was realized in the year 2007. The rate of using secondary care of all economic groups in 2011 was higher than that in 2002. The use of health care services at district hospital of the poorest group in 2007 and 2011 was pretty higher than other quintile groups. The rate of using secondary care was not much different among the four remaining quintile groups.

*Figure 12. The use of district hospital among different quintile groups*
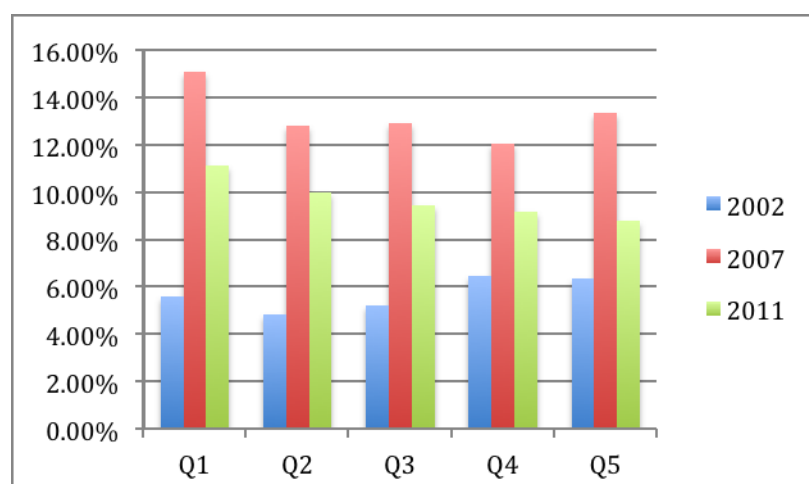
## 5.3. Factors affecting health care utilization

There are 159,921 sick episodes recorded with their choices of using different types of health care services in the study over the population under the surveillance in 2002, 2007 and 2011. Multicollinearity among independent variables was checked. No serious collinearity (80% or over) was reported. Binary logistic regression for panel data was applied in the study to see the effects of demographic and socio-economic factors of people in FilaBavi on their health care seeking behaviors. Health care services considered in this study consist of services of provincial hospital (tertiary care), district hospital (secondary care), communal health centers (primary care), private clinics (commonly used in Vietnamese health setting) and self-treatment (commonly used in Vietnamese health setting).

### 5.3.1. Factors affecting heath care utilization of provincial/central hospitals

Binary logistic regression for panel data was run with a dependent variable of whether or not a person would use health services at provincial or central hospitals. P-value at 5% and 95% CI were applied to see the significance of coefficients of the variables included in the regression. Marginal effects were calculated to see differences in the probability of choosing health care services at provincial/central hospital among different population groups.

*Table 13. Estimated coefficients and marginal effects from the binary logistic regression for the utilization of provincial/central hospitals (Dependent variable: Phospital)*

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal effects |
|---|---|---|---|---|---|---|
| Distance | 0.012 | 0.016 | 0.480 | -0.021 | 0.044 | 0.012 |
| Sex | 0.342* | 0.033 | 0.000 | 0.277 | 0.407 | 0.006 |
| Primary | -0.909* | 0.068 | 0.000 | -1.042 | -0.777 | -0.023 |
| Secondary | -0.512* | 0.062 | 0.000 | -0.633 | -0.392 | -0.012 |
| High school | -0.284* | 0.071 | 0.000 | -0.423 | -0.144 | -0.007 |
| Q2 | 0.004 | 0.064 | 0.945 | -0.121 | 0.130 | 0.000 |

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal effects |
|---|---|---|---|---|---|---|
| Q3 | 0.194* | 0.063 | 0.002 | 0.070 | 0.318 | 0.003 |
| Q4 | 0.380* | 0.062 | 0.000 | 0.258 | 0.502 | 0.006 |
| Q5 | 0.582* | 0.063 | 0.000 | 0.458 | 0.706 | 0.010 |
| Age05 | -0.714* | 0.080 | 0.000 | -0.871 | -0.557 | -0.004 |
| Age0622 | -0.450* | 0.068 | 0.000 | -0.583 | -0.317 | -0.003 |
| Age2365 | 0.148* | 0.061 | 0.015 | 0.029 | 0.268 | 0.001 |
| Married | 0.142* | 0.053 | 0.007 | 0.038 | 0.245 | 0.002 |
| Non-working | 0.360* | 0.056 | 0.000 | 0.250 | 0.469 | 0.006 |
| Employee | 0.401* | 0.060 | 0.000 | 0.283 | 0.520 | 0.007 |
| Others | 0.322* | 0.056 | 0.000 | 0.213 | 0.431 | 0.005 |
| Year2007 | 0.298* | 0.039 | 0.000 | 0.223 | 0.374 | 0.002 |
| Year2011 | 0.389* | 0.041 | 0.000 | 0.309 | 0.469 | 0.003 |
| _cons | -4.349* | 0.112 | 0.000 | -4.569 | -4.128 | |
| /lnsig2u | 0.408 | 0.045 | | 0.320 | 0.497 | |
| sigma_u | 1.226 | 0.028 | | 1.173 | 1.282 | |
| rho | 0.314 | 0.010 | | 0.295 | 0.333 | |

* Significant at 5%

**Distance variable:** The coefficient of distance variable was not significant at p-value < 0.05 and 95% CI. It implied that distance to the nearest health facilities did not play any role in people's decisions in using health care services at provincial/central hospitals, holding other variables constant.

**Gender variable:** Gender variable is a dummy variable with the value of 1 for male and 0 for female. The coefficient of gender variable was significant at p-value < 0.05 and 95% CI [0.277 – 0.407]. The coefficient of sex variable was positive meaning that if an individual was a male, he would be more likely to use health care services at provincial/central hospital rather than females, holding other variables constant. More meaningfully, the marginal effect was 0.006, meaning that if a person was a male, the predicted probability of using provincial/central hospital services would increase by 0.006.

**Educational level variable:** The educational level variable is categorical dummy variables including ***undergraduate*** variable for people having training from university, college or professional schools, ***high school*** variable for people trained at high schools, ***secondary*** variable for those who only graduated or being trained at secondary schools and ***primary*** variable for people who had educational background at primary level, who could only read and write and those who were illiterate. The variable of undergraduate was omitted from the regression as the comparison group. The coefficients of three remaining variables were significant at p-value less than 5% and 95% CI.

- The coefficient of primary variable was negative with marginal effect of -0.023. It indicated that in comparison with those who have educational level at undergraduate, people having low educational background or being illiterate used less health care services at provincial/central hospitals. If a person had low education background or was illiterate, the predicted probability to use provincial/central hospital services would reduce by 0.023, given other variables constant.

- The coefficient of secondary variable was negative with marginal effect of -0.012. It implied that if people had educational background at secondary level, the predicted probability to use health care services at provincial/central hospitals would reduce by 0.012, given other variables constant.

- The coefficient of high school was negative with marginal effect of -0.007, meaning that if the highest educational level of a person was high school, the predicted probability of purchasing provincial/central hospital services would reduce by 0.007, given other variables constant.

**Marital status variable:** The marital status variable is a dummy variable with the value of 1 for being married and 0 for single, widowed, or divorced. The coefficient of marital status was significant at p-value less than 5% and 95% CI [0.038; 0.245]. The coefficient was positive, meaning that married people tended to use more provincial/central hospitals rather than those who were not married, holding other variables constant. The marginal effect showed that the probability of using provincial/central hospitals of married people would increase by 0.002.

**Occupation variable:** The occupation variable is categorical dummy variables consisting of ***farmer variable*** for people whose major working time was spent on farming; ***employee variable*** for those who had salary from the employers; ***non-working variable*** for unemployed people, the elderly, students and small children; and ***other occupation variable*** for people who had other types of occupation rather than the above mentioned ones. Farmer variable was omitted from the regression as a comparison group. The coefficients of the three remaining occupational variables were significant at p-value less than 5% and 95% CI.

- The coefficient of employee variable was positive with marginal effect of 0.007, meaning that if a person was an employee, the predicted probability to use provincial/central hospital services of that person would increase by 0.007, holding other variables constant.

- The coefficient of non-working variable was positive, meaning that those who did not work tended to use more health care services at provincial/central hospitals than farmers. The marginal effect of this variable was 0.006, indicating that if a person was not working, the predicted probability to use health care services at higher-level hospitals would increase by 0.006, given other variables constant.

- The coefficient of other occupation variable was positive with marginal effect of 0.005. It indicated that if a person did other jobs rather than the list above, the predicted probability to use health care services at provincial/central hospitals would increase by 0.005, holding other variables constant.

**Age variables:** The age variables are categorical dummy variables with Age05, Age0622, Age2365 and Age66. The variable of Age66 was omitted from the regression as a comparison group. The coefficients of all three age groups were significant at p-value less than 5% and 95% CI.

- The coefficients of Age05 variable and Age0622 variable were negative with marginal effects of -0.004 and -0.003, respectively. It indicated that people from 0 to 5 years old were 0.004 less likely to use provincial/central hospitals than people aged 66 and above, holding other variables constant. The probability of using provincial/central hospitals of people from 6 to 22 years

old would increase by 0.003 in the age group of 66 and above, holding other variables constant.

- The coefficient of Age2365 variable was positive with marginal effect of 0.001. Therefore, the probability for people aged from 23 to 65 using provincial/central hospitals increased by 0.001 compared with people aged 66 and above, holding other variables constant.

**Economic status variables:** The economic status variables are categorical dummy variables with Q1, Q2, Q3, Q4 and Q5. Q1 variable was omitted from the regression as a comparison group. The coefficient of Q2 was not significant at p-value less than 5% and 95% CI, meaning that there was no difference in the use of provincial/central hospital between Q1 and Q2.

- The coefficient of Q3 was positive and significant at p-value less than 5% and 95% CI [0.07; 0.318] with marginal effect of 0.003. Concluding that if people belonged to the third quintile group, the probability of using health care services at provincial/central hospitals would increase by 0.003 in comparison with the poorest group, holding other variables constant.

- The coefficient of Q4 was positive and significant at p-value less than 5% and 95% CI [0.258; 0.502] with marginal effect of 0.006. It implies that people belonging to the forth quintile group were 0.6% more likely to use provincial/central hospitals than the poorest group, holding other variables constant.

- The coefficient of Q5 was positive and significant at p-value less than 5% and 95% CI [0.458; 0.706] with marginal effect of 0.01. It means that the predicted probability of using provincial/central hospitals of the richest would increase by 0.01 compared to the poorest, holding other variables constant.

**Time variables:** Time variables were categorical dummy variables with Year2002, Year2007 and Year2011 variables. Year2002 variable was omitted from the regression as a comparison period. The coefficients of Year2007 and Year2011 variables were significant at p-value less than 5% and 95% CI. The coefficients are both positive with marginal effect of 0.002 for Year2007 and 0.003 for Year2011. It clearly shows that in comparison with 2002, the predicted probability of using

provincial/central hospitals was higher by 0.002 and 0.003 in 2007 and 2011, respectively, holding other variables constant.

### 5.3.2. *Factors affecting the use of district hospital*

Binary logistic regression for panel data was run with a dependent variable of whether or not a person would use health services at district hospital. P-value at 5% and 95% CI were applied to see the significance of coefficients of the variables included in the regression. Marginal effects were calculated to see the differences in the probability of choosing health care services at district hospitals among people with different demographic and socio-economic status.

*Table 14. Estimated coefficients and marginal effects from the Binary logistics regression for the use of district hospital*
*(Dependent variable: Dist. Hos.)*

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effects |
|---|---|---|---|---|---|---|
| Distance | -0.001 | 0.012 | 0.906 | -0.026 | 0.023 | -0.001 |
| Sex | 0.315* | 0.021 | 0.000 | 0.273 | 0.356 | 0.017 |
| High school | -0.588* | 0.056 | 0.000 | -0.697 | -0.479 | -0.039 |
| Secondary | -0.493* | 0.047 | 0.000 | -0.584 | -0.402 | -0.034 |
| Primary | -0.594* | 0.049 | 0.000 | -0.690 | -0.498 | -0.060 |
| Q2 | -0.143* | 0.037 | 0.000 | -0.214 | -0.071 | -0.008 |
| Q3 | -0.177* | 0.038 | 0.000 | -0.252 | -0.103 | -0.010 |
| Q4 | -0.189* | 0.039 | 0.000 | -0.266 | -0.112 | -0.011 |
| Q5 | -0.215* | 0.042 | 0.000 | -0.297 | -0.132 | -0.012 |
| Age05 | 0.254* | 0.042 | 0.000 | 0.172 | 0.336 | 0.009 |
| Age0622 | -0.165* | 0.042 | 0.000 | -0.247 | -0.083 | -0.005 |
| Age2365 | 0.060 | 0.040 | 0.132 | -0.018 | 0.139 | 0.002 |
| Married | 0.151* | 0.035 | 0.000 | 0.081 | 0.220 | 0.008 |
| Employee | 0.087* | 0.044 | 0.047 | 0.001 | 0.172 | 0.004 |

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effects |
|---|---|---|---|---|---|---|
| Non_working | 0.248* | 0.037 | 0.000 | 0.176 | 0.320 | 0.013 |
| Others | 0.050 | 0.040 | 0.219 | -0.030 | 0.129 | 0.002 |
| Year2007 | 0.959* | 0.025 | 0.000 | 0.910 | 1.007 | 0.030 |
| Year2011 | 0.553* | 0.028 | 0.000 | 0.499 | 0.607 | 0.014 |
| _cons | -3.070* | 0.075 | 0.000 | -3.218 | -2.922 | |
| /lnsig2u | 0.404 | 0.029 | | 0.346 | 0.461 | |
| sigma_u | 1.224 | 0.018 | | 1.189 | 1.259 | |
| rho | 0.313 | 0.006 | | 0.301 | 0.325 | |

* Significant at 5%

The predicted probability of using health care services at district hospital was higher in 2007 and in 2011 in comparison with the year 2002 with the marginal effect of 0.03 for the year 2007 and 0.014 for the year 2011. If a person was a male, the predicted probability of using district hospital services would increase by 0.017. People, who were married, tended to use more health care services at district hospitals than single, widowed or divorced people. It was more likely for people with higher educational level to use district hospital services than other groups with lower education background. Children under six were more likely to use health services at district hospitals while people in the age from 6 to 22 years old used less district hospital services in comparison with people more than 65 years old. People who were farmers were less likely to use health care services than employees and people who were not working.

Interestingly, the poorest group tended to use health care services at district hospitals more than other economic groups. The predicted probability of attending district hospitals of the poor was higher than that of other quintile groups, with the magnitude of 0.008, 0.01, 0.011 and 0.012 higher when comparing to the second, third, the rich and richest quintile groups, respectively.

### 5.3.3. *Factors affecting heath care utilization of communal health centers*

Binary logistic regression for panel data was run with a dependent variable of whether or not a person would use health services at communal health centers. P-value at 5% and 95% CI were applied to see the significance of coefficients of the variables included in the regression. Marginal effects were calculated to see the differences in the probability of choosing health care services at communal health centers among different population groups.

*Table 15. Estimated coefficients and marginal effects from the binary logistic regression for the utilization of communal health centers (Dependent variable: CHC)*

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effect |
|---|---|---|---|---|---|---|
| Distance | -0.760* | 0.024 | 0.000 | -0.807 | -0.713 | -0.760 |
| Sex | 0.051* | 0.026 | 0.050 | 0.000 | 0.102 | 0.001 |
| High school | -0.150 | 0.078 | 0.055 | -0.304 | 0.003 | -0.004 |
| Secondary | -0.151* | 0.069 | 0.028 | -0.287 | -0.016 | -0.004 |
| Primary | -0.051 | 0.071 | 0.467 | -0.190 | 0.087 | -0.006 |
| Q2 | 0.065 | 0.046 | 0.154 | -0.024 | 0.155 | 0.002 |
| Q3 | 0.011 | 0.048 | 0.816 | -0.082 | 0.105 | 0.000 |
| Q4 | -0.193* | 0.051 | 0.000 | -0.292 | -0.093 | -0.005 |
| Q5 | -0.243* | 0.055 | 0.000 | -0.351 | -0.135 | -0.007 |
| Age05 | 1.232* | 0.050 | 0.000 | 1.133 | 1.330 | 0.047 |
| Age0622 | 0.435* | 0.051 | 0.000 | 0.336 | 0.535 | 0.011 |
| Age2365 | -0.022 | 0.052 | 0.675 | -0.125 | 0.081 | -0.000 |
| Married | 0.033 | 0.046 | 0.474 | -0.057 | 0.123 | 0.000 |
| Employee | -0.065 | 0.063 | 0.305 | -0.189 | 0.059 | -0.002 |
| Non-working | 0.084 | 0.047 | 0.074 | -0.008 | 0.177 | 0.002 |
| Others | -0.004 | 0.054 | 0.944 | -0.110 | 0.103 | -0.000 |
| Year2007 | 0.624* | 0.028 | 0.000 | 0.569 | 0.680 | 0.020 |

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effect |
|----------|-------|-----------|---------|------------|-----------|-----------------|
| Year2011 | -0.203* | 0.034 | 0.000 | -0.270 | -0.136 | -0.004 |
| _cons | -3.039* | 0.105 | 0.000 | -3.244 | -2.834 | |
| /lnsig2u | 1.030 | 0.031 | | 0.970 | 1.089 | |
| sigma_u | 1.673 | 0.026 | | 1.624 | 1.724 | |
| rho | 0.460 | 0.008 | | 0.445 | 0.475 | |

* Significant at 5%

Regarding the use of health care services at communal health centers, marital status variable and occupation variables were not significant at p-value less than 5% and 95% CI. The same situation for Q2 and Q3 variables, meaning that there was no difference found out in the use of health care services at communal health centers of people belonging to the second and third quintile groups in comparison with the poorest group.

In the year 2007, it was more likely for people to use primary health care at communal health centers rather than in the year2002. By contrast, in 2011, people tended to use communal health centers less than the year 2002.

The distance to the nearest health care center played an important role in the decision of whether or not a person would use health care services at communal health centers. The farther the nearest health care center, the less likely people would use communal health centers. The predicted probability of using communal health centers of children under 5 and people from 6 to 22 increased by 0.047 and 0.011 times, respectively, in comparison with people aged 66 and above.

The probability to use primary health care at communal health centers of people belonging to the rich and richest quintile groups was lower than that of the poorest group. In comparison with people in Q1 group, the predicted probability to use communal health centers of people in Q4 group and Q5 was 0.005, and 0.007 less, respectively.

### *5.3.4.* *Factors affecting heath care utilization of private clinics*

Binary logistic regression for panel data was run with a dependent variable of whether or not a person would use health services at private clinics. P-value at 5% and 95% CI were applied to see the significance of coefficients of the variables included in the regression. Marginal effects were calculated to see the differences in the probability of choosing health care services at private clinics among people with different demographic and socio-economic status.

***Table 16. Estimated coefficients and marginal effects from the binary logistics regression for the use of private clinics***

***(Dependent variable: Private)***

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effect |
|---|---|---|---|---|---|---|
| Distance | -0.060* | 0.010 | 0.000 | -0.079 | -0.041 | -0.060 |
| Sex | 0.089* | 0.014 | 0.000 | 0.062 | 0.116 | 0.020 |
| High school | 0.289* | 0.041 | 0.000 | 0.208 | 0.370 | 0.063 |
| Secondary | 0.310* | 0.037 | 0.000 | 0.238 | 0.382 | 0.068 |
| Primary | 0.368* | 0.038 | 0.000 | 0.294 | 0.443 | 0.153 |
| Q2 | 0.065* | 0.026 | 0.011 | 0.015 | 0.116 | 0.015 |
| Q3 | 0.077* | 0.027 | 0.004 | 0.024 | 0.130 | 0.017 |
| Q4 | -0.029 | 0.028 | 0.306 | -0.084 | 0.026 | -0.006 |
| Q5 | -0.023 | 0.031 | 0.451 | -0.083 | 0.037 | -0.005 |
| Age05 | 0.504* | 0.029 | 0.000 | 0.447 | 0.560 | 0.116 |
| Age0622 | 0.331* | 0.027 | 0.000 | 0.277 | 0.384 | 0.076 |
| Age2365 | -0.028 | 0.027 | 0.299 | -0.082 | 0.025 | -0.006 |
| Married | -0.001 | 0.024 | 0.951 | -0.048 | 0.045 | -0.000 |
| Employee | 0.003 | 0.031 | 0.917 | -0.058 | 0.065 | 0.000 |
| Non-working | -0.018 | 0.024 | 0.461 | -0.066 | 0.030 | -0.004 |
| Others | -0.022 | 0.027 | 0.433 | -0.075 | 0.032 | -0.005 |
| Year2007 | -1.154* | 0.016 | 0.000 | -1.184 | -1.123 | -0.269 |

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effect |
|---|---|---|---|---|---|---|
| Year2011 | -0.672* | 0.017 | 0.000 | -0.704 | -0.639 | -0.163 |
| _cons | -0.170* | 0.054 | 0.002 | -0.275 | -0.064 | |
| /lnsig2u | 0.536 | 0.020 | | 0.497 | 0.575 | |
| sigma_u | 1.308 | 0.013 | | 1.282 | 1.333 | |
| rho | 0.342 | 0.004 | | 0.333 | 0.351 | |

* Significant at 5%

The use of private clinics was among the most common choice of people in FilaBavi over time. The coefficients of year2007 and year2011 variables were significant at p-value less than 5% and 95% CI and they are both negative with the marginal effects of -0.269 and -0.163. It shows that the predicted probability of using private clinics in 2002 reduced by 0.269 and 0.163 compared to 2007 and 2011, respectively.

The coefficients of marital status and occupation variables were not significant. Thus, the effects of marital status and occupation on the use of private health care services could not be investigated.

In terms of economic status, the coefficients of Q2 and Q3 were significant at p-value less than 5% and 95% C. The sign of these two coefficients are all positive with marginal effect of 0.015 for Q2 and 0.017 for Q3. It implies that the second and the third quintile groups tended to use more private health services than the poor. However, the coefficients of Q4 and Q5 were not significant at p-value less than 5%. Therefore, we could not find out the differences in the use of private clinics between the rich, the richest groups and the poorest group.

The distance to the nearest health care center also had some certain impact on the use of private clinics. The coefficient of the distance variable was significant at p-value less than 5% and 95% CI and its sign was negative, meaning that the farther the nearest health care center was, the less likely for people to use private health care services. People with under-graduate background tended to use less private health services than people with high school, secondary and primary education background. Among all age groups, people aged 66 and above tended to use less private clinics

than children and people from 06 to 22 while there was no difference in the use of private clinics between the elderly and people aged 23 to 65.

### 5.3.5. Factors affecting health care utilization of self-treatment

Binary logistic regression for panel data was run with a dependent variable of whether or not a person would use self-treatment. P-value at 5% and 95% CI were applied to see the significance of coefficients of the variables included in the regression. Marginal effects were calculated to see the differences in probability of choosing self-treatment among different population groups.

**Table 17. Estimated coefficients and marginal effects from the binary logistic regression for the utilization of self-treatment**

*(Dependent variable: Self-treatment)*

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effect |
|---|---|---|---|---|---|---|
| Distance | 0.005 | 0.009 | 0.606 | -0.013 | 0.022 | 0.005 |
| Sex | -0.225* | 0.015 | 0.000 | -0.253 | -0.196 | -0.038 |
| High school | -0.034 | 0.042 | 0.422 | -0.115 | 0.048 | -0.006 |
| Secondary | -0.033 | 0.037 | 0.367 | -0.105 | 0.039 | -0.006 |
| Primary | 0.074 | 0.038 | 0.051 | 0.000 | 0.147 | 0.007 |
| Q2 | -0.134* | 0.026 | 0.000 | -0.185 | -0.083 | -0.023 |
| Q3 | -0.109* | 0.027 | 0.000 | -0.162 | -0.057 | -0.019 |
| Q4 | -0.072* | 0.028 | 0.009 | -0.127 | -0.018 | -0.013 |
| Q5 | -0.198* | 0.030 | 0.000 | -0.257 | -0.139 | -0.034 |
| Age05 | -1.254* | 0.031 | 0.000 | -1.315 | -1.194 | -0.207 |
| Age0622 | -0.944* | 0.028 | 0.000 | -0.998 | -0.890 | -0.168 |
| Age2365 | -0.357* | 0.027 | 0.000 | -0.409 | -0.304 | -0.071 |
| Married | -0.153* | 0.023 | 0.000 | -0.199 | -0.108 | -0.026 |
| Employee | -0.176* | 0.033 | 0.000 | -0.241 | -0.112 | -0.030 |
| Non-working | -0.130* | 0.024 | 0.000 | -0.178 | -0.082 | -0.022 |

| Variable | Coef. | Std. Err. | P-value | [95% Conf. | Interval] | Marginal Effect |
|---|---|---|---|---|---|---|
| Others | -0.098* | 0.028 | 0.000 | -0.152 | -0.044 | -0.017 |
| Year2007 | -0.793* | 0.015 | 0.000 | -0.823 | -0.763 | -0.152 |
| Year2011 | -1.215* | 0.018 | 0.000 | -1.250 | -1.179 | -0.211 |
| _cons | 0.257* | 0.053 | 0.000 | 0.153 | 0.361 | |
| /lnsig2u | 0.127 | 0.023 | | 0.082 | 0.173 | |
| sigma_u | 1.066 | 0.012 | | 1.042 | 1.090 | |
| rho | 0.257 | 0.004 | | 0.248 | 0.265 | |

* Significant at 5%

The distance variable and educational level variables were not significant at p-value less than 5% and 95% CI. It seems that the distance to the nearest health care centers and the educational level did not have any impact on the use of self-treatment of people in FilaBavi followed up in this study.

Concerning the use of self-treatment over 3 years, farmers tended to use more than employee, non-working group and people with other types of occupation with the marginal effect of 0.03, 0.022, 0.017, respectively. The use of self-treatment seemed to be on the decreasing trend as in 2002 people were more likely to use self-treatment rather than in 2007 or 2011 with the magnitude of 0.152 and 0.211, respectively.

The predicted probability of using self-treatment of males decreased by 0.038. People at the age of 66 and above were significantly more likely to treat themselves at home rather than people at other age groups. People who had marital status of being married tended to use less self-treatment than single, widowed or divorced people.

In terms of economic status, people belonging to the poorest group (Q1 group) were significantly more likely to use self-treatment than other quintile groups. In comparison with the poorest, the predicted probability of using self-treatment of people under Q2, Q3, Q4, Q5 groups decreased by 0.023, 0.019, 0.013 and 0.034, respectively, holding other variables constant.

### *5.3.6. Health care utilization and illness symptoms*

Health care utilization of different demographic and socio-economic classes has been identified throughout this study. However, health care utilization should also be assessed in the context of different types of diseases. In the routine surveys conducted in FilaBavi, we collected information regarding the self-perceived symptoms of illness. In order to assess more adequately the real need in purchasing different types of health care services of people in FilaBavi, we would like to discover more about the association between the use of health care services and the self-perceived symptoms of illness to see people with which kind of symptoms would come to which services to seek for health care, and thus we hope to partially assess whether or not the referral system worked.

The symptoms of illness were grouped into six main categories compromising ***common illness, injury, digestive symptoms, respiratory problems, cardiovascular diseases (CVD), and other symptoms***. Each group consisted of different symptoms as below:

- Common illness:     cough, fever, headache, bone-ache
- Injury
- Digestive:     colic, diarrhea
- Respiratory:     ENT, difficult breathing
- CVD:     hypertension, flutter, chest pain
- Other symptoms:     vomit, blood in urine, swoon, sore-eye, dental problems, tiresome, pressure, other

In the study, cough, fever, headache and bone-ache were the most common symptoms in the population under the surveillance, accounted for 78.3% of total symptoms reported. The second common symptom group was respiratory problems including difficult breathing and ear – nose – throat problems. The proportion having respiratory symptoms accounted for 27.7%.

*Table 18. Descriptive statistics of symptoms of illness*

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Common illness | 159921 | 0.7825927 | 0.4124833 | 0 | 1 |
| Injury | 159921 | 0.0240181 | 0.1531058 | 0 | 1 |
| Digestive | 159921 | 0.061743 | 0.2406889 | 0 | 1 |
| Respiratory | 159921 | 0.2774682 | 0.4477509 | 0 | 1 |
| CVD | 159921 | 0.0346734 | 0.1829517 | 0 | 1 |
| Other symptoms | 159921 | 0.2933136 | 0.4552823 | 0 | 1 |

In general, we think that the use of health care services among people with different symptom categories was in the same situation with the overall use of health care services. No matter what kinds of symptoms presented, private health clinics were the most common choice of individuals in the study, except for injury. The second most popular health seeking behavior was self-treatment. For those who suffered injury, CVD or digestive, the rate of using health care services at district hospitals was pretty high, representing 25.7%, 22.4% and 16.2%, respectively. The rate of using health care services at provincial/central hospitals was highest among those who had injury (14.1%) and the second highest was CVD carriers (10.3%). Primary health care at communal health centers was used least among all types of health care services by people with all kinds of symptoms.

*Table 19. Health care utilization of people with different symptoms of illness*

| | Prov. Hos. | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| Common illness (N = 125,153) | 1.60% | 7.90% | 7.70% | 46.50% | 28.40% |
| Injury (N = 3,841) | 14.10% | 25.70% | 8.40% | 23.30% | 43.50% |
| Digestive (N = 9,874) | 6.10% | 16.20% | 6.60% | 38.80% | 33.30% |

| | Prov. Hos. | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| Respiratory (N = 44,373) | 1.50% | 9.60% | 9.50% | 43.20% | 17% |
| CVD (N = 5,545) | 10.30% | 22.40% | 8.30% | 39.40% | 21.20% |
| Other symptoms (N = 46,907) | 6.20% | 11.20% | 5.90% | 48.50% | 32.70% |

Despite high availability of and accessibility to communal health centers, the low rate of using primary health care at communal health centers no matter what they were rich or poor, they had which kinds of symptoms could prove that people did not feel truthful in the quality of treatment at communal health centers. In fact, the availability of drugs in communal health centers was not high in comparison with private clinics or drug stores. Moreover, in spite of the government's efforts in improving primary health care, both in terms of quality and accessibility, people were still somehow doubtful about the quality of health care at communal health centers. That's why, even in case of common symptoms, they still did not use communal health centers.

Except for people with injury or CVD, the rate of using health care services at provincial/central hospitals and district hospitals was very low among other groups, especially for people with common illness and respiratory problems. The proportion of people with digestive problems using district hospitals was pretty high, accounted for 16.2%. This finding is not either surprising or strange. Injury contains different types with different severity level, from mild to life-threatening cases, from normal to emergency cases. For the cases of people suffering hypertension, flutter and chest pain, they contain either chronic or acute symptoms. Cardiovascular diseases have long been considered life-threatening diseases for all those who suffer them. Therefore, the high rate of using provincial/central hospitals and district hospitals among those people was explainable. To some extent, it reflects that the referral system worked somehow in Bavi district, especially with common symptoms.

*a. Factors affecting health care utilization of people with common symptoms of illness*

The socio-demographic and economic factors also have certain effects on health care utilization of people with common symptoms of illness. The effects of demographic factors on the use of different kinds of health care services among those with common symptoms of illness are almost similar to that of all population under surveillance. It can be explained by the fact that common symptoms of illness were the major problems that people in the area had to deal with, accounted for 78% among all kinds of symptoms. Self-treatment was still the most popular among the poorest group in comparison with other economic groups while the two richest groups with common symptoms of illness used more health care services at provincial/central hospitals (see Table 20).

*Table 20. Factors affecting health care utilization of people with common symptoms of illness*

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | β |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Distance | 0.00 | 0.02 | -0.83*** | -0.07*** | 0.00 |
| | *(0.02)* | *(0.02)* | *(0.03)* | *(0.01)* | *(0.01)* |
| Sex | 0.31*** | 0.31*** | 0.06* | 0.16*** | -0.26*** |
| | *(0.05)* | *(0.04)* | *(0.03)* | *(0.01)* | *(0.02)* |
| High school | -0.29*** | -0.48*** | -0.19*** | 0.22*** | -0.07 |
| | *(0.11)* | *(0.01)* | *(0.09)* | *(0.05)* | *(0.05)* |
| Secondary | -0.40*** | -0.53*** | -0.24*** | 0.27*** | -0.06 |
| | *(0.09)* | *(0.08)* | *(0.08)* | *(0.04)* | *(0.04)* |
| Primary | -0.88*** | -0.64 *** | -0.13 | 0.31*** | 0.03 |
| | *(0.11)* | *(0.08)* | *(0.08)* | *(0.05)* | *(0.05)* |
| Q2 | -0.08 | -0.19*** | 0.05 | 0.08*** | -0.17*** |
| | *(0.09)* | *(0.06)* | *(0.05)* | *(0.03)* | *(0.03)* |

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | β |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Q3 | 0.05 | -0.18*** | 0.02 | 0.08** | -0.13*** |
| | *(0.09)* | *(0.06)* | *(0.05)* | *(0.03)* | *(0.03)* |
| Q4 | 0.22*** | -0.12** | -0.2*** | -0.03 | -0.08** |
| | *(0.09)* | *(0.06)* | *(0.06)* | *(0.03)* | *(0.03)* |
| Q5 | 0.55*** | -0.24*** | -0.22*** | -0.07* | -0.17*** |
| | *(0.09)* | *(0.07)* | *(0.06)* | *(0.04)* | *(0.03)* |
| Age05 | -0.71*** | 0.42*** | 1.32*** | 0.52*** | -1.42*** |
| | *(0.11)* | *(0.08)* | *(0.06)* | *(0.03)* | *(0.03)* |
| Age0622 | -0.86*** | -0.04*** | 0.49*** | 0.42*** | -1.13*** |
| | *(0.11)* | *(0.07)* | *(0.06)* | *(0.03)* | *(0.03)* |
| Age2365 | 0.05 | 0.21*** | -001 | -0.04 | -0.37*** |
| | *(0.09)* | *(0.06)* | *(0.06)* | *(0.03)* | *(0.03)* |
| Married | 0.26*** | 0.28*** | 0.05 | 0.00 | -0.15*** |
| | *(0.08)* | *(0.05)* | *(0.05)* | *(0.03)* | *(0.03)* |
| Employee | 0.49*** | -0.04 | -0.06 | 0.05 | -0.2*** |
| | *(0.09)* | *(0.07)* | *(0.07)* | *(0.04)* | *(0.04)* |
| Non-working | 0.67*** | 0.24*** | 0.09* | -0.02 | -0.14*** |
| | *(0.08)* | *(0.06)* | *(0.05)* | *(0.03)* | *(0.03)* |
| Other occupation | -0.51*** | -0.03*** | -0.03 | 0.01 | -0.13*** |
| | *(0.09)* | *(0.07)* | *(0.06)* | *(0.03)* | *(0.03)* |
| Year 2007 | 0.21*** | 1.57*** | 0.78*** | -1.38*** | -0.83*** |
| | *(0.06)* | *(0.04)* | *(0.03)* | *(0.02)* | *(0.02)* |
| Year 2011 | 0.45*** | 1.19*** | -0.12*** | -0.82*** | - 1.26*** |
| | *(0.06)* | *(0.05)* | *(0.04)* | *(0.02)* | *(0.02)* |

\*\*\*　Significant at 1%

\*\*　Significant at 5%

\*　Significant at 10%

### b. Factors affecting health care utilization of people with injury

Demographic factors seemed to have less effect on the use of different health care services of people suffering injury. It is partly because some kinds of injury may happen suddenly and out of people's control, such as traffic accidents. As a mater of fact, traffic accidents are considered emergency cases and thus the use of health care services among people suffering traffic accidents is not dependent on demographic and economic factors. However, an adverse picture was witnessed among the poorest and the richest groups in the use of self-treatment and health care services at provincial/central hospitals.

*Table 21. Factors affecting health care utilization of people with injury*

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | β |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Distance | 0.21*** | -0.05 | -0.41*** | -0.04 | 0.03 |
| | (0.05) | (0.04) | (0.08) | (0.04) | (0.04) |
| Sex | 0.79*** | 0.16 | 0.3*** | 0.17* | -0.46*** |
| | (0.15) | (0.10) | (0.14) | (0.10) | (0.09) |
| High school | -0.35 | -0.33 | 0.00 | 0.25 | 0.12 |
| | (0.25) | (0.24) | (0.34) | (0.24) | (0.22) |
| Secondary | -0.85*** | 0.21 | 0.05 | 0.17 | -0.21 |
| | (0.23) | (0.20) | (0.29) | (0.21) | (0.19) |
| Primary | -1.51*** | 0.18 | 0.04 | 0.35 | 0.22 |
| | (0.26) | (0.21) | (0.31) | (0.22) | (0.2) |
| Q2 | -0.02 | 0.19 | -0.17 | 0.08 | -0.2 |
| | (0.22) | (0.25) | (0.21) | (0.16) | (0.14) |
| Q3 | 0.27 | 0.16 | -0.23 | 0.14 | -0.19 |
| | (0.22) | (0.16) | (0.21) | (0.15) | (0.14) |
| Q4 | 0.31 | 0.33** | -0.22 | 0.13 | -0.27* |
| | (0.22) | (0.16) | (0.21) | (0.16) | (0.15) |

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | (Stand. Err) | (Stand. Err) | (Stand. Err) | (Stand. Err) | (Stand. Err) |
| Q5 | 0.55*** | 0.44*** | -0.35 | -0.14 | -0.35** |
| | (0.23) | (0.17) | (0.23) | (0.17) | (0.15) |
| Age05 | 0.19 | 0.77*** | 0.88*** | -0.43* | -0.22 |
| | (0.35) | (0.23) | (0.32) | (0.23) | (0.21) |
| Age0622 | 0.32 | 0.55*** | 0.88*** | -0.42** | -0.41*** |
| | (0.27) | (0.19) | (0.27) | (0.18) | (0.1) |
| Age2365 | 0.66** | 0.37* | 0.31 | -0.38** | -0.51*** |
| | (0.28) | (0.20) | (0.28) | (0.19) | (0.17) |
| Married | -0.54*** | -0.04 | 0.28 | 0.06 | 0.25* |
| | (0.19) | (0.15) | (0.23) | (0.15) | (0.14) |
| Employee | 0.56*** | 0.19 | -0.58** | -0.15 | -0.44*** |
| | (0.2) | (0.17) | (0.26) | (0.18) | (0.17) |
| Non-working | 0.14 | 0.18 | 0.00 | -0.31* | -0.51*** |
| | (0.21) | (0.17) | (0.23) | (0.16) | (0.15) |
| Others | 0.4* | -0.19 | -0.33 | -0.01 | -0.19 |
| | (0.21) | (0.18) | (0.25) | (0.17) | (0.16) |
| Year2007 | 0.95*** | 1.27*** | 0.36** | -0.56*** | -1.08*** |
| | (0.16) | (0.12) | (0.14) | (0.12) | (0.11) |
| Year2011 | 0.96*** | 1.24*** | -0.16 | -0.03 | -1.26*** |
| | (0.18) | (0.14) | (0.19) | (0.12) | (0.13) |

### c. Factors affecting health care utilization of people with digestive symptoms

Generally speaking, there was not much difference recognized in the use of health care services among different quintile groups when they faced digestive symptoms. However, the proportion of the richest group in the total number of provincial/central hospital users was significantly higher than that of the poorest group. And a completely opposite phenomenon happened in the use of self-treatment of the richest and the poorest groups. For people with digestive problems, differences

in the use of health care services among age groups and in different years were captured.

There was not much difference realized in association between socio-demographic and economic factors and the use of health care services among people with digestive problems because as mentioned above digestive problems included diarrhea and colic. Some people with diarrhea and colic may also suffer emergency cases no matter who they were and what they did. The problem is that we lacked information on the severity of digestive problems, resulting in the fact that we could not explain the probability of using higher-level hospitals or lower-level health facilities among different population groups.

***Table 22. Factors affecting health care utilization of people with digestive symptoms***

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Distance | 0.19*** | 0.04 | -0.91*** | -0.09*** | 0.02 |
| | *(0.04)* | *(0.03)* | *(0.09)* | *(0.03)* | *(0.03)* |
| Sex | 0.06 | 0.18*** | -0.13 | -0.14** | -0.02 |
| | *(0.11)* | *(0.07)* | *(0.12)* | *(0.06)* | *(0.06)* |
| High school | -0.01 | -0.44** | -0.3 | 0.32* | -0.18 |
| | *(0.26)* | *(0.19)* | *(0.36)* | *(0.17)* | *(0.18)* |
| Secondary | -0.28 | -0.27* | -0.32 | 0.34** | -0.05 |
| | *(0.22)* | *(0.16)* | *(0.31)* | *(0.15)* | *(0.15)* |
| Primary | -0.35 | -0.43*** | -0.3 | 0.4*** | 0.16 |
| | *(0.24)* | *(0.17)* | *(0.31)* | *(0.15)* | *(0.16)* |
| Q2 | 0.15 | 0.15 | -0.09 | 0.15 | -0.02 |
| | *(0.19)* | *(0.11)* | *(0.18)* | *(0.09)* | *(0.1)* |
| Q3 | 0.28 | 0.11 | -0.11 | 0.3*** | -0.2** |
| | *(0.19)* | *(0.11)* | *(0.18)* | *(0.1)* | *(0.1)* |
| Q4 | 0.78*** | 0.15 | -0.41** | 0.08 | -0.01 |
| | *(0.18)* | *(0.12)* | *(0.2)* | *(0.1)* | *(0.1)* |

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | (Stand. Err) | (Stand. Err) | (Stand. Err) | (Stand. Err) | (Stand. Err) |
| Q5 | 0.93*** | 0.16 | -0.14 | 0.09 | -0.25** |
| | (0.19) | (0.12) | (0.2) | (0.1) | (0.11) |
| Age05 | -0.18 | 0.77*** | 1.32*** | 0.54*** | -1.08*** |
| | (0.25) | (0.15) | (0.22) | (0.12) | (0.13) |
| Age0622 | -0.16 | 0.07 | 0.02 | -0.27** | -0.13 |
| | (0.24) | (0.15) | (0.24) | (0.11) | (0.12) |
| Age2365 | 0.42** | 0.1 | -0.39*** | -0.27*** | -0.2*** |
| | (0.21) | (0.13) | (0.22) | (0.11) | (0.11) |
| Married | 0.01 | -0.06 | -0.13 | 0.03 | -0.16* |
| | (0.17) | (0.11) | (0.19) | (0.09) | (0.1) |
| Employee | 0.2 | 0.26* | -0.77** | -0.03 | -0.06 |
| | (0.21) | (0.14) | (0.32) | (0.13) | (0.14) |
| Non-working | 0.00 | -0.26** | -0.13 | -0.12 | 0.19* |
| | (0.18) | (0.12) | (0.2) | (0.1) | (0.1) |
| Others | 0.27 | 0.00 | -0.41* | -0.07 | 0.1 |
| | (0.18) | (0.13) | (0.24) | (0.11) | (0.11) |
| Year 2007 | 0.05 | 0.69*** | 0.7*** | -0.96*** | -0.92*** |
| | (0.12) | (0.08) | (0.13) | (0.07) | (0.07) |
| Year 2011 | -0.21 | 0.43*** | -0.17 | -0.21*** | -1.52*** |
| | (0.14) | (0.09) | (0.17) | (0.08) | (0.09) |

***     Significant at 1%

**     Significant at 5%

*     Significant at 10%

***d. Factors affecting health care utilization of people with respiratory symptoms:***

Respiratory symptoms were the second most popular symptoms among people involving in the study. The association between socio-demographic and economic

factors and the use of different types of health care services of people with respiratory symptoms was obviously almost similar to the overall situation in FilaBavi. Distance to the nearest health care centers only had significant impacts on the use of private clinics and communal health centers. Males and people with higher educational background used more formal health care services than females and people being illiterate or with lower educational level. Statistically significant difference in the use of health care services between the richest and the poorest groups was also captured among people with respiratory problems. People in four age groups also used health care services differently from each other.

***Table 23. Factors affecting health care utilization of people with respiratory symptoms***

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Distance | -0.06 | 0.02 | -1.03*** | -0.17*** | -0.11*** |
| | *(0.04)* | *(0.02)* | *(0.05)* | *(0.02)* | *(0.02)* |
| Sex | 0.22*** | 0.15*** | -0.05 | 0.1*** | -0.1*** |
| | *(0.09)* | *(0.04)* | *(0.05)* | *(0.03)* | *(0.04)* |
| High school | -0.26 | -0.58*** | -0.27* | 0.34*** | -0.02 |
| | *(0.2)* | *(0.13)* | *(0.16)* | *(0.1)* | *(0.1)* |
| Secondary | -0.26 | -0.44*** | -0.1 | 0.44*** | -0.15* |
| | *(0.17)* | *(0.11)* | *(0.14)* | *(0.09)* | *(0.09)* |
| Primary | 0.64*** | 0.41*** | 0.07 | 0.6*** | -0.11 |
| | *(0.19)* | *(0.11)* | *(0.15)* | *(0.09)* | *(0.09)* |
| Q2 | -0.07 | -0.24*** | 0.07 | 0.06 | -0.23*** |
| | *(0.17)* | *(0.08)* | *(0.09)* | *(0.07)* | *(0.07)* |
| Q3 | 0.13 | -0.26*** | -0.1 | 0.11 | -0.14** |
| | *(0.16)* | *(0.08)* | *(0.1)* | *(0.07)* | *(0.07)* |
| Q4 | 0.29* | -0.42*** | -0.29*** | 0.01 | -0.16** |
| | *(0.16)* | *(0.08)* | *(0.1)* | *(0.07)* | *(0.07)* |

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Q5 | 0.55*** | -0.36*** | -0.54*** | -0.2** | -0.17** |
| | *(0.16)* | *(0.09)* | *(0.11)* | *(0.08)* | *(0.08)* |
| Age05 | -0.47*** | 0.14 | 1.23*** | -0.31*** | -1.11*** |
| | *(0.19)* | *(0.09)* | *(0.11)* | *(0.07)* | *(0.08)* |
| Age0622 | -0.84*** | -0.55*** | 0.22 | -0.33*** | -0.96*** |
| | *(0.2)* | *(0.09)* | *(0.11)* | *(0.07)* | *(0.07)* |
| Age2365 | 0.32* | -0.18* | -0.1 | -0.24*** | -0.44*** |
| | *(0.18)* | *(0.1)* | *(0.12)* | *(0.08)* | *(0.08)* |
| Married | 0.29* | 0.21*** | -0.03 | -0.09 | -0.13** |
| | *(0.16)* | *(0.08)* | *(0.1)* | *(0.07)* | *(0.07)* |
| Employee | 0. 36** | 0.12 | -0.05 | -0.06 | -0.13* |
| | *(0.17)* | *(0.1)* | *(0.13)* | *(0,07)* | *(0.08)* |
| Non-working | 0.77*** | 0.59*** | 0.08 | -0.01 | -0.13* |
| | *(0.17)* | *(0.09)* | *(0.11)* | *(0.07)* | *(0.07)* |
| Others | 0.68*** | 0.07 | 0.1 | -0.11 | -0.09 |
| | *(0.15)* | *(0.1)* | *(0.12)* | *(0.07)* | *(0.07)* |
| Year 2007 | -1.38*** | 0.21* | 1.35*** | -1.65*** | -0.9*** |
| | *(0.16)* | *(0.11)* | *(0.16)* | *(0.09)* | *(0.08)* |
| Year 2011 | -1.12*** | -0.38*** | 0.21 | -0.99*** | -1.3*** |
| | *(0.16)* | *(0.11)* | *(0.16)* | *(0.09)* | *(0.09)* |

***     Significant at 1%

**     Significant at 5%

*     Significant at 10%

### *e. Factors affecting health care utilization of people with cardiovascular symptoms*

Affects of demographic and socio-economic factors on the use of health care services of people with difficult breathing, flutter, chest pain and hypertension were

seen in Bavi. The rate of using formal treatment was pretty high among people with cardiovascular symptoms, as these symptoms had long been considered serious ones. The higher the economic status was, the higher rate of using provincial/central hospitals. Meanwhile, poor people with CVD used more services at district hospitals (see Table 21). As a matter of fact, the inequity in health care utilization was captured among different economic classes, especially in the use of tertiary care even in case of life-threatening diseases.

**Table 24. Factors affecting health care utilization of people with CVD**

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Distance | 0.19*** | 0.02 | -1.58*** | -0.27*** | -0.06 |
| | *(0.06)* | *(0.05)* | *(0.15)* | *(0.05)* | *(0.05)* |
| Sex | -0.03 | 0.48*** | 0.09 | 0.04 | -0.25** |
| | *(0.16)* | *(0.12)* | *(0.17)* | *(0.11)* | *(0.12)* |
| High school | 0.2 | -0.16 | -0.96*** | 0.3 | 0.14 |
| | *(0.3)* | *(0.25)* | *(0.4)* | *(0.25)* | *(0.25)* |
| Secondary | -0.21 | -0.29 | -0.42 | 0.31* | 0.00 |
| | *(0.24)* | *(0.19)* | *(0.28)* | *(0.18)* | *(0.2)* |
| Primary | -0.69*** | -0.39** | -0.37 | 0.8** | 0.03 |
| | *(0.25)* | *(0.2)* | *(0.28)* | *(0.19)* | *(0.2)* |
| Q2 | 0.52* | -0.09 | -0.48** | 0.44*** | -0.46*** |
| | *(0.29)* | *(0.17)* | *(0.23)* | *(0.15)* | *(0.17)* |
| Q3 | 1.03*** | -0.52*** | -0.55** | 0.29* | -0.21 |
| | *(0.28)* | *(0.17)* | *(0.24)* | *(0.16)* | *(0.17)* |
| Q4 | 1.23*** | -0.47*** | -0.47** | 0.24 | -0.38** |
| | *(0.28)* | *(0.18)* | *(0.24)* | *(0.16)* | *(0.17)* |
| Q5 | 1.34*** | -0.66*** | -0.56** | 0.00 | -0.25 |
| | *(0.28)* | *(0.18)* | *(0.24)* | *(0.16)* | *(0.18)* |

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | (Stand. Err) | (Stand. Err) | (Stand. Err) | (Stand. Err) | (Stand. Err) |
| Age05 | 5.41*** | -1.14 | -0.15 | -2.26** | -18.14 |
| | (1.07) | (1.44) | (1.37) | (1.09) | (2966.1) |
| Age0622 | 0.69 | 0.7* | 0.81* | -0.52 | -0.98** |
| | (0.55) | (0.38) | (0.49) | (0.36) | (0.45) |
| Age2365 | 0.63*** | 0.19 | -0.36* | -0.32*** | -0.06 |
| | (0.19) | (0.14) | (0.2) | (0.13) | (0.14) |
| Married | 0.83*** | 0.22 | -0.38** | -0.23* | 0.03 |
| | (0.22) | (0.14) | (0.2) | (0.13) | (0.14) |
| Employee | 0.9*** | -0.34 | -0.36 | -0.17 | -0.16 |
| | (0.3) | (0.25) | (0.38) | (0.24) | (0.16) |
| Non-working | 0.41*** | -0.5*** | -0.58*** | 0.2 | -0.25* |
| | (0.2) | (0.14) | (0.19) | (0.13) | (0.14) |
| Others | 0.35 | -0.43** | -0.66** | 0.1 | 0.16 |
| | (0.25) | (0.19) | (0.28) | (0.17) | (0.18) |
| Year 2007 | -0.53*** | 0.25* | 0.8** | -0.82*** | -0.3** |
| | (0.19) | (0.15) | (0.22) | (0.13) | (0.14) |
| Year 2011 | -0.11 | -0.09 | -0.09 | -0.48*** | -0.52*** |
| | (0.19) | (0.15) | (0.23) | (0.13) | (0.14) |

| | |
|---|---|
| *** | Significant at 1% |
| ** | Significant at 5% |
| * | Significant at 10% |

*f. Factors affecting health care utilization of people with remaining symptoms of illness:*

This group of symptoms compromises vomit, blood in urine, swoon, sore-eye, dental problems, tiresome, and pressure. For people with this group of symptoms, their demographic and economic factors had certain impacts on their health care utilization. Generally speaking, such impacts were almost the same as the affects of

demographic and socio-economic factors on the use of health care services of the whole population in the area.

*Table 25. Factors affecting health care utilization of people with other symptoms of illness*

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Distance | 0.06$^{***}$ | 0.02 | -0.88$^{***}$ | -0.09$^{***}$ | 0.04$^{***}$ |
| | *(0.02)* | *(0.02)* | *(0.05)* | *(0.01)* | *(0.02)* |
| Sex | 0.14$^{***}$ | 0.31$^{***}$ | -0.02 | 0.01 | -0.19$^{***}$ |
| | *(0.05)* | *(0.04)* | *(0.05)* | *(0.03)* | *(0.03)* |
| High school | -0.21$^{**}$ | -0.48$^{***}$ | -0.13 | 0.44$^{***}$ | -0.03 |
| | *(0.11)* | *(0.09)* | *(0.14)* | *(0.07)* | *(0.08)* |
| Secondary | -0.49$^{***}$ | -0.53$^{***}$ | -0.25$^{**}$ | 0.42$^{***}$ | -0.05 |
| | *(0.09)* | *(0.08)* | *(0.13)* | *(0.07)* | *(0.07)* |
| Primary | -0.83$^{***}$ | -0.65$^{***}$ | -0.15 | 0.41$^{***}$ | 0.1 |
| | *(0.1)* | *(0.08)* | *(0.13)* | *(0.07)* | *(0.07)* |
| Q2 | 0.12 | -0.19$^{***}$ | 0.15$^{*}$ | 0.13$^{***}$ | -0.14$^{***}$ |
| | *(0.09)* | *(0.06)* | *(0.09)* | *(0.05)* | *(0.05)* |
| Q3 | 0.21$^{**}$ | -0.18$^{***}$ | 0.1 | 0.18$^{***}$ | -0.17$^{***}$ |
| | *(0.09)* | *(0.06)* | *(0.09)* | *(0.05)* | *(0.05)* |
| Q4 | 0.54$^{***}$ | -0.12$^{**}$ | -0.23$^{**}$ | 0.1$^{**}$ | -0.17$^{***}$ |
| | *(0.09)* | *(0.06)* | *(0.1)* | *(0.05)* | *(0.05)* |
| Q5 | 0.8$^{***}$ | -0.24$^{***}$ | -0.26$^{***}$ | 0.08 | -0.31$^{***}$ |
| | *(0.09)* | *(0.07)* | *(0.1)* | *(0.05)* | *(0.05)* |
| Age05 | -0.26$^{**}$ | 0.42$^{***}$ | 0.66$^{***}$ | 0.64$^{***}$ | -0.89$^{***}$ |
| | *(0.12)* | *(0.08)* | *(0.11)* | *(0.06)* | *(0.06)* |
| Age0622 | -0.34$^{***}$ | -0.04 | 0.18$^{*}$ | 0.35$^{***}$ | -0.68$^{***}$ |
| | *(0.1)* | *(0.07)* | *(0.1)* | *(0.05)* | *(0.05)* |

| | Prov. Hos | Dist. Hos | CHC | Private | Self-treatment |
|---|---|---|---|---|---|
| | β | β | β | β | B |
| | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* | *(Stand. Err)* |
| Age2365 | 0.2** | 0.21*** | -0.01 | -0.06 | -0.36*** |
| | *(0.09)* | *(0.07)* | *(0.1)* | *(0.05)* | *(0.05)* |
| Married | 0.31*** | 0.28*** | 0.04 | -0.04 | -0.19*** |
| | *(0.08)* | *(0.06)* | *(0.08)* | *(0.04)* | *(0.04)* |
| Employee | 0.33*** | -0.05 | 0.04 | -0.04 | -0.12* |
| | *(0.09)* | *(0.08)* | *(0.12)* | *(0.06)* | *(0.07)* |
| Non-working | 0.42*** | 0.24*** | 0.07 | -0.06 | -0.13*** |
| | *(0.08)* | *(0.06)* | *(0.09)* | *(0.04)* | *(0.04)* |
| Others | 0.32*** | -0.03 | 0.05 | -0.17*** | -0.08 |
| | *(0.08)* | *(0.07)* | *(0.1)* | *(0.05)* | *(0.05)* |
| Year 2007 | 1.14*** | 1.57*** | 0.45*** | -1.29*** | -0.79*** |
| | *(0.06)* | *(0.04)* | *(0.06)* | *(0.03)* | *(0.03)* |
| Year 2011 | 1.2*** | 1.19*** | -0.14** | -0.76*** | -1.4*** |
| | *(0.06)* | *(0.05)* | *(0.07)* | *(0.03)* | *(0.04)* |

| *** | Significant at 1% |
|---|---|
| ** | Significant at 5% |
| * | Significant at 10% |

## 5.4. Discussion

This study aims at identifying the association between demographic and socio-economic factors with the use of different kinds of health care services. The differences in the use of health care services including health care at provincial/central hospitals (tertiary care), district hospitals (secondary care), communal health centers (primary care), private clinics and self-treatment were recorded in the study. The study also investigated the effects of demographic and socio-economic factors on the use of different kinds of health care services in FilaBavi.

### 5.4.1. *Health care utilization and socio-demographic factors*

Not only policies and quality of care of health care services played important roles in determining which health care services to be used by people in the study but we believe that demographic changes also had certain impacts on the utilization of health care services. Thanks to the improvement in the living conditions, life expectancy at birth of Vietnamese people has been increasing considerably fast, from 72.8 years old in 2002 to 74.8 years old in 2010 (World Bank, 2011). Thanks to the family planning campaigns of Vietnamese government, the fertility rate of Vietnam has been reduced. As a matter of fact, Vietnam is facing population-aging related problems. The same situation also happened in FilaBavi. There are more and more cases with chronic diseases and more seriously non-communicable diseases like hypertension, cardiovascular diseases, diabetes, etc., especially among the elderly (Hoi LV., 2011). As a result, the use of health care services may change due to the changes in the population structures, especially for the elderly. They may need more sophisticated health care services at higher-level health facilities. It may explain why the rate of using provincial/central hospitals of the population in the study witnessed an increasing trend.

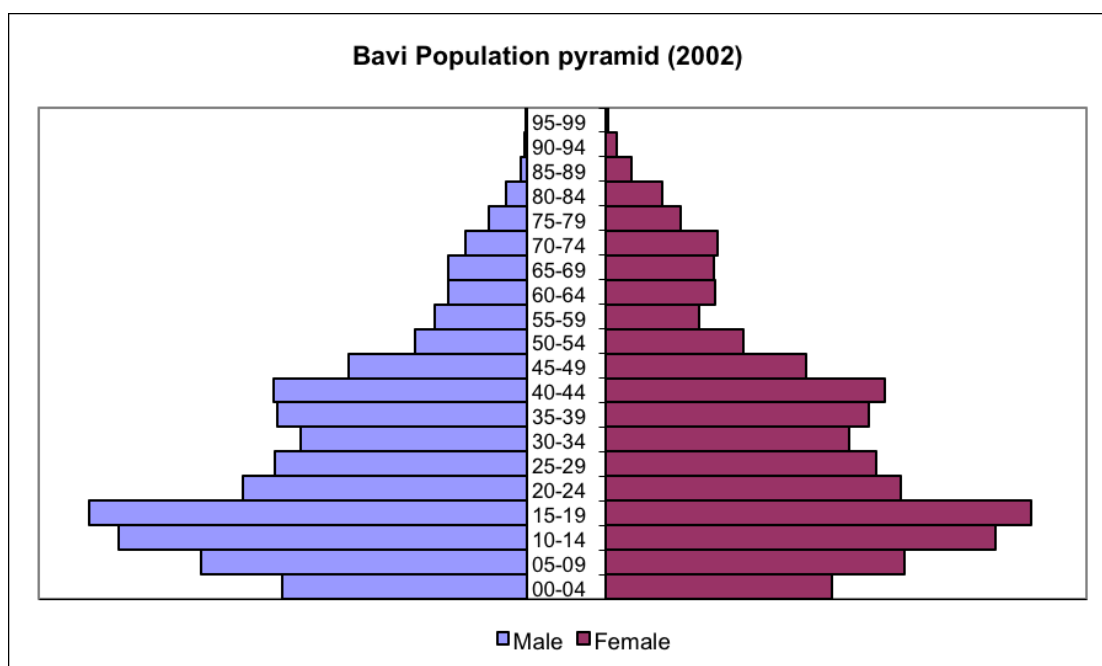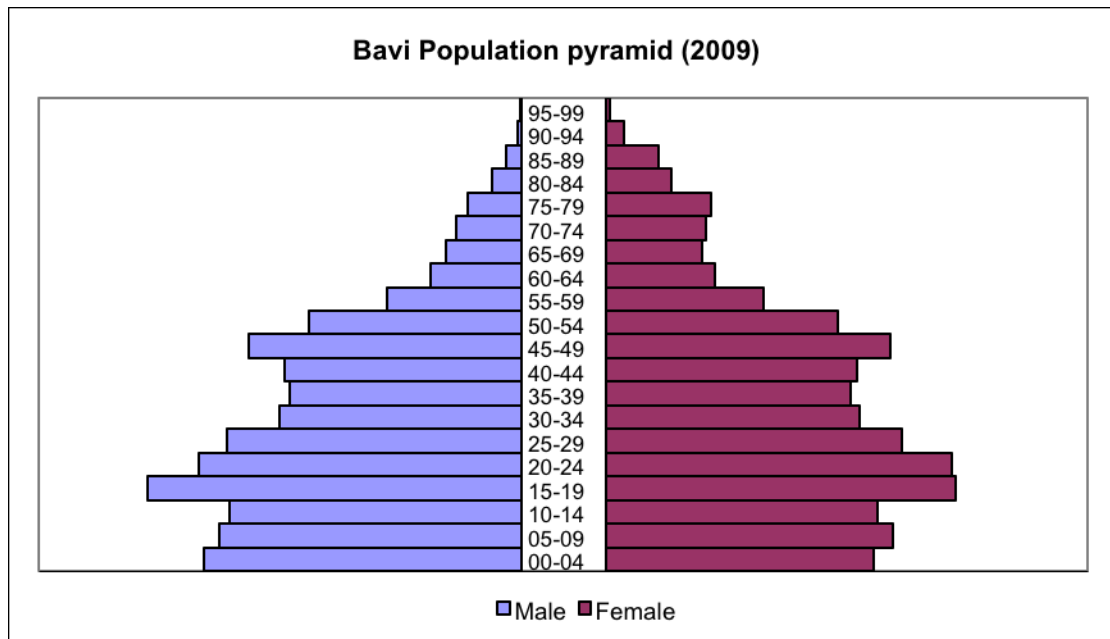*Figure 13. Bavi Population pyramid, 2002*

*Figure 14. Bavi Population pyramid, 2009*



**Bavi Population pyramid (2009)**

Age groups (top to bottom): 95-99, 90-94, 85-89, 80-84, 75-79, 70-74, 65-69, 60-64, 55-59, 50-54, 45-49, 40-44, 35-39, 30-34, 25-29, 20-24, 15-19, 10-14, 05-09, 00-04

☐ Male ☐ Female

### a. Health care utilization and educational level

The study found out that people with education background of professional school, college and university used more health care services at provincial hospitals, district hospitals more than people with lower education background while people graduating from high school or lower tended to use more private clinics. This finding is consistent with one cross-sectional study conducted in FilaBavi in 1999 about self-reported illness and health care utilization (Giang KB, 2003).

However, it is quite contradictory to some other studies' findings in other countries. In one study conducted in Indonesia, it was found out that people with higher education had more chances to access to private health clinics. It happened because the two studies were conducted in two different settings. Unlike other countries where the quality of private clinics are good, in Bavi district, the majority of private clinics were small and run by retired physicians or doctors in hospital working after official time. Thus, to some extent, the quality of private clinics was not comparable to the district hospitals in terms of infrastructure. The price of private clinics in Bavi was not much expensive. Therefore, in Bavi, it was not as difficult to get access to private clinics as in other more developed countries, or in the urban areas.

***b. Health care utilization and age:***

We found out in the study that among those who treated themselves at home when being sick, the proportion of the elderly who aged 66 and above was the highest in comparison with other age groups. This finding is consistent with one study conducted by Gulliford in 2010 on the use of screening on diabetes and associated factors.

***c. Health care utilization and gender:***

Consistent with some other studies on health care utilization, this study found out that females used almost all kinds of formal health care services significantly less than males. The proportion of females using self-treatment was higher than that of males. It also happened in other developing countries where women often were not much aware of their health status and where lacking of health informational was still a problem. Going with the tradition of Vietnam, Vietnamese women spend much of their time taking care of their families rather than taking care of themselves.

***d. Health care utilization and occupation:***

In the 3 year – time period of 2002, 2007 and 2011, in FilaBavi, self-treatment was the common choice of people who did farming. Compared to other people, farmers used less health care services of provincial/central hospitals and district hospitals. It happened because the education background of farmers was not high and normally they belonged to lower economic classes (see Table 9 & 11).

***e. Health care utilization and distance to the nearest health care center:***

After conducting this study, we found out that the distance to the nearest health center only had significant impact on the utilization of communal health centers and private health clinics. It did happen because the nearest health center in Bavi was normally communal health centers or private clinics. As mentioned above in the part of study setting, there was one communal health center in each commune of Bavi district. And also, private practitioners were available in the communes.

It did not have any impact on the use of provincial/central hospitals and district hospitals. In the whole district of Bavi, there was only one district hospital and this hospital was served as secondary health care center. Because it was the only one in the area, it was only near to some certain amount of households in the region. The distance from the hospital to the households is much longer than that from communal

health center and private clinics. The highest levels of health care are provincial/central hospitals where are much farther from people's residency area in Bavi. People in the rural areas just visited or were referred to provincial/central hospitals when falling into severe status. They may explain why the distance variable did not have any significant impact on provincial/central hospital users.

### 5.4.2. *Health care utilization and economic factors*

Changes in economic factors may have certain impacts on health care utilization of the population, and on affordability in particular. Improved economic status may contribute to improve the affordability to health care services. Poor people may not use health care services as much as higher economic class neither because they have less severe illness nor they do not need it, but because they cannot afford it. Therefore, change in economic status is one important factor determining the use of health care services at different levels of the health system of the population in the study.

In this study, we recognized that the poorest group tended to use more self-treatment and health care services at district hospitals rather than all other quintile groups while using less health care services at provincial/central health facilities. The proportion of the poor using communal health centers was significantly higher than that of the rich and the richest groups.

The use of self-treatment in this study seemed to be consistent with findings from other studies in the area, in Vietnam and in other developing countries. This problem might be blamed on several causes. First of all, limited knowledge on health status, on the consequences of self-treatment and shortage of medical information contributed greatly to the high rate of self-treatment among the poor.

Secondly, it could be blamed on the existence of inequity in the health sector of Vietnam. It can't be denied that health inequity has been improving in Vietnam nowadays. However, inequity in health still exists in every corner of the health sector. The results of this study that the poor used more self-treatment while used less services at higher-level hospitals than any other economic group have partially shown a clear picture about the existence of inequity in health in the rural area of Vietnam.

Despite support and policies from the health care sector and the government, it was in fact financially difficult for poor people to get access to higher-level hospitals even though they were in real need. Therefore, the richest group used health care services at higher-level hospitals significantly much more than the poorest group. High out-of-pocket payment when purchasing health care services in higher-level hospital together with transportation, accommodation, food and other related costs were among the issues pushing poor people into catastrophic spending for health care.

Vietnamese government, especially the Ministry of Health, has been making lots of efforts in improving quality of health care services and health status for people nationwide. They have been attempting to narrow the gap between the rich and the poor in accessibility to health care services, particularly of public sector. The policies on free health care for the poor and 50% subsidy for the near-poor group are among the government's efforts in encouraging people to purchase and use health care insurance cards, aiming at improving the accessibility to public health care services for the poor and reducing catastrophic spending for health. Thanks to that effort of the government, the use of public health care services, especially at the primary and secondary health care facilities, has been improved. Therefore, the rate of communal health center and district hospital users was highest among the poor (see Table 19).

*Table 26. The proportion of using district hospitals and communal health centers of different quintile groups*

|  | Q1 | Q2 | Q3 | Q4 | Q5 |
|---|---|---|---|---|---|
| District Hos. | 10.64% | 9.18% | 9.16% | 9.16% | 9.46% |
| Communal HC | 7.76% | 8.20% | 7.65% | 6.40% | 6.01% |

### 5.4.3. *Access to health care services:*

Access to health care services has long been considered key component of health equity and improvement of access to health care services has been regarded as one of the main objectives of many health systems all over the world. However, to evaluate access to health care services is not simple as access to healthcare itself is a very sophisticated concept. It covers at least four different aspects of the health

system compromising geographical availability of qualified health care services, people's financial affordability to health care services, acceptability and utilization of health care services at different levels of the health system of the country. Once health care services are available with appropriate supply system, people would certainly have chances to obtain health care services. However, in fact, whether people can get access to health care services in reality still depends on many other factors like whether people have enough money to pay for healthcare or not, whether the organization of the health system can response to people's needs or not, whether people can overcome any social or cultural barriers or not (Gulliford et al, 2002).

Another issue to take into consideration is the appropriateness of access to health care services. Accessibility to health care services and utilization of health care services in particular would be good when people are in real needs and it would be effective in accordance with high quality of treatment. By contrast, it would be improper if people just want to seek for health care services not because they need it but because they want it. Concepts about real need, felt need, unfelt need and want should be distinguished. People may seek for different health care services just because they want to have that kind of healthcare, or just because they feel that they need it. However, in fact, it is not really necessary for them to have that kind of services. Thus health care utilization should be considered in the context of people's needs to see whether the health sector can response to people's needs or not and the evaluate the effectiveness of the health sector's response. The utilization of health care services at different levels of the health sector can be either good or bad depending on whether the use matches people's needs or not. It can be said that the health system works effectively if it is responsive to people's need. On the contrary, if the health system responses to people's wants or people's felt needs, the health system should be adapted to response to people's needs, but not people's wants.

### 5.4.4. *Quality of care of different health facilities in Bavi district:*

Being in the same situation with other developing countries, quality of health care services in Vietnam is one of the most concerned issues. Quality of care of different health care services may have significant impacts on treatment results and

health outcomes. Treatment with appropriate guidelines and drugs is one of the key factors determining the success of the treatment process. People with their own knowledge and experience on the use of herbal medicine or traditional medicine may cure their common illness. Treatment at health facilities may not always be good due to the low quality of local health staffs. Therefore, quality of care is a very essential factor determining the effectiveness of the treatment process as well as impacting on people's belief in health care services of different levels of the health system, both in public and private sector. Moreover, quality of care at different levels of the health sector and between urban and rural areas is distinguished.

The highest level of care – tertiary care is at provincial and central hospitals. According to the Health Statistics Yearbook of Vietnam in 2008, there were totally 44 central hospitals and 383 provincial hospitals nationwide (MOH, 2008). Almost all of central and provincial hospitals were located in big cities. Together with the development of the economy, private health facilities have been mushrooming in Vietnam. However, in Vietnam, central and provincial hospitals are considered the best in terms of quality of treatment and infrastructure.

The secondary care level is at district hospitals. As mentioned above, in Bavi district, there is only one hospital with 200 beds. According to the annual report of Bavi hospital, in 2011, there were totally 184 health workers in the hospital, including 32 doctors (accounting for 15.3% of total health staff of the hospital), 116 nurses, midwives, technicians and 02 pharmacists (HHB, 2011).

Primary health care level is at communal health station. In Bavi district, there are 32 communal health centers equally distributed in 32 communes of the whole district. As reported by the Health Department of Bavi district, in 2005, 91% of communal health centers in the region had one working doctor, and 50% of the communal health centers met the national standards. However, shortage in drugs and the quality of the health staff working at communal health centers were still the two remarkable problems towards communal health centers. The health staffs working at the grassroots level rarely have chances to improve their skills or update their knowledge even in short training courses.

The overall picture of the public health delivery system of Vietnam was seen through these three levels, tertiary, secondary and primary care. As mentioned above,

Vietnamese health system has paid more attention to the improvement of the infrastructure as well as medical equipment of health facilities. However, most of high technology equipment has been located in central and provincial hospitals. Moreover, most of high quality physicians have been working at higher-level hospitals of the health sector of Vietnam as they would have more chances to develop their clinical skills, more opportunities to be promoted and their living conditions in the urban areas, especially in big cities would be much better. As a matter of fact, there should be some certain gaps in the quality of care at different level of the public health care delivery system of Vietnam.

Since "Doi moi" period, private health facilities have had more opportunities to develop. Reportedly in 2009 by the Ministry of Health, in the whole countries there were 100 private hospitals and 300 polyclinics (MOH, 2010). However, these hospitals and polyclinics were mostly distributed in big cities and in urban areas, not in rural areas. In rural areas, there were only small private clinics, which were opened and run by retired physicians. Being in the same situation, private clinics in Bavi district were only small clinics, run by retired physicians or working doctors after working hours. To some extent, it proves that the quality of private clinics in Bavi district cannot be compared to the district hospitals, but better than that of communal health centers, at least in terms of drug availability and staff's attitude towards patients. Another reason contributing to the common use of private clinics in rural areas. One remaining problem existing in the area is that some of the private clinics in the region even have not registered their professional practice with the authority. Therefore, it is very difficult to control their activities as well as the quality of their treatment.

## 5.5. Limitations

We tried to explore the utilization of different health care services and its association with demographic and socio-economic factors. This study used secondary data from routine activities of the Epidemiological Field Laboratory of Bavi as the dataset for analysis. For this convenience, it is impossible to avoid some limitations.

Health insurance has long been considered an important factor in the health care financing system of almost all countries, especially of developing countries. Health insurance would help to improve health equity, especially for vulnerable groups. The ownership of health insurance may play an important role in deciding which kind of health care services to be used. However, the ownership of health insurance was not included in the questionnaire.

Pattern of diseases and the severity of diseases are the two very important determinants of health care utilization. The dataset involved the self-reported symptoms only, but did not either record information on exact diseases that people had or record self-perceived severity of the symptoms of illness. Therefore, the study could not assess the appropriateness of the use of different types of health care services or to evaluate whether or not the health system could respond to people's real need in health care.

The study attempted to investigate the differences in health care utilization of people belonging to different socio-economic classes. The main explanatory variable included in the regression is the wealth index quintile variable. In spite of the advantages over other quintile classifications basing on income and expenditure as mentioned in the Chapter of Literature review, there are still some certain problems with classifying quintiles basing on wealth index. One very important problem to be considered is that the speed of changing economic status may be different from the speed of changing properties of households. Their economic status, their income may increase, but they may not buy more properties, or vice versa. Thus, for some households with changes economic status, wealth index quintiles cannot reflect the real situation of households.

As the dataset used for the study was taken from one rural district in the North of Vietnam, the findings could only provide a clear picture about that district, part of the situation of the North of Vietnam. Although, findings of the study may be considered evidence for the policy making process, they could not be generalized for the whole country.

Access to health care has long been considered one important component of the health sector of many countries, of which utilization of health care services is one key chain. This study aimed at investigating the differences in health care utilization

of different demographic and socio-economic groups in Bavi district. Therefore, it can take into consideration only one part of access to health care services among different population groups, and thus can only assess part of health equity among different population groups. As a matter of fact, further studies about different angles of access to health care including availability, affordability and acceptability of health care services should be conducted to comprehensively assess health equity in the society.

# CHAPTER VI
# CONCLUSION AND RECOMMENDATION

## 6.1. Conclusion

The study aims at providing information on the differences of health care utilization among different demographic and socio-economic groups in Bavi district, Vietnam, in the period from 2002 to 2011. With the method of binary logistic regression for panel data, the study found out that demographic and socio-economic factors had significant impacts on the decisions of which health care services to be used.

Private clinics and self-treatment were the two most commonly used by people under the surveillance in these three years (2002, 2007 and 2011). A contradictory trend in the use of self-treatment and tertiary care was recorded. The proportion of purchasing health care services at provincial/central hospitals increased from 2.49% in 2002 to 3.77% in 2011. Meanwhile, self-treatment became less common in the population under surveillance, reducing from 40.27% to 18.87% in the period from 2002 to 2011.

There did exist differences in the use of different types of health care services among different socio-economic groups. Males seemed to use more formal treatment at provincial/central hospitals, district hospitals and private clinics than females. People being trained from professional schools, college or university tended to use more tertiary care and secondary care than people being illiterate or with lower educational level. Among all kinds of health care services, the only treatment that farmers used more was self-treatment. Provincial/central hospital and district hospital services were purchased more by people with marital status of being married. The elderly in FilaBavi used more self-treatment than people belonging to any other age groups. Meanwhile, the proportion of children under 5 years of age purchasing health care services at district hospitals, communal health centers and private clinics was significantly higher than that of other age groups. The higher rate of self-treatment was recorded among the poorest in comparison with other quintile groups. The use of health care services at higher-level hospitals (provincial or central hospitals) was more popular among the rich than the poor while primary health care at communal

health centers was used more by the poor group. The proportion of district hospital visitors was significantly higher among the poorest than other economic groups.

To some extent, significant differences in the use of different types of health care services reflect that inequality in health care utilization still existed in the society, in particular between the rich and the poor, between males and females, between people with higher and lower educational background, between farmers and people working in other fields and among people at different age groups. Even though considerable efforts had been made from the government, which had contributed to improve health equity for Vietnamese people, disparities in health and health care utilization still existed in every corner of the health sector.

## 6.2. Recommendations

On the basis of the findings of my study, I would like to suggest some recommendations in order to improve health care utilization at different levels of the health sector, to narrow the gap in health care utilization between the rich and the poor and to ensure the quality of care of informal sector.

- Improve quality of communal health centers in terms of availability of drugs and quality of health staff to encourage the use of primary health care at communal health centers aiming at reducing overcrowding for secondary and tertiary hospitals and to response to people's needs, especially for vulnerable groups like the poor, the elderly and the children in order to improve health equity in the society.

- Provide more health information and communication to raise people's awareness about their health status and health care activities in order to reduce the commonness of self-treatment and to increase the use of primary health care.

- Control the practice of drug prescription and dispensing at drug stores and private clinics in order to reduce the rate of people treating themselves at home and to ensure the quality of treatment with the overall aim of reducing drug resistance and side-effects of incorrect treatment which are becoming very serious in Vietnam.

- Assess the differences in health care utilization of different population groups before and after the issuance of health related policies, especially the policies on supporting the poor and vulnerable groups in order to see whether these vulnerable groups can enjoy benefits from these policies or not.

- Further studies about health care utilization in accordance with pattern of diseases as well as self-perceived severity of the diseases among different demographic and socio-economic groups are needed to assess the responsiveness of the health care sector towards people's real needs in health care and to identify the health inequity in the current society of Vietnam.

- Further studies about three remaining aspects of access to health care services should be conducted in order to comprehensively assess health equity in Vietnam.

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# BIOGRAPHY

| | | |
|---|---|---|
| **Name** | : | Mrs. Nghiem Nguyen Minh Trang |
| **Date of birth** | : | 22/09/1984 |
| **Place of birth** | : | Hanoi, Vietnam |
| **Nationality** | : | Vietnam |
| **Education** | : | Bachelor of Art, graduated in 2008 |
| | | English Department, |
| | | Hanoi University, |
| | | Hanoi, Vietnam |

**Working experience**:

| | |
|---|---|
| 2007 – 2011 | Office secretary, |
| | Health System Research Project, |
| | Hanoi Medical University, Hanoi, Vietnam |
| 2009 – Present | Project secretary, |
| | Clinical Nutrition Project |
| | Hanoi, Vietnam |
| **Permanent address:** | No 44, Alley No 102/44, Phao Dai Lang Street, |
| | Dong Da District, Hanoi, Vietnam |
| | Telephone:    +84-4-3-7751842 |
| | Cell phone:   +84-904967122 |
| | Email:        minhtrang2209@yahoo.com |