The injury poverty trap in rural Vietnam:
Causes, consequences and possible solutions

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Abstract

The focus of this study is the vicious circle of poverty and ill-health. The case is injuries but it could have been any lasting and severe disease. Poverty and health have very close links to economic development and to how health care is financed. Out-of-pocket payment seems to increase the risk of poverty while prepaid health care reduces it. The overall objective is to investigate the “injury poverty trap” and suggest possible solutions for it. A cohort of 23,807 people living in 5,801 households in Bavi district of Vietnam was followed from 1999 to 2003 to investigate income losses caused by non-fatal unintentional injuries in 2000 as well as the relationships between social position in 1999 and those injuries. For the possible solutions, a survey in 2064 household was performed to elicit people’s preferences and willingness to pay for different health care financing options. The results showed that unintentional injuries imposed a large economic burden on society, especially on the victims. By two pathways – treatment costs and income losses – unintentional injury increased the risk of being poor. The losses for non-poor and poor injured households were about 15 and 11 months of income of an average person in the non-poor and poor group, respectively. Furthermore, poverty was shown to be a probable cause of non-fatal unintentional injuries. Specifically, poverty led to home injuries among children and the elderly, and adults 15 – 49 years of age were particularly at risk in the workplace. The middle-income group was at greatest risk for traffic injuries, probably due to the unsafe use of bicycles or motorbikes. About half of the population preferred to keep an out-of-pocket system and the other half preferred health insurance. People’s willingness to pay suggested that a community-based health insurance scheme would be feasible. However, improvements in the existing health insurance systems are imperative to attract people to participate in these or any alternative health insurance schemes, since the limitations of the existing systems were generalized to health insurance as a whole. A successful solution should follow two tracks: prepayment of health care and some insurance based compensation of income losses during the illness period. If the risk of catastrophic illness is more evenly spread across the society, it would increase the general welfare even if no more resources are provided.

Key words: unintentional injury, poverty, out-of-pocket payment, health insurance, Vietnam.
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Original papers


V. Lofgren C, Thanh NX, Chuc NTK, Emmelin A, Lindholm L. People’s willingness to pay for health insurance in rural Vietnam (manuscript).

The original papers are printed in this thesis with permission from the publishers (http://www.tandf.co.uk).
Abbreviations

ADB  Asean Development Bank
AIDS  Acquired Immunodeficiency Syndrome
ARI  Acute Respiratory Infection
BMI  Body Mass Index
CDD  Control of Diarrhoeal Disease
CHI  Compulsory Health Insurance
CHS  Communal Health Station
CI  Confidence Interval
Coef  Coefficient
CV  Contingent Valuation
CVM  Contingent Valuation Method
DPT  Diphtheria, Pertussis, Tetanus
EPI  Expanded Programme on Immunization
FilaBavi  Epidemiological Field Laboratory in Bavi District
GDP  Gross Domestic Product
GSO  General Statistics Office
HC  Health Care
HCFP  Health Care Funds for the Poor
HH  Household
HI  Health Insurance
HIV  Human Immunodeficiency Virus
IMF  International Monetary Fund
MCH/FP  Maternal and Child Health/Family Planning
MOH  Ministry of Health
MOLISA  Ministry of Labour, Invalid and Social Affairs
NOMESCO  Nordic Medico-Statistical Committee
OOP  Out-of-pocket payment
OR  Odds Ratio
P  P-value
RR  Relative Risk
SES  Socio-Economic Status
SAREC  Swedish Agency for Research Cooperation with Developing Countries
Sida  Swedish International Development Cooperation Agency
TB  Tuberculosis
TV  Television
UNDP  United Nations Development Programmes
VHI  Voluntary Health Insurance
WB  World Bank
WHO  World Health Organization
WTP  Willingness to pay
Chapter 1. Introduction

The focus of this study is the vicious circle of poverty and ill-health. The case is injuries and their consequences but it could have been any lasting and severe disease. Poverty and health have very close links to economic development and to how health care is financed. Out-of-pocket payment seems to increase the risk of poverty while prepaid health care reduces it. In reality, however, it is not easy to have a successful prepaid scheme in developing countries such as Vietnam. The success of such a system is dependent on a range of determinants. An important determinant that should be firstly mentioned is support for or at least acceptance of the system by the population. In the following each of the issues mentioned above will be further discussed.

1.1. Injuries and costs

Throughout the world, injuries have become a major public health problem in terms of health and economic burden. An estimated 5 million people worldwide died from injuries in 2000 — a mortality rate of 83.7 per 100,000 population. For every person that dies, several thousands more are injured, many of them with permanent sequelae of injuries. Injuries occur in all regions and countries, and affect people in all age and income groups. The magnitude of the problem, however, varies considerably by age, sex, region and income group. For example, in the low and middle-income countries in the Western Pacific, the leading injury-related causes of death are road traffic injuries, drowning and suicide, while in Africa they are war, interpersonal violence and traffic injuries.

Analyses show that there are very few countries where unintentional injuries do not appear among the five leading causes of death. In the American continent in particular, unintentional injuries are among the five leading causes of death in all countries, whatever their level of development. In the United States, for example, unintentional injuries are the leading cause of death for people aged 1 to 34. Each year, more than 90,000 people die in the United States as a result of unintentional injuries. During an average year in the United States, unintentional injuries account for nearly 31 million emergency room visits.

How large is the injury problem in low-income countries such as Vietnam? It is very difficult to give an adequate picture of injuries in Vietnam because, so far, there are neither comprehensive injury register systems nor research about frequencies and consequences of injuries. However, since 1986, the year when the liberalization of the economy started (“Đoì Mới”), the injury pattern in
Vietnam has been reported to change. This is especially clear for traffic injuries.\textsuperscript{4} From 1988 to 1997 traffic accidents increased fourfold to 19,159. Police statistics showed that fatal accidents soared by almost 235\% and injuries by 400\%. Traffic accidents increased from 7.1 per 1000 inhabitants to 24.9, fatalities rose from 3.9 to 7.4, and injuries from 8.7 to 28.4, giving Vietnam one of the highest traffic accident rates in the world.\textsuperscript{5} The trends seem to continue. In 2001, about 58 people died daily on the roads in Vietnam and almost double the deaths were the numbers of injury-causing accidents. Especially among children, in the same year, 4,100 children were reported to have died from traffic accidents, equivalent to 11 children a day (Boys were twice as likely to die as girls), and 290,000 were injured, equivalent to 794 a day.\textsuperscript{6}

![Heavy traffic in Vietnam](image)

**Picture 1.** Heavy traffic in Vietnam.

Injuries are not only the leading cause of death and disability, but also a great financial burden on the economy of each country. For example, in the United States, injuries continue to impose a multibillion-dollar burden on the economy, as reported by Miller and Lestin.\textsuperscript{7} Medical spending on injuries in 1987 was USD 64.7 billion in 1993 dollars or 8.3\% of 1993’s total health care spending in the
United States. Non-hospital medically treated injuries averaged USD 571 in medical spending per case, or USD 181 per visit. If medical cost was estimated together with costs for rehabilitation and income loss, the costs of injury would be more than USD 224 billion in year 2000. In reality, the consequences of unintentional injuries for health care are tremendous and probably greatly underestimated by the public and by decision-makers. Unintentional injuries are a major cause of demands on the health system, both at the primary health care level and the hospital level. On average in developed countries, and also in many developing countries, one hospital bed out of ten is occupied by an unintentional injury victim.

In a country without comprehensive injury register systems, such as Vietnam, very little is known about injury costs. Therefore, “How large is the economic burden of injuries and how does the burden distribute among households, the government and insurance agencies?” is the first issue being investigated in this study.

1.2. Lack of prepaid health care causes a poverty trap

Health care financing solutions around the world are heterogeneous. In developed countries almost all health care is prepaid. In Western Europe taxes and social insurance are most common and most important. In the US, private insurance has a prominent position but is complemented by tax financed health care for the poorest. In developing countries out-of-pocket is a very common financing source, and Vietnam is no exception. Rather, Vietnam is among the countries in the world that have the smallest proportion of prepaid health care. The absence of prepaid health care was addressed in the report of the Commission on Macroeconomics and Health. They conclude that the economic consequences of a disease episode, or ill health caused by injuries, on an individual household can be magnified because the cost of dealing with the illness, in the absence of insurance, forces a household to spend so much of its resources on medical care that it depletes its assets and debts are incurred. This may throw a household into poverty from which it cannot escape, and which has ramifications for the welfare of all its members and often of relatives as well. Poor households in developing countries are rarely insured against catastrophic injuries, and are therefore often required to sell their few assets, such as farm equipment and animals, or to mortgage their land, in order to maintain minimal consumption in the face of lost market earnings and to pay for urgent medical care. This depletion of productive assets can lead to a poverty trap (i.e. persisting poverty) at the household level even after the acute illness is overcome, since impoverished households will have a hard time re-capitalizing their productive
activities. The indebted household will lack the working capital to make the short-term investments (e.g. in seed, fertilizer) to produce sufficient output to pay off the debts, and will be unable to borrow against future earnings. The poverty in turn may intensify the original disease conditions as well.

Furthermore, Whitehead et al.\textsuperscript{10} argue that two global trends – the introduction of user fees for public services, and the growth of out-of-pocket expenses for private services – together constitute a major poverty trap. They identify four main categories of effects of the medical poverty trap: untreated morbidity; reduced access to care; long-term impoverishment; and irrational use of drugs. The first three hardly require any explanations, but regarding drugs they argue that in many low-income countries drugs are sold out-of-pocket without any prescription by unqualified people who have financial incentives to sell as much as possible. The consequences will be an overuse of drugs, not motivated by the medical condition and sometimes even hazardous for the patient’s health.

This phenomenon has been observed in developing countries, for instance China and Cambodia. According to a household survey in rural China,\textsuperscript{11} high medical expenses (user fees and payment for drugs) are the main reason for becoming poor today. It causes a greater threat for driving people into poverty than unemployment and poor harvests. A study in Cambodia\textsuperscript{12} shows that consultation fees charged by private providers increased in tandem with price increases introduced at the referral hospital. It further demonstrates that the introduction and subsequent increase in user fees created a “medical poverty trap”, which has significant health and livelihood impacts including untreated morbidity and long-term impoverishment.

1.3. The relationship between poverty and injuries in Vietnam

What is known about the problem in Vietnam? Not much, but there are some reasons to expect that the problem is significant and increasing. Before 1989, Vietnamese health care was financed mainly from two sources: mostly from the national revenue and a small part from foreign donors. Health care services were used free of charge. Since the transition to market economy started, public contribution has decreased substantially while the importance of user fees has grown. This policy has generated more resources for the health sector thereby increasing the quality of health care services.\textsuperscript{13} However, the policy has also had some negative effects, especially regarding the poor’s access to health care services.\textsuperscript{14,15,16,17} When the poor get ill or injured they usually treat themselves. When the health consequences are serious and medical treatment is absolutely
unavoidable, people have to borrow money and/or sell assets in order to afford the user fees.

Financial contribution to the health care system by different income groups is frequently studied, and the main findings of these studies is that the Vietnamese system is regressive, i.e. that lower income groups pay a larger fraction of their income to health care than groups with higher income.\textsuperscript{18,19,20,21} In a recent study, Thuan\textsuperscript{22} showed that the households health care expenditure was 5.0\% in the group with the highest income and 8.4\% in the group with the lowest income. Considering the fact that the income was three times larger in the “high-income” group, it is obvious that they can afford both more and better health care. However, the average proportion paid in different income classes is only one side of the coin since the random nature of disease and injuries makes it highly likely that people in the same income group will pay very different amounts. People free from disease and injuries will pay nothing while those more unfortunate who are affected by catastrophic illness have to pay enormous amounts.

A recent cross-sectional participatory poverty assessment in Vietnam\textsuperscript{23} identified the economic shock of ill health as the most common cause of household poverty. Around 3 million people are driven into poverty each year as a result of meeting health care payments – a 4\% rise in the poverty headcount in 1993 and 3.4\% in 1998.\textsuperscript{24,25} This process may be accelerated by the fact that the risk of injuries is not likely to be independent of poverty, as shown in Swedish studies,\textsuperscript{26} an English study\textsuperscript{27} and an American study.\textsuperscript{28} This social gradient in injury risk will probably be found in developing countries as well. People living under harsh conditions are certainly willing, or forced, to accept jobs that expose them to extremely high risks and their housing and traffic environments are often very risky, for instance.

The relationship between injuries and poverty has not been longitudinally investigated in empirical studies in Vietnam. There may be a vicious circle: poverty increases the risk of injuries, injuries require high medical expenditure and cause losses of earnings that may throw people into poverty, thereby further increasing the risk of injuries and poverty-related diseases etc. These are the second and third issues being investigated in this study.

1.4. Can prepaid health care protect against the poverty trap?

The consequences and extension of the injury poverty trap can be alleviated in different ways. One is of course the prevention of injuries. The Ministry of Health of Vietnam has initiated a national programme on injury prevention and
safe communities since 1996. Reportedly, the programme has initially achieved remarkable results, although further studies and improvements are needed.\textsuperscript{29}

Another way to reduce the consequences is through health care financing reforms. Disease and injury poverty traps will exist and be unavoidable in all systems with a high proportion of out-of-pocket payment. Public or private prepayment models are needed to eliminate the traps because by such models, financial risk will not be only spread over time, but also pooled across the population.\textsuperscript{12,30,31,32}

There are two common types of health insurance in the world. They are health insurance based on community rating and health insurance based on risk rating.\textsuperscript{33,34} Community rating means that people cannot be discriminated against in obtaining health insurance on the basis of health risk. It requires that in setting premiums, or paying benefits, insurers cannot discriminate between contributors on the basis of health status, age, race, gender, use of hospital or medical services, or general claims history.\textsuperscript{35,36} Conversely, risk rating means premiums are high or low depending on health risks of the insured. If you are old and have some chronic disease, you have to pay a premium higher than a young person free from disease. This type of health insurance is common in the US, while community rating health insurance is common in European countries. Both types have their own strong and weak points, depending upon different perspectives. For example, an American article\textsuperscript{37} argues that community rating would increase the number of uninsured because it involves raising the premiums of healthy individuals in order to subsidize the premiums of those at high risk. Subsequently, as sick people enter the market, causing costs (and, therefore premiums) to rise, healthy people leave. While a document from Ireland - an European country\textsuperscript{38} considers that is a strong point of community rating because it makes disadvantage group (old, sick, poor…) affordable for health insurance.

In Vietnam, a health insurance policy has been implemented since 1992 and the premiums have contributed to an increasing proportion of a very limited health care budget.\textsuperscript{39} In addition, health insurance enables poor people to access health care and thus indirectly contributes to the preliminary success of the “hunger elimination and poverty reduction” policy of the Vietnamese government in recent years. Today, however, the majority of health care financing is through out-of-pocket payment and health insurance coverage remains very low. By 2002, only 16.5\% of about 80 million Vietnamese were insured, mostly in the form of compulsory insurance for salaried employees.\textsuperscript{40} The goal of the Vietnam Government and Vietnam Health Insurance is “health insurance for all by the year 2010”.\textsuperscript{41} However, the ways to achieve this goal, including which health
insurance scheme should be applied, have not been adequately studied. An appropriate scheme should receive support or at least acceptance and a willingness to pay among the Vietnamese population. Therefore, people’s preferences and willingness to pay for different health care financing systems are the forth and the fifth issues being investigated in this study, in order to suggest a health care financing system in line with people’s desires.

### 1.5. Conceptual framework

Figure 1. The injury poverty trap and possible solutions

**Possible Solution**

Health insurance:
- Preferences (IV)
- WTP (V)

**Injury Poverty Trap**

Poverty:
- Can’t escape
- Drop into poverty
- Income loss

Costs:
- Health care cost
- Production loss

Unintentional injuries

I

II

III
1.6. Objectives

1.6.1. Overall objective:

The overall objective of the study is to investigate the “injury poverty trap” and suggest possible solutions for the trap in a rural district in Vietnam.

1.6.2. Specific objectives:

- To estimate the economic burden of non-fatal unintentional injuries and describe how the burden is distributed among households, the government and insurance agencies (paper I).

- To longitudinally investigate the relationships between non-fatal unintentional injuries and poverty: Do non-fatal unintentional injuries increase the risk of being poor? (paper III); and does poverty lead to non-fatal unintentional injuries? (paper II)

- To elicit and analyze people’s preferences (paper IV) for different health care financing options: out-of-pocket payment, compulsory health insurance based on community rating, and voluntary health insurance based on risk rating.

- To elicit and analyze people’s willingness to pay (paper V) for joining in different health insurance schemes: compulsory health insurance based on community rating, and voluntary health insurance based on risk rating.
Chapter 2. Vietnam

2.1. Geography

Vietnam is a long and narrow country extending along the eastern edge of the Indochina Peninsula, facing the Gulf of Tonkin and the South China Sea. The coastline is over 3,000 km long and the land borders extend over 3,700 km (sharing 1,160 km with China, 1,650 km with Laos and 930 km with Cambodia). It has a total surface area of 331,100 km². Vietnam is situated in the tropics, in the centre of South-East Asia. It is closer to the Tropic of Cancer than to the Equator. Its subsoil contains most of the minerals essential to industrialization: petroleum, coal, iron, tin, bauxite, copper, chrome, apatite, etc. Arable land covers 6.5 million hectares of the country. The cultivation of rice, cereals, and fruits, takes place in the vast and fertile plains around the Red and Mekong River Deltas, while cash crops such as coffee, tea and rubber are concentrated in the hill areas and plateaus.

Source: CIA 2005.
Vietnam has four distinct seasons with noticeably different climates. Also due to
the length of the country, weather patterns vary from region to region. Winter
lasts from November to January in the north, January being the coldest month,
when the mean temperature drops below 15 degrees centigrade. Winter is
normally characterized by fine drizzle that is damp and penetrating. The centre
Vietnam also undergoes cooler temperatures during these months but they do
not last as long as in the north. However, the mean temperature in the south does
not drop below 25 degrees centigrade. The spring lasts for about three months
(February-April) with the temperature between 18 and 22 degrees centigrade in
the north, and already up to 30 degrees centigrade, the peak mean temperature,
in the south. April can bring heavy rainfall to the north, noticeably drier weather
to central areas, and scorching heat to the south. The summer in the north lasts
from May to July when the temperature is also at its highest (30-40 degrees
centigrade) and, surprisingly, the temperature in the north is hotter than the in
the south. Typhoons are frequent during this period. Starting in August, the fall
sets in with cool weather and temperatures of about 20 degrees. At this time the
season of heavy rains and typhoons commences in central Vietnam. Annual
rainfall averages about 1,830 mm with high humidity (85-88%) throughout the
year.

2.2. Demography

The twelfth most populous country in the world, Vietnam has a population
estimated at 83,535,576 and a population growth rate at 1.04% in 2005.43 The
two most populated regions are the deltas of the Red River (north) and Mekong
River (south). Ethnic Vietnamese (Kinh) make up 85% of the population, a
mixture of over 50 ethno-linguistic groups make up 12% and ethnic Chinese
comprise the remaining 3%.

Vietnamese is the national language and is spoken by over 80% of the
population. The ethnic minorities of the mountainous regions, while preserving
their own languages, also speak and study Vietnamese. The majority of
Vietnamese practice Buddhism. Other religions include Confucianism, Taoism,
Christianity, Animism, Cao Daism, Hoa Hao and Islam.

2.3. Economic Conditions

Vietnam has been transitioning from a centrally planned economy to a socialist-
oriented market economy since the economic reforms in 1986, known as Doi
Moi (renovation). The Doi Moi with market liberalization and decentralization
policies has dramatically transformed the country. Over the last ten years Gross
Domestic Product (GDP) has more than doubled, while inflation has fallen to low, single digit figures (9.5% in 2004).\textsuperscript{43}

Figure 2. Economic growth 1990-2002 (1990=100).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{economic_growth.png}
\caption{Economic growth 1990-2002 (1990=100).}
\end{figure}

Source: UNDP 2002.\textsuperscript{42}

Major changes have occurred in the composition of GDP by sector since the beginning of the 1990s. According to the UNDP report of 2002,\textsuperscript{42} all GDP sectors have grown steadily since the implementation of Doi Moi. However, as the country has modernized, the share of agriculture in GDP has declined relative to that of services and industry. The share in GDP of the agricultural sector (including forestry and fishing) declined from 40% in 1990 to a lower, but still substantial, 21.8% in 2002. In contrast, the GDP shares for industrial and construction sector was at 40% in 2002 compared with 22% in 1990. The share of the services sector stood at 38.2% in 2002 compared with 38% in 1990.

Although GDP per capita is officially just over USD 440 and poverty is still widespread, the country’s performance in terms of human development is relatively favorable. This is reflected in the gradual increase of the human development index over the last decade, and summarizes the progress made in education, health and standard of living. Out of 173 countries around the globe, Vietnam climbed from being 120\textsuperscript{th} on the Human Development Index in 1995 to 109\textsuperscript{th} in 2002.
2.4. Poverty

There is no unique definition of poverty, and therefore no perfect indicator to measure its change over time. Poverty is a state of deprivation involving multiple dimensions, from limited income to vulnerability in the face of shocks to few possibilities to participate in collective decision making.  

A variety of poverty and social development indicators are currently available in Vietnam. The Ministry of Labour, Invalids and Social Affairs (MOLISA) uses a methodology based on household income. Households are deemed poor if their income per capita falls below a conventional threshold, that varies between urban, rural and mountainous areas. The current poverty line for the 2001-05 period has three levels, and an urban resident is considered poor if he earns VND 150,000 (USD 10) a month. It is VND 100,000 (USD 6.7) a month for people in rural areas and VND 80,000 (USD 5.3) for those residing in mountainous regions and islands. The MOLISA plans to introduce a new poverty line for the 2006-2010 period. As per the new poverty line, an urban resident who earns VND 230,000 (USD 15.3) or less a month and a rural resident earning VND 200,000 (USD 13.3) or less will be considered poor. Poverty rates are defined as the proportion of the population with income below these thresholds. With the current poverty line, the poverty rate has come down from 17.2% in 2000 to 8.3 in 2004. This rate will increase to 26.7% if the Prime Minister approves the new poverty line for the 2006-2010 period submitted by the MOLISA.

The General Statistics Office (GSO) relies on both income and expenditure information to compute a poverty rate. It defines a threshold based on the cost of a consumption basket which includes food and non-food items, with food spending being large enough to secure 2100 calories per day per person. Households are considered poor when their income or expenditure level is not high enough to afford this consumption basket.

The expenditure approach to the measurement of poverty provides a reasonable first look, and one that allows comparison across localities and over time. Based on this approach, and using a poverty line computed according to international standards, the success of Vietnam in terms of poverty reduction is remarkable. As recently as 1993, 58% of the population lived in poverty, compared to 37% in 1998 and 29% in 2002 (table 1). This amounts to halving the share of poverty in less than a decade. Or, put differently, almost a third of the total population was lifted out of poverty in less than ten years.
Table 1. Poverty rate in Vietnam estimated by the expenditure approach (%).

<table>
<thead>
<tr>
<th></th>
<th>1993</th>
<th>1998</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>58.1</td>
<td>37.4</td>
<td>28.9</td>
</tr>
<tr>
<td>Urban</td>
<td>25.1</td>
<td>9.2</td>
<td>6.6</td>
</tr>
<tr>
<td>Rural</td>
<td>66.4</td>
<td>45.5</td>
<td>35.6</td>
</tr>
<tr>
<td>Kinh &amp; Chinese</td>
<td>53.9</td>
<td>31.1</td>
<td>23.1</td>
</tr>
<tr>
<td>Ethnic Minorities</td>
<td>86.4</td>
<td>75.2</td>
<td>69.3</td>
</tr>
</tbody>
</table>

Source: UNDP 2004.44

According to the UNDP 2004, the driving forces behind poverty reduction are job creation by the private sector and the increased integration of agriculture in the market economy. A vast majority of the working-age population of Vietnam actually works, and labour market participation rates are among the highest in the world. Although the proportion of the population living out of poverty has increased steadily in Vietnam, many households are still vulnerable to falling into poverty. Among the most common shocks they confront are episodes of ill health, failure of a crop or investment (such as death of livestock), adverse movements in the prices of key agricultural commodities, unstable employment opportunities, and the occurrence of natural disasters. Depending on the estimate, between 5 and 10% of the population of Vietnam is still vulnerable to falling into poverty.

2.5. Health status

The general health status in Vietnam is much better than one would expect considering the level of economic development.6 Life expectancy is high (70 years in 2002) in relation to Vietnam’s socioeconomic development status, when compared with other low-income countries. Infant mortality rate fell from 111 per 1,000 live births in 1970 to 45 in 1989,47 to 36 in 1998, and to 18 in 2002.48 Child mortality fell from 47 per 1000 live births in 1993 to 24, in comparison with 121 in low-income countries in 2002. Other noticeable indicators showing that Vietnam’s general health status is much better than other low-income countries are immunization rates. In 2002, measles and DPT immunization rates in Vietnam were 97% and 98% compared to 60% and 62% respectively in other low-income countries. In the same year, the illiteracy rate among people 15 years of age and older in other low-income countries was almost 5 times higher than in Vietnam (37% vs. 6.6%). For more details, please see table 2.
Table 2. Health, Social demographic indicators in Vietnam, East Asia and low income countries.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Unit of measure</th>
<th>1993</th>
<th>1998</th>
<th>2002</th>
<th>East Asia</th>
<th>Low income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant mortality</td>
<td>Per 1000 live birth</td>
<td>36</td>
<td>30</td>
<td>18</td>
<td>34</td>
<td>80</td>
</tr>
<tr>
<td>Under 5 mortality</td>
<td>Per 1000 live birth</td>
<td>47</td>
<td>40</td>
<td>24</td>
<td>44</td>
<td>121</td>
</tr>
<tr>
<td>Maternal mortality</td>
<td>Per 100,000 live birth</td>
<td>...</td>
<td>200</td>
<td>165</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Immunization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td>Percent of age group</td>
<td>93.0</td>
<td>96.0</td>
<td>97.0</td>
<td>76.3</td>
<td>59.8</td>
</tr>
<tr>
<td>DPT</td>
<td>Percent of age group</td>
<td>91.0</td>
<td>95.0</td>
<td>98.0</td>
<td>76.8</td>
<td>61.5</td>
</tr>
<tr>
<td>Child malnutrition (&lt;5)</td>
<td>Percent of age group</td>
<td>51.0</td>
<td>34.0</td>
<td>29.5</td>
<td>14.8</td>
<td>...</td>
</tr>
<tr>
<td>Population per physician</td>
<td>Persons</td>
<td>2,428</td>
<td>2,208</td>
<td>2,283</td>
<td>595</td>
<td>...</td>
</tr>
<tr>
<td>Population per nurse</td>
<td>Persons</td>
<td>723</td>
<td>789</td>
<td>822</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Population per hospital bed</td>
<td>Persons</td>
<td>355</td>
<td>379</td>
<td>414</td>
<td>420</td>
<td>...</td>
</tr>
<tr>
<td>Human resource</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>Million</td>
<td>69</td>
<td>75</td>
<td>80</td>
<td>1,823</td>
<td>2,506</td>
</tr>
<tr>
<td>Population growth rate</td>
<td>Annual percent</td>
<td>1.7</td>
<td>1.6</td>
<td>1.3</td>
<td>0.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Age dependency</td>
<td>Ratio</td>
<td>0.74</td>
<td>0.66</td>
<td>0.58</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Total fertility rate</td>
<td>Births per woman</td>
<td>3.3</td>
<td>2.4</td>
<td>1.9</td>
<td>2.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>Years</td>
<td>67</td>
<td>68</td>
<td>70</td>
<td>69</td>
<td>59</td>
</tr>
<tr>
<td>Illiteracy</td>
<td>Percent of pop age 15+</td>
<td>9.0</td>
<td>7.9</td>
<td>6.6</td>
<td>13.2</td>
<td>37.0</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>US dollars</td>
<td>355</td>
<td>360</td>
<td>440</td>
<td>914</td>
<td>432</td>
</tr>
</tbody>
</table>

*Source: IMF 2005.*

However, morbidity in Vietnam is still high, especially due to infectious diseases and malnutrition. Table 3 shows the five leading causes of morbidity and mortality in 2002 according to hospital-based data.
Table 3. Five leading causes of Mortality and Morbidity in Vietnam 2002 (rate per 100,000 population).

<table>
<thead>
<tr>
<th>Mortality</th>
<th>Rate</th>
<th>Morbidity</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intracranial injury</td>
<td>2.67</td>
<td>Pneumonia</td>
<td>297.83</td>
</tr>
<tr>
<td>Transport accident</td>
<td>1.88</td>
<td>Acute pharyngitis and acute tonsillitis</td>
<td>251.39</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1.76</td>
<td>Acute bronchitis and acute bronchiolitis</td>
<td>214.82</td>
</tr>
<tr>
<td>Intracerebral haemorrhage</td>
<td>1.42</td>
<td>Diarrhoea and gastroenteritis of presumed infectious origin</td>
<td>209.54</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>0.99</td>
<td>Transport accident</td>
<td>159.08</td>
</tr>
</tbody>
</table>

Source: MOH 2002.49

2.6. Health system

Public health services have four levels: central; provincial; district; and communal. At the central level, the Ministry of Health (MOH) is directly in charge of 10 national institutes, 9 medical and pharmaceutical universities, central pharmaceutical enterprises and 20 central hospitals. The MOH also operates 14 vertical programmes, including programmes for malaria, TB, EPI (Extended Programme on Immunization) and ARI. Together with the central government, the MOH formulates the national health policies and plans. The MOH and health authorities at different levels organize health care activities, co-ordinate services from different providers, manufacture and distribute pharmaceutical products, train health staff, co-ordinate medical research and provide preventive and curative health services to the whole population.50

Altogether, there are now 64 provinces in Vietnam. At the provincial level, there is a general hospital with 300-1000 beds including some major specialized departments such as internal medicine, obstetrics and gynecology, surgery, pediatrics, infectious diseases, traditional medicine, emergency wards and laboratories. There are some specialized hospitals, a medical secondary school, some preventive centres and pharmaceutical companies and enterprises. To date there are approximately 260 general and specialized hospitals and pharmaceutical-medical equipment enterprises under the management of the Provincial Health Bureau. About 35% of all health personnel work at the provincial level. The provincial health services receive technical support and
Vietnam

resources from the MOH, other central institutions and the provincial government.

The District Health Centre is responsible for three major activities: (i) curative activities; (ii) preventive programmes (e.g., EPI, malaria control, ARI, TB control, CDD, vitamin A and iodine supplementation); and (iii) surveillance and management of health programmes and health statistics. The District Health Centres include a district hospital with an average of 100 beds, a laboratory; a hygiene and epidemiology team; and a MCH/FP team. These district services are supposed to serve a population of about 170,000 and support polyclinics and commune health stations by technical assistance, financial support, and training. District health staff are paid from the central government budget.

The basic health care unit is the commune health station (CHS). The commune is the lowest level of local government organization. The CHS is staffed by a team of one doctor or assistant doctor, one nurse and one secondary or primary midwife and it is supposed to serve 7,000–9,000 inhabitants. It is responsible for the provision of primary preventive care such as antenatal, immunization and child delivery services. It also provides primary curative care such as treatment of common symptoms and diseases, provision of first aid and implementation of vertical health programmes. Since 1995, the government has paid the commune health workers' salaries.

In order to mobilize manpower as well as other resources, and to improve community involvement in health care, the government has allowed private health service providers to practice.\(^{51}\) The number of private clinics and pharmacies rapidly increased after the health sector reforms. The number of private hospitals has grown from 3 in 1998\(^ {52}\) to 9 in 2000 and to 20 in 2002.\(^ {53}\) In addition, there were over 20,000 private health care clinics, and approximately 11,000 traditional medicine centres and family-planning clinics in 2002. In 1997, 60-80% of the government health staff had been reported to work as private practitioners after official hours in government health services.\(^ {54}\) These percentages are estimated to have increased since then. Most of the private clinics are much smaller than the public ones. There are two types of private clinics: (i) full-time service providers who own private facilities, collect fees directly from their patients, and usually have retired from the public health services; and (ii) part-time service providers who are staff of the public health services, but do additional private work in their own time.
2.7. Health care financing

Until the Doi Moi, the health system in Vietnam was fully subsidized by the government. User fee and health insurance policies were launched in 1989 and 1992, respectively, in order to mobilize more resources for health care with the ultimate goal being to improve the quality of health services. These reforms have led to relatively high total health expenditure (USD 23 per capita or around 5.2% of GDP in 2002). Like most developing countries, Vietnam is now using the three main options to finance national health expenditure, including: (1) a government budget allocation; (2) out-of-pocket payments; and (3) prepayment schemes or health insurance.

Government budget

In 2002, the government health budget, including the central, provincial and commune budgets, was USD 7 per capita per year (about 1.5% of GDP). This figure is one of the lowest in the world and places Vietnam behind China, the Philippines and Thailand in terms of public spending on health care (Figure 3).

Figure 3: Public/private health expenditure in some selected countries 2002.
Allocation of resources from the central to provincial level is based on the number of beds for curative care and on the population for preventive services. Even though disparities among regions are taken into account, the allocation may favor hospitals in the urban and richer areas of the country and the densely populated provinces. Thus, better-off provinces may receive more funds as provincial health budgets are usually higher in these provinces. Furthermore, the lack of cross-commune redistribution of resources within provinces may lead to disparities between communes as well. The government budget and overseas development assistance (which amounts to USD 0.41 per capita per year or 1.8% of total expenditure on health in 2002) usually concentrates on capital costs. Thus, the recurrent costs have to be mainly covered by user fees.

**Out-of-pocket payments**

Out-of-pocket payments are an important source of health care financing in Vietnam. According to the World Health Report 2005, they account for 87.6% of private expenditure on health, which amounts to USD 16 per capita per year in 2002. The out-of-pocket payments include formal user fees, informal payments for public services, payments for private services, self-medication and pharmaceuticals. The introduction of user fees has generated additional income for the public health sector (USD 0.40 per capita per year in 2001). Fees have become a financial burden on the poor and near-poor households. The impact of this can be seen in the change in the utilization of many public health facilities over time. It was recognized at the outset that transferring the burden of financing directly to the population through user charges for services could undermine equitable access to health care. This indeed leads to poverty because of the high proportion of household expenditure being spent on health care and in some cases, because of disability as a result of the inaccessibility of treatments.

However, user fees remain a major source of health financing in Vietnam and the recently-issued Decree 10 on revenue raising in public service entities reinforces the trend, because it is also applied to health services. In addition to official user fees, a very large part of the revenues of hospitals and providers comes from informal payments by individual patients. Households report paying 14 times as much in user fees at public health facilities as the government reports in user fee revenue collection. In addition to financing public and private health services through formal and informal user fees, out-of-pocket expenses account for most of the pharmaceutical consumption in the country.

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* Own calculation based on data from World Health Report 2005
To reduce the major barrier that user fees pose to access for the uninsured to public hospitals, and especially access by the uninsured poor, the government introduced a formal policy on user fee exemption and free insurance cards for the poor. In fact, the Prime Minister has recently (on October 15, 2002) issued Decision 139 to establish a Health Care Funds for the Poor (HCFP) in each province. These funds are allocated VND 70,000 (USD 4.7) per beneficiary per year, with 75% covered by the central budget and the rest by other sources, such as individual and community contributions. Provinces can allocate HCFP resources to the direct reimbursement of health care costs, or to the purchase of health insurance cards. As of 2003, there were 11 million HCFP beneficiaries, representing 84% of the target population. Out of this group, one third had been granted health insurance cards and two thirds had been entitled to direct reimbursements of health care costs.

The HCFP is an initiative by the Vietnam Government with expectations to reduce the financial burden and prevent many poor and near-poor people from the “medical poverty trap”. However, the initiative has highlighted some issues regarding implementation that need to be improve, such as misclassification of the beneficiaries, unstable contributions to the fund from other sources (e.g. the community) and the problems with health insurance cards, etc.

Prepayment mechanisms

The government introduced compulsory and voluntary health insurance schemes in 1992. These schemes contributed approximately USD 0.71 per capita per year to national health expenditure in 2002. The aims of these mechanisms are to stabilize the financing of health services and to improve equitable access of the population to basic health care services. Responsibility for the development of both the compulsory and voluntary health insurance schemes was given to Vietnam Health Insurance, under the umbrella of the Vietnam Social Insurance. Currently the insurance schemes operate according to the following financing arrangements:

- Compulsory coverage. There is compulsory coverage of all active and retired workers in the public sector and all salaried workers in private sector enterprises with 10 or more workers. However, the coverage of private sector workers remains low. The premium is equal to 3% of one’s salary (2% paid by the employer and 1% by the employee).

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* Own calculation based on data from World Health Report 2005
- Voluntary schemes. These mainly include health insurance for school children. For the school children’s scheme, the premium is between VND 10,000 (USD 0.7) and VND 45,000 (USD 3) per school child per year.\footnote{59} Registration and contribution collection functions are handled through educational institutions and in collaboration with the Ministry of Education and Training at the provincial level. Other voluntary insurance schemes include community based health insurance schemes being implemented in some areas with premiums of about VND 60,000 – 100,000 and VND 80,000 – 140,000 per person per year in rural and urban areas respectively. However its coverage is very limited.\footnote{60}

- Schemes fully subsidized by the government. These include schemes for the beneficiaries, including meritorious persons, free cards for the poor, etc.

By the end of 2002, the total number of insured people was slightly more than 13.0 million, or 16.5% of the total population of Vietnam. Around 54% of the members of Vietnam Health Insurance were covered by the compulsory health insurance scheme and 34% of the members are school children or students in higher education, all covered on a voluntary basis through the School Health Insurance Scheme. The remaining 13% are poor people covered under the HCFP (table 4).

Table 4: Coverage of different health insurance schemes from 1998-2002.

<table>
<thead>
<tr>
<th>Unit of measure</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1998</td>
</tr>
<tr>
<td>Health insurance cover % of population</td>
<td>12.7%</td>
</tr>
<tr>
<td>Total No of the insured persons %</td>
<td>9,758,015</td>
</tr>
<tr>
<td>Compulsory persons %</td>
<td>6,069,039</td>
</tr>
<tr>
<td>Voluntary persons %</td>
<td>3,688,706</td>
</tr>
<tr>
<td>Free health insurance persons %</td>
<td>492,966</td>
</tr>
<tr>
<td>Source: Vietnam Social Insurance 2003.\footnote{40}</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 3. Methodology

3.1. Study setting

The studies were carried out in Bavi district, Ha Tay province, in the north of Vietnam, 60 km west of the capital, Hanoi. Ha Tay is one of 64 provinces in Vietnam, situated in the Red River Delta with a population of 2,330,500 living in 14 districts in 1999. Bavi district covers an area of 410 km$^2$, including lowland, highland and mountainous areas. The district consists of 32 communes with 221 villages. Of the district area, 120 km$^2$ are used for agriculture and more than 70 km$^2$ are forested. The district population was approximately 235,000 in 1999 including 4,400 children less than one year of age, 28,000 children under 5, and 39,000 women aged 15 to 49 years.

The climate in Bavi is typical of Northern Vietnam with four seasons: spring (February-April) with cool weather and drizzling rain, a warm and hot summer (May-July) with heavy rains, a cool autumn (August-October) and a cold winter (November-January). The district has three major cropping seasons: two rice crops from February to May and from June to September, and one other crop from October to February. Each crop has 4 periods: sowing, flowering, maturation and harvest. Sowing and harvest are periods of major farming activity, while flowering and maturation are relatively slow periods for farmers.

Agricultural production and livestock breeding are the main economic activities of the local people (81% of population). Major products are wet rice, cassava, corn, soya beans, green beans and fruits such as pineapple, mandarin orange and
papaya. Other economic activities are forestry (8%), fishing (1%), small trade (3%), handicraft (6%) and transport (1%). The average production was 290 kg rice per person per year in 1996 (equivalent to about VND 600,000 [-USD 40]). This is unequally distributed between communes with the highest rice production achieved in Cam Linh commune, with 459 kg rice per person per year, as compared to 190 kg rice per person per year in Minh Quang commune.

Illiteracy is low (0.4%) and 69% of the adult population has completed primary school, 21% secondary level, 9% high school and 0.6% higher or university education.

There are 32 commune health stations (CHS) in Bavi district, one in each commune. Twenty-one of these CHS are under the direct supervision of the Bavi District Health Centre, while eleven CHS are supervised and supported by three Polyclinics. The private health sector is so far officially reported to be weak in Bavi district. There are only three private pharmacies (with licenses), and a few private practitioners. However, studies show that the proportion of people using
private health care is high.\textsuperscript{62,63} It is likely that there are a lot of unlicensed and uncontrolled private practitioners, including public health staff who work privately at home.

Bavi district was selected for this study because there has been already an ongoing epidemiological field laboratory for health system research. By choosing this district for the present investigation, resources from the main study including data collectors were available.

**3.2. FilaBavi**

In 1999, an epidemiological field laboratory for health systems research called FilaBavi was set up in Bavi district as part of the Health Systems Research Cooperation Programme between Sweden and Vietnam. The programme is financially supported by the Swedish Government through Swedish International Development Cooperation Agency (Sida). The overall objective of FilaBavi was to develop an epidemiological surveillance system, which could generate basic health data, supplying information for health planning and serving as a basis and sampling frame for health systems research, especially intervention studies.\textsuperscript{61}

A cluster sampling method was used for FilaBavi. Clusters were sampling units, generally comprising a single village. However, in some cases small villages were brought together into one cluster, whilst other larger villages were subdivided, in order to give roughly comparable cluster sizes. In total, there were 352 clusters in the district with the number of households varying from 41 to 512 (mean 146) and population sizes varying from 185 to 1944 (mean 676). According to district statistics, there were on average 4.5 persons per household. The FilaBavi sample included a cohort of 67 clusters, which were randomly selected from 352 clusters in the district, comprising 11,000 households with 51,024 people out of the district population of 235,000 in 1999. This was approximately 20\% of the whole district population. After the baseline survey in 1999, the largest cluster was subdivided into 3, in order to reduce the size differences among the selected clusters. Therefore, in total, the number of clusters in FilaBavi has been 69 since then.

FilaBavi uses a data collection cycle in which each of the monitored households is visited every three months. Trained survey teams carried out a baseline survey between January and March 1999. This included socio-economic characteristics of the selected households, diseases and health conditions. A re-census survey has been repeated every second year.
At the household level, information was collected on housing conditions, water resources, latrines, expenditure, income, agriculture land, access to the nearest commune health centre and hospital, and household SES classified by the local leaders. For each household member (individual level), information on age, sex, ethnicity, religion, occupation, education, and marital status was collected. Following the baseline survey, quarterly follow-up surveys have been carried out to collect data on marital status changes, migrations, pregnancy follow-ups, births and deaths.

3.3. Methods for investigating injuries

This study was carried out within the framework of FilaBavi. In order to study the incidence of injury in a population of 51,024 with an estimated annual injury rate of approximately 20/1000 person-years, with a precision of ±0.2 % and a design effect of 1.5 (due to clustering), the required sample size is a minimum of 20,000.

Cluster sampling methods which have been widely used in developing countries without accurate lists of individual households, were applied. The two main advantages of cluster sampling in practice, especially in sample surveys of human populations and in samples covering large geographic areas, are feasibility and economy. Accordingly, using the FilaBavi study base as a platform, 30 clusters were selected randomly, resulting in an initial reported population size of 23,807 in 5,801 households. The study population included all people in every household within the 30 sampled clusters. The sampled clusters were distributed over different geographical areas of Bavi.

Four cross-sectional household surveys were carried out among the sampled communities at three-month intervals during 2000. A structured questionnaire was used to collect information on the economic consequences and related aspects of injuries. The interviews were performed during home visits by field workers. By asking the heads of the households, injury victims were identified, and in the next step the victims themselves were interviewed. If it was impossible to arrange a personal meeting, or if the victims were children, the household’s head was the informant. All cases of injuries that were reported to have occurred within three months prior (from the last visit of the interviewer to the household) to the date of interview were recorded.

The study only addressed non-fatal unintentional injuries, using the following definitions:
Methodology

**Injury case** An injury was included in the study when it was serious enough to meet any of the following conditions: need for any kind of medical care; need to stay in bed for at least one day; or need to stop regular work or activity for at least one day after injury. This definition was supported by others.

Unintentional injuries were categorized as home, traffic, work, school and other injuries according to place and mechanism of injury together with the main activity performed by the victim at the time of injury in accordance with the NOMESCO classification.

**Traffic injuries** This category included all injuries involving at least one moving vehicle of any kind. The definition used in the present study also embraced pedestrian’s injuries in an accident not involving another person or vehicle, e.g. an injury caused by slipping or stumbling. This is in accordance with the Swedish Road and Traffic Research Institute’s definition of injuries resulting from traffic accidents.

**Home injuries** A home injury was defined as an injury occurring in any home and/or residence related premises such as a flat, a house, a driveway, a garage, an out-house, a garden, yard, garden walks, and ponds.

**Work-related injuries** A work-related injury was an injury that occurred within a work place

**School injuries** A school injury was defined as an injury that occurred within a school area during school hours, during activities organized by the school.

**Other injuries** Other injuries were those occurring in an environment or during an activity not defined above, e.g. another public place, day-care centre etc.

**Severity levels of injury** In this study, the victims’ “perception” was used as a measure of the severity of injury. The respondents were asked to classify the degree of severity into one of four levels: minor; moderate; serious; and very serious. If there was any respondent who did not answer or answered “I don’t know”, the severity was classified as “not known”.

**Household** The term household in this study was defined as a group of persons who stay in the same house and use food from the same source for at least 3 months.
3.4. Methods for Costing

An incidence-based cost analysis was applied. All non-fatal unintentional injuries reported to have occurred from November 1st 1999 to October 30th 2000 were included. Costs were tracked in the short-term period from the time injuries occurred until discharge from health facilities.

In our cost estimates, “direct costs” included costs for health care and transportation. The costing system in public health care in Vietnam was used, as well as information from the victims. Total direct costs for health care were divided between three groups: the victim’s out-of-pocket costs; contributions from the government as grants; and, in some cases, contributions paid by insurance agencies. In order to avoid double counting, we had to reduce the user fees with the reimbursement paid from insurance agencies to the victims.

Indirect costs were also estimated, and included patient’s time cost, relative’s time cost, and so-called “restricted normal activity” cost. The patient’s time cost and the relative’s time cost were equal to production losses due to temporary incapacitation or due to taking care of victims. The production losses were estimated by multiplying the off-work period in days by the average gross earning per day per person.

The concept of “restricted normal activities” included all other activities (for instance education), apart from the labor market, which could not be maintained owing to the injury. Since some restricted normal activities might be more valuable than working hours and some less, it was decided that the same value as for production losses would be used in the estimations.

The total cost for the whole population in the district was estimated by multiplying the total cost for the sample by the ratio of whole population, divided by sampled population. The unit costs (cost per case) for different types of injury were calculated as the total cost for a particular type of injury, divided by the number of such injuries.

To estimate the economic burden of injuries on victims, we transformed the unit costs measured in money into unit costs measured as working time. The working time is the number of months needed for a victim to earn the money to meet the out-of-pocket cost of his/her injury.
3.5. Methods for investigating relationship between injuries and poverty

3.5.1. Do non-fatal unintentional injuries increase the risk of being poor?

The cohort of 5801 households living in 30 clusters selected for the study on injury in 2000 was followed up from baseline 1999 to re-census in 2003 (figure 4). The injury study identified 458 households that reported severe injuries, 1157 that reported moderate or minor injuries and 4186 that reported no injuries. To assess affects of injury on households’ income as well as socio-economic status (SES) classified by the local authority, 458 households reporting a severe injury were considered as an “exposed group” and 4186 no-injury households as a “control group”. The exposed group was compared to the control group in terms of changing income between 1999 and 2001 or 2003 and socio-economic status between 1999 and 2001.

Figure 4. Available data in FilaBavi.

Measurement of social mobility

For the estimations of social mobility, we analyzed at the household level using the SES classification provided by the local authority. The validity of this classification has been previously assessed.74

The exposed and control groups were divided into four sub-groups: “poor injured”, “poor non-injured”, “non-poor injured” and “non-poor non-injured”. The “poor injured” included households classified as poor in 1999 and reported injuries in 2000, while the “poor non-injured” included households classified as poor in 1999 and reported no injury in 2000. Similarly, The “non-poor injured” included households classified as non-poor in 1999 and reported injuries in 2000 and the “non-poor non-injured” included households classified as non-poor in 1999 and reported no injury in 2000. The relative risk (RR) of dropping into
poverty between the “non-poor injured” and the “non-poor non-injured”, as well as RR of escaping from poverty between “poor non-injured” and “poor injured” were calculated.

Measurement of income development

Self-reported income was used, and the questionnaire had a format and content as described in table 5. The probability of being injured depends not only on contextual and household factors, but also on personal characteristics. Thus for estimations of effects of injury on income changes, individual level analysis with household income was applied using the propensity score matching method.

Table 5. Question to estimate household’s income.

<table>
<thead>
<tr>
<th>Estimate your household’s income last year:</th>
<th>VND</th>
</tr>
</thead>
<tbody>
<tr>
<td>- From agriculture</td>
<td>VND</td>
</tr>
<tr>
<td>- From breeding</td>
<td>VND</td>
</tr>
<tr>
<td>- From forest</td>
<td>VND</td>
</tr>
<tr>
<td>- From handicraft</td>
<td>VND</td>
</tr>
<tr>
<td>- From fishing</td>
<td>VND</td>
</tr>
<tr>
<td>- From small trade</td>
<td>VND</td>
</tr>
<tr>
<td>- From salary/allowance</td>
<td>VND</td>
</tr>
<tr>
<td>- From other source, specify...</td>
<td>VND</td>
</tr>
</tbody>
</table>

The propensity score matching method is implemented in two steps. Firstly, the conditional probability of having an injury (i.e. the propensity score) must be calculated. Secondly, the nearest neighbors by proximity to the injured individuals’ propensity scores are selected from the control group of uninjured individuals, and the average difference in the change in income for the nearest neighbors is calculated.

Paper II has shown that personal characteristics (e.g. age, sex), household characteristics (e.g. previous socio-economic status) and contextual characteristics (e.g. living in a mountainous area) affect the risk of being injured. Thus, the conditional probability of being injured, based on those characteristics, has been separately calculated for both non-poor and poor individuals using a logit estimation.

The nearest neighbour matching was then performed imposing a caliper of 0.001 in order to ensure common support (i.e. that there are control group individuals
with propensity scores to which the individual suffering the injury can be matched), and the average difference in the change in income between 1999 and 2001 or 2003 respectively was calculated. In addition, 95% confidence intervals were obtained by bootstrap methods and the bias-corrected confidence intervals are presented.

3.5.2. Does poverty lead to non-fatal unintentional injuries?

Taking advantage of the prospective cohort study on injuries in 2000, a retrospective analysis was carried out to see whether poverty was associated with an increased risk of the previously recorded injuries. Households were classified into five groups (rich, upper middle, middle, poor and very poor) by the local authority in 1999. For this assessment of incidence rate ratios between the groups, using a Poisson regression model, “poor” and “very poor” were amalgamated, as were “rich” and “upper-middle”, due to very few households falling into the extreme categories.

Both univariate and multivariate analyses were used to calculate incidence rate ratios. The outcome (or dependent) variable was the number of injuries observed per individual, and the rate multiplier was the individual time under surveillance. The model allowed for any potential effect of injury incidence being clustered by households.

Risk factors for injury are commonly grouped into four groups: biological; behavioural; household; and environmental (or contextual). Variables representing each of those groups were used in the present study as explanatory variables. Age group was used as the biological variable and sex as the behavioural, while the household variable was economic status according to the local leaders’ classification, and the environmental variable was geographical location (mountains versus lowlands).

3.6. Methods for eliciting people’s preferences for different health care financing options

A stated preference discrete choice model was applied. Respondents were presented with a series of options (a choice set) and were asked to choose their preferred option. The choice set included three options regarding different health care financing options as described in box 1. “A” was an out-of-pocket model similar to the present in Bavi whilst “B” and “C” had identical benefit packages but a different basis for the financing schemes. B was a compulsory health insurance scheme based on community rating, and C a voluntary scheme based on risk rating. The household cost for joining B or C was not presented since this...
would require detailed assumptions about tariffs as well as knowledge about the household’s income and demographic composition.

From each cluster of FilaBavi, 30 households (50% of which were headed by women) were randomly selected for this survey in 2004. The heads of households (decision-makers in households) were the respondents to interviews. They were informed in detail about the choice set and asked to choose their preferred option. If the head was absent, his/her spouse was interviewed instead.

To better understand what people think and with the ultimate goal to establish a health insurance scheme in line with people’s desires, a qualitative question was asked about reasons for the choice made. All given reasons were noted and later analyzed using a content analysis.

**Box 1: Different health care financing options**

A. Households pay the full cost for each visit to the Communal Health Station or District Health Centre and for medicine prescribed by the doctor. Households that are not able to pay will not receive any services. A service is given at cost price – there is no profit. There are no exemption cards. The total annual cost for a household will depend on how many members will be ill and will visit the Communal Health Station or District Health Centre during the year.

B. All households in the district are compulsory (obliged) to pay an annual premium to a local health care fund when crops are sold. There are no exemption cards. The fee is based on how much income the households have. The higher income, the higher the fee. Thereby all members in the household are entitled to free health care at the Communal Health Station or District Health Centre and free medicine if prescribed by the doctor. If care at higher levels is needed, the insured patient will be supported by an amount based on the cost per bed day at the District Health Centre level. The fund will be managed by the Commune People Committee (or a voted representative).

C. Each household can choose to voluntarily pay an annual premium to a local health care fund when crops are sold. The fee is based on the number of people in the household and the fee is higher for children under five and elderly over 65 because they are expected to use more health care. All persons in the household paying the fee are entitled to free health care at the Communal Health Station or District Health Centre and free medicine if prescribed by the doctor. If care at higher levels is needed, the insured patient will be supported by an amount based on the cost per bed day at the District Health Centre level. The fund will be managed by the Commune People Committee (or a voted representative).
Determinants of the preferences were also collected. They were variables that proximately measure three of the four prerequisite factors (not price) for health insurance demand, including the individual’s degree of risk aversion, the perceived magnitude of the loss relative to income, and information concerning the likelihood that an illness will actually occur. Expected influences on the preferences of the determinants are presented in table 6. We strove for a two-step hypothesis, first the choice between out-of-pocket and insurance, and secondly the choice between compulsory and voluntary. Since the benefit packages were equal in scenarios B and C, we assume that people chose between them on the basis of the financing schemes.

The influence of the determinants on people’s preferences was analyzed using logistic and nested logistic regressions. A logistic regression was used for comparison of choices between health insurance (both variants) and out-of-pocket. The nested logistic regressions were used to deal with the two-step hypothesis, in order to compare the choices between compulsory health insurance and out-of-pocket; between voluntary health insurance and out-of-pocket; and between compulsory and voluntary health insurance.
### Table 6. Determinants of people’s preferences.

<table>
<thead>
<tr>
<th>No</th>
<th>Variables</th>
<th>Types</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head</td>
<td>Binary</td>
<td>In the study plan heads were chosen as respondents. However, in reality it was difficult to meet all the heads and the absent head’s spouse was interviewed instead. Thus the variable “head” was included to check if heads and spouses answered differently.</td>
</tr>
<tr>
<td>2</td>
<td>Sex</td>
<td>Binary</td>
<td>Women prefer health insurance based on community rating because of higher risk of illness.</td>
</tr>
<tr>
<td>3</td>
<td>Age</td>
<td>Continuous</td>
<td>Older people prefer health insurance based on community rating because of higher risk of illness.</td>
</tr>
<tr>
<td>4</td>
<td>Farmer</td>
<td>Binary</td>
<td>Farmers prefer health insurance because of the possible magnitude of income loss if ill. No possible reason was found to hypothesize that they prefer health insurance based on community or risk rating.</td>
</tr>
<tr>
<td>5</td>
<td>N° of household member</td>
<td>Continuous</td>
<td>The more members the households have, the higher the total risk of illness and thus the household prefers health insurance based on community rating.</td>
</tr>
<tr>
<td>6</td>
<td>N° of Children 0-5 years</td>
<td>Continuous</td>
<td>The more children 0-5 years the households have, the higher the total risk of illness and thus the household prefers health insurance based on community rating.</td>
</tr>
<tr>
<td>7</td>
<td>N° of Elderly 65+</td>
<td>Continuous</td>
<td>The more elderly the households have, the higher the total risk of illness and thus the household prefers health insurance based on community rating.</td>
</tr>
<tr>
<td>8</td>
<td>Poor</td>
<td>Binary</td>
<td>The poor prefer health insurance based on community rating because of higher risk of illness.</td>
</tr>
<tr>
<td>9</td>
<td>Rich</td>
<td>Binary</td>
<td>The rich prefer health insurance based on risk rating because of lower risk of illness.</td>
</tr>
<tr>
<td>10</td>
<td>HH income</td>
<td>Continuous</td>
<td>The more income the households have, the lower the total risk of illness and thus the household prefers health insurance based on risk rating.</td>
</tr>
<tr>
<td>11</td>
<td>More than primary school</td>
<td>Binary</td>
<td>People with more than primary school education prefer health insurance based on risk rating because of lower risk of illness.</td>
</tr>
<tr>
<td>12</td>
<td>Chronic disease</td>
<td>Binary</td>
<td>Households having people with chronic diseases prefer health insurance based on community rating because of higher risk of illness.</td>
</tr>
<tr>
<td>13</td>
<td>In need of health care</td>
<td>Binary</td>
<td>Heads of household having people in need of health care during 12 months prior to the interview date prefer health insurance based on community rating because of higher risk of illness.</td>
</tr>
<tr>
<td>14</td>
<td>Insurance experience</td>
<td>Binary</td>
<td>Heads of households having people with insurance experience prefer health insurance because of higher degree of risk aversion.</td>
</tr>
<tr>
<td>15</td>
<td>Radio</td>
<td>Binary</td>
<td>Households having a radio are richer and thus prefer health insurance based on risk rating because of lower risk of illness. They are also better informed about insurance (the insurance is often announced by radio).</td>
</tr>
<tr>
<td>16</td>
<td>TV</td>
<td>Binary</td>
<td>Households having a TV are richer and thus prefer health insurance based on risk rating because of lower risk of illness. They are also better informed about insurance (the insurance is often announced by TV).</td>
</tr>
</tbody>
</table>
3.7. Methods for eliciting people’s willingness to pay for health insurance

The willingness to pay (WTP) questions were of a take-it-or-leave-it nature in relation to a certain bid (insurance cost) followed by an open-ended question about the respondents’ maximum WTP (appendix). The respondents were asked firstly: Given that option B or C is chosen, would you be willing to pay VND 45,000 (USD 3) per month for your household? Secondly, they were given an open-ended question about their maximum WTP in each option. The bid to the respondents was calculated based on results from a study on average health care costs for households in FilaBavi.22

Determinants of people’s WTP were variables that proximately measure the prerequisite factors (not including price) for health insurance demand,79 including the individual’s degree of risk aversion, the perceived magnitude of the loss relative to income, information concerning the likelihood that an illness will actually occur (perceived risk), and income.

There was of course no clear border between groups of proxy variables and between the prerequisite factors. One variable could influence WTP through more than one prerequisite factor, while the prerequisite factors could also influence each other. However, we strove to group and hypothesize as follows: proxy variables collected to determine the degree of risk aversion and the perceived magnitude of the loss relative to income were “insurance experience” and “farmer” respectively. We hypothesized that respondents with insurance experience had higher WTP compared with those without experience and that farmers’ WTP was higher than that of others. For income, proxy variables collected were “rich” and “poor” as classified by the local authority. The rich were hypothesized to have higher WTP, while the poor to have lower WTP than otherwise. Finally, collected variables proximately measuring the perceived risk were “sex”, “age”, “education”, “household members”, “children 0-5 years”, “elderly 65 years and above”, “chronic” and “in need of HC”. A higher WTP was expected from female, older or higher educated respondents and from those individuals from households with more members, more children, more elderly, any chronic patients, and any use of health care during the 12 months prior to the interview.

Due to the “heap effect” – whereby respondents appear to concentrate on convenient values – interval regression models were used to analyze the influence of the determinants on people’s WTP for health insurance.81
3.8. Quality control

All questionnaires used in FilaBavi generally, and in this study in particular, were tested by specific pilots. The versions developed through this piloting were then discussed with interviewers. The purpose of the discussion was for training the interviewers and further refining the questionnaire. Before going to the field, the interviewers were trained twice on how to use and complete the questionnaires using a role-play technique.

A monitoring system was set up for data quality control by researchers and five full-time field supervisors. The field supervisors had various kinds of medical qualification and were trained to detect and deal with problems in the field. The researchers checked 15% of the completed questionnaires randomly and the field supervisors checked all collected questionnaires. All checked questionnaires with missing information or errors were returned to interviewers for correction. To assess the reliability of collected information, 5% of the study population was randomly selected for re-interviews. Almost all of the original data was found to be reliable.

3.9. Ethical clearance

The Research Ethics Committee at Umeå University gave ethical approval for the FilaBavi household surveillance system, including data collection on vital statistics (reference number 02-420). Specific approval for the injury investigation was given by Karolinska Institute in Stockholm, and approval for the stated preferences survey was given by the Research Ethics Committee at Umeå University (§86/04). All studies receive ethical approval from the Hanoi Medical University and Ministry of Health in Hanoi. The interviewers obtained informed consent for the interviews, from heads of household and injury victims.
Chapter 4. Methodology consideration

4.1. Injury investigation

In this study, only non-fatal unintentional injuries were addressed. Fatal injuries were excluded because the sample size was not large enough for a mortality study. A related study is reported elsewhere about cause-specific mortality for the whole FilaBavi population in 1999. For non-fatal injuries, unintentional injuries comprise the greatest majority compared to intentional injuries. The investigation of intentional injuries would require different methods, which are likely to incorporate qualitative approaches.

In Vietnam, especially in a rural district without any injury register system, community-based surveys of unintentional injuries are a feasible way to calculate the economic burden. Although a hospital-based cost study could be used, giving more accurate costing for those treated in hospital, this kind of study would be incomplete because there is a lot of injury cases not treated in hospital. A large proportion of victims either treat themselves or use some other kind of health care outside hospitals. According to a Vietnamese study, the self-medication rate was 53.7%, a private health care service was used by 14.8%, and traditional healers were used by 1.3%. Only 30.2% of the victims in that study went for treatment to either the hospitals or the commune health stations, where information is recorded in a hospital-based system. Community-based surveys can overcome this weakness and cover a much higher proportion of total injuries. However, community-based surveys like this one also have inherent weaknesses. One problem is recall bias. There are three major sources of error in recall data: omission, rounding, and "telescoping". Omission can be simply the result of forgetting, which is most likely to occur with long recall periods, low-involvement events and less severe problems.

This type of recall bias may cause an underestimation of incidence for injuries which may lead to an underestimation of costs for injuries in this study. In a study from Ghana, Mock et al. showed that “longer recall periods significantly underestimate the injury incidence compared to shorter recall periods. Shorter recall periods (1 – 3 months) should be used when calculating the overall non-fatal injury incidence.” A similar conclusion was also reported by Moshiro et al. in Tanzania. Accordingly, a three-month recall period was applied in the current study. Even if there were some minor injury cases that were forgotten, the underestimation of costs for injuries would not be serious since the cost is closely
correlated to the severity of injuries. The less the severity is, the less the cost will be.

The second source of recall error, rounding, reflects a tendency for people to recall events or behaviour in terms of commonly used increments or multiples of time or quantity. For example, time may be reported in terms of hours or half-hours rather than minutes; a month may be reported as 30 days, or vice versa; days may be reported in terms of weeks, or months; quantities may be reported as so many dozen, or in terms of multiples of 5, 10 or 100, and so on. This type of recall bias may influence the reported injury costs as well as the number of off work days. However, this bias is hardly serious during a short recall period of 3 months.

Finally, telescoping, or more correctly, "forward" telescoping, is the displacing of events in time towards the present. In other words, events occurring outside of the specified time-frame are included in the time-frame, leading to over-reporting of events. This effect, also known as "border bias", has been widely reported.

Consequently, one may expect overestimation in this study due to "forward telescoping" recall bias. Loftus and Marburger show that describing a “landmark event” to respondents reduced the telescoping even better than the provision of a specific calendar date did. Accordingly, a landmark event in combination with specification of a calendar date, were used in this study. For the purpose of this study, the landmark was the last visit made by an interviewer to the household. Subsequently, the forward telescoping recall bias could be minimized.

4.2. Injury cost estimation

The levels of precision in hospital costing range from “micro-costing” (most precise) to “average per diem” (least precise) (box 2). The current study aimed to estimate costs of all non-fatal unintentional injuries and we decided to use the average per diem over all categories of patient, as this was the only information available in the Bavi District Health Centre. It was assumed that the governmental costs for health care were equal in all hospitals, independent of level. However, in reality cost is dependent on the level of care, therefore the estimated cost for those who were treated at the provincial or central levels was underestimated. On the other hand, for those who were treated at communal level, the cost was probably overestimated.
Adopting the principles from Drummond et al., the indirect costs were estimated as the production losses and restricted normal activities. Similar approaches have been recommended by the COST 313 action of the European Commission, and in Sweden by Stockholm County Council. Most of the people in the study were farmers and it is not clear how the production losses should be estimated in this case. It can be argued that some days during a growth period for a particular crop are very critical, for instance the mature crop may rot if not promptly harvested. In reality, however, to have a good crop the farmers have to take care of crops during the whole season. Furthermore, in Bavi District, most farmers can earn money from other work such as feeding animals, handicraft, and working outside the farm for wages, etc. Thus we used the same average income per day for estimating the costs of production losses.

Methodology consideration

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Obviously, the value of time used for normal activities is greater than zero. For some people the value might be greater than market-determined wages; for some it might be less. We have found neither normative arguments implying that the value of time of a person should be reflected by his/her income nor other motives to weigh the value of time differently for different individuals. Hence, for this study, we decided to use the same value as for production losses, the average income per day, for the estimation of restricted normal activity cost. Conventionally, the indirect costs for children and the elderly as production losses are not calculated, but we did so for two reasons. Firstly, farming as practiced in this setting includes many activities that can be done by people of different ages. Taking care of animals or watering vegetables in the garden, for example, can be done by small children as well as by older people. Hence, in an economy such as the one in Bavi, the workforce cannot be defined by general age rules. Secondly, one ultimate goal of a civilized society is to support individuals in their “production of quality of life”. This quality of life can be achieved by working or doing domestic chores, telling stories to grandchildren or taking part in cultural activities. Hence, we argue that injuries restricting these kinds of activities imply a production loss.
4.3. Poverty classification

How to classify household economic status or measure poverty remains as a difficult task. There are many ways to approach this, however three methods have commonly been used in the context of injuries: expenditure quintiles, income quintiles and local leaders’ classification.  

Income data are not easy to collect and income alone is not enough to measure resources available to households. Additionally, income measures have been reported to be of low reliability due to underestimations. Measures of poverty using household expenditure have become more widely used because information on expenditure is easier for respondents to give. Expenditure measures, however, also have limitations since interviewers may have to administer lengthy interviews to collect detailed information on hundreds of purchases. Furthermore, expenditure does not reflect access to non-cash resources, which may considerably contribute to living standards, nor the effects on family well-being of state-provided goods and services. A study from Sierra Leone showed that households recalled food expenditure relatively consistently, while other major expenditure was commonly under-reported.
A person may be considered poor if his or her consumption or income level falls below a minimum level necessary to meet basic needs. This minimum level is usually called the “poverty line”. Accordingly, if income or expenditure is used, there could be misclassification for those who are not poor but belong to the poorest quintile.

Poverty measured by local leaders’ estimation is a simple income proxy method commonly used in Vietnam. It can solve some of the problems connected with income and expenditure measures by combining quantitative and qualitative approaches. Living in a community, local leaders can classify poverty qualitatively. In addition, using available figures about land area ownership and income from rice production, which play a crucial role in the total income of poor households, they can classify poverty quantitatively. Classification by local leaders has been used in this thesis in the belief that this minimizes misclassification bias. However, another bias that one can expect is that households have strategic reasons to underestimate their agricultural production because certain benefits are provided if a household is classified as poor, such as exemption from user fees in health care. However, this bias is also likely to be quite constant in the short run.

Self-reported income is notoriously for being underestimated, and we believe that this is the case in the present study. Nevertheless, there is no reason to suspect that the magnitude of underestimation varies considerably between the studied years. The trend is certainly valid but the absolute level is too low. This means that our calculations of the total absolute losses due to injuries are likely to be underestimated.

4.4. Design

The strengths of this study are the cohort design, allowing longitudinal follow-up and calculation of incidence rates on an individual person-time basis, particularly in paper II, where dates of the outcome occurrence are recorded. In a cohort study of this kind we can assess not only the association between two factors, but also we can be sure that the economic assessment was made before accidents occurred, rather than as a consequence of injury or disability. In addition it was possible to minimise seasonal effects by using surveillance data over a whole year.

However, a problem due to the prolonged data collecting periods may affect the order between injury and income loss in paper III. That is, what is classified as 2001’s income is in reality the previous year’s income reported in interviews undertaken from April to June 2001. Thus the measurement periods for income
2001 and injuries are partly overlapping, while no overlap exists between injuries and income in 2003.

Sensitivity analyses were performed to investigate the consequences of overlapping (paper III) and to cross-check the results from different social economic classifications (paper II). In paper III, injuries that occurred before the April 1, 2000 were analyzed separately. The results showed that the pattern was almost identical to the one based on the complete data.

Similarly, to cross-check the results in paper II, the calculations presented were repeated with leaders’ classification replaced by reported income. The main results did not change appreciably. This probably reflects the high correlation between leaders’ classification and reported income.

There are two potential diluting biases. Firstly, some households with injuries may be falsely classified in the control group. These are households with injuries that occurred after the date of the 1999 economic classification but before the 2000 injury study. Secondly, measures of self assessed health are known to be influenced by social position. The better the position, the more problems reported. Thus we can expect an underreporting in the poor group, and this could result in some “injured” cases being present in the control group. This dilution should not be a serious problem for paper III since the underreporting is very unlikely to occur with severe cases. However, it may dilute the association between poverty and injury in paper II where minor injuries are included.

There is also a potential selection bias. This bias can destroy the results because confounders may distribute differently between “exposed” and “control” groups, particularly in paper III. Thus, the results on social mobility should be considered as a description needing further study. However, the bias has been minimised in the results on affects of injury on income development by the propensity score matching methods. Propensity score matching estimators are used to evaluate treatment effects by comparing outcomes of exposed individuals to similar persons in the control group. In this case exposed represents being injured, and the outcomes are the difference in the change in income between 1999 and 2001, and 1999 and 2003, respectively, for exposed individuals compared to similar individuals in the control group. Comparison group individuals were determined to be suitable matches for exposed individuals if they had similar observed characteristics as evaluated by some distance metric, in this case the propensity score from a logit model.
4.5. Elicitation of people’s preferences for different health care financing options.

Several stated preference techniques have been developed for eliciting consumer’s preferences and measuring WTP for goods and services. All these techniques involve asking respondents to consider one or more hypothetical options and to express their preferences through surveys. There are three different groups of stated preference techniques: contingent valuation, conjoint analysis and choice modeling (including choice experiment). According to Merino-Castello and Bateman et al., conjoint analysis requires the individual to rate or rank each alternative product, while choice modeling asks the consumer to choose one among several alternative products. In this respect, choice-based approaches are based on a more realistic task that consumers perform every day, the task of choosing a product from among a group of competitors. This is one of the reasons why choice-based approaches are better than, or at least more preferred to, preference-based approaches.

According to Ryan (2004), choice experiments have been applied to address a wide range of issues in the field of health. The technique has been well received by policy makers and validity has been addressed at a number of levels. High levels of internal validity – that is, results consistent with a priori expectations – have been recorded. Convergent validity – that is, results move in line with those of other instruments measuring the same construct – has been demonstrated. At the theoretical level, three key axioms underlying the technique – completeness, stability and rationality – have been investigated with encouraging results.

Having considered the literature, the choice experiment technique was applied to elicit people’s preferences for health care financing options in rural Vietnam – out-of-pocket payment, compulsory health insurance based on community rating and voluntary health insurance based on risk rating. With a large sample size, a carefully developed and tested questionnaire, and a well-trained and skillful team of interviewers from FilaBavi, it is likely this study provides valuable results. However, an important question that remains regarding the use of any survey technique is that of external validity – do individuals behave in reality as they state in a hypothetical context? Although, limited research has been conducted in this area and future research is clearly important, experience from other areas such as the valuation of environmental goods and services implies that we can be optimistic.
4.6. Elicitation of people’s willingness to pay for health insurance.

Values for WTP can be directly or indirectly estimated. Indirect methods are based on revealed preference, where market prices or behaviours are observed. Direct methods mean asking people for their maximum WTP for a hypothetical good or service. These are so-called contingent valuation methods (CVM), which are widely used with respect to non-market goods. The approach is based on interviews with a representative sample in an area and the interview mainly consists of:

- A detailed description of the good(s) being valued and the hypothetical circumstances under which it is made available to the respondent.
- Questions which bring out the willingness to pay for the good(s) to be provided.
- Questions about the respondent characteristics (for example: age, income…), their preference relevant to the good(s) being valued, etc. This information is then generalized for a representative group of people.

Accordingly, the CVM was applied in the present study to elicit people’s WTP for joining in the hypothetical health insurance schemes either based on community or risk rating given each will be implemented.

Ideally in a contingent valuation (CV) survey, respondents make a hypothetical choice in the same way they would if faced with an actual decision situation. However, systematic errors can occur in the design as well as in the execution of a CV survey, therefore the possibility of biases in such a survey is large. Some biases overestimate, while others underestimate WTP. According to literature, the following potential biases which concern the design and elicitation technique of the CV survey exist: yea-saying, protest answers, starting point bias, information bias and strategic bias.

Yea-saying is provoked by the fact that respondents seem to have the tendency to answer with yes when responding to discrete CV questions in order to express their motivations instead of giving their true preferences. On the other hand, the protest answers are provoked by some respondents answering with no or refusing to answer at all. These two kinds of bias are induced by elicitation techniques with only a yes/no response alternative. They are both less likely in this study because respondents were given the possibility to express their support for the scenarios regardless of price and follow-up questions concerning their maximum WTP.
Starting point bias occurs when a bid is given to the respondents and thereby a cue is suggested to where the WTP may lie. This bias may be accentuated by a tendency to the yea-saying. The starting point bias seems to be minimized in this study since the yea-saying is less likely as discussed above. This is also indicated by the results that most respondents give a WTP far lower than the bid they were given. Only 15% (for compulsory health insurance) and 13% (for voluntary health insurance) of respondents stated a WTP equal to or higher than the bid they were given (paper V, table 2). The average WTP was less than half of the bid.

Crucial for a CV survey is the information respondents have regarding the hypothetical commodity. Since the commodity being valued is normally a non-market good, respondents may not be very familiar with it. If estimated WTP is insensitive to familiarity with the commodity being valued, then it should not depend on whether informed or uninformed respondents value the commodity. However, studies show that persons who are unfamiliar with a good or service being valued cannot give valid and reliable answers to WTP questions. Therefore, in our study respondents were clearly described about the scenarios before asking the valuation questions. The interview process was closely monitored and the interviewers did not report any problems in making the bid understandable for the respondents. In addition, a qualitative question was asked about why they made their choices. Their answers implied that they fully understood the hypothetical scenarios (paper IV). However, the respondents, probably those who preferred out-of-pocket payment for health insurance, may not have trusted the scenarios because they generalized the problems of the existing health insurance systems in Vietnam to the hypothetical ones (paper IV). In reality, when using insurance, patients can risk longer waiting times and lower quality of care. They also run the risk of still having to pay considerable amounts out-of-pocket e.g. in the form of gifts to the staff. With these in mind the respondents may not have believed or trusted that the health insurance described in the scenarios would deliver the benefits promised. If so there is an information bias. The WTP that respondents stated may relate to benefits that are smaller than the intended benefits in the scenarios, and therefore the WTP may be underestimated.

There is another bias that may also underestimate the WTP. This “strategic bias” occurs when respondents purposely state WTP higher or lower than they would really pay because, in their self-interest, respondents want to influence the study results. 21% of respondents gave a WTP equal to zero for the compulsory insurance and 30% gave a WTP equal to zero for the voluntary insurance. Almost all of these respondents (90%) belong to the group preferring the out-of-
pocket financing option over the health insurance options. It may be the case that some of these respondents voted again for their preferred option when they stated zero WTP, even though the question was about their WTP given that the decision to implement a different health insurance option had been made.

If the biases discussed above are present, it seems that only WTP of people who preferred out-of-pocket to health insurance option may be underestimated, thereby the mean WTP of the whole population may be underestimated. However, the WTP of people who preferred health insurance to the out-of-pocket option is less likely to be affected.
Chapter 5. The injury poverty trap: Causes and consequences

Injury and poverty are both causes and consequences of each other, forming a vicious circle (figure 1). This chapter presents and discusses the results on the relationship between injury and poverty.

5.1. Costs of non-fatal unintentional injuries

5.1.1. Total costs

Total costs, number of injuries, and unit costs for different types of injury are given in table 7. In the sampled communities, the total annual cost of all the unintentional injuries was VND 345,712,000 (USD 23,842), with an average cost per injury of VND 198,685 (USD 13.7). Extrapolated to the whole population of Bavi District, the total cost would amount to VND 3,412,539,000 (USD 235,347). Health care accounted for 50% of the total cost, transportation for 2% and indirect costs for 48%. With the largest number of cases, home injuries gave rise to the greatest cost, accounting for 45% of the total, followed by traffic injuries (38%), work-related injuries (10%), “other” injuries (4%), and school injuries (3%).

Table 7. Total and unit costs for different types of injury (VND000; USD 1-VND 14,500).

<table>
<thead>
<tr>
<th>Types of cost</th>
<th>Types of injury</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Home</td>
<td>Traffic</td>
<td>Work</td>
<td>School</td>
<td>Other</td>
<td>Total</td>
</tr>
<tr>
<td>Direct costs:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs for health care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>paid by victims</td>
<td>57,441</td>
<td>60,808</td>
<td>9,631</td>
<td>4,389</td>
<td>4,551</td>
<td>136,820</td>
</tr>
<tr>
<td>paid by insurance</td>
<td>2,785</td>
<td>2,533</td>
<td>590</td>
<td>618</td>
<td>120</td>
<td>6,646</td>
</tr>
<tr>
<td>paid by government</td>
<td>14,567</td>
<td>12,468</td>
<td>1454</td>
<td>291</td>
<td>581</td>
<td>29,361</td>
</tr>
<tr>
<td>Costs for transportation</td>
<td>3,680</td>
<td>2,277</td>
<td>549</td>
<td>236</td>
<td>125</td>
<td>6,867</td>
</tr>
<tr>
<td>Indirect costs:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victim’s time</td>
<td>39,400</td>
<td>26,776</td>
<td>13,287</td>
<td>1,977</td>
<td>4,208</td>
<td>85,648</td>
</tr>
<tr>
<td>Relative’s time</td>
<td>12,757</td>
<td>8,194</td>
<td>1,961</td>
<td>763</td>
<td>917</td>
<td>24,592</td>
</tr>
<tr>
<td>Restricted normal activities</td>
<td>25,997</td>
<td>17,018</td>
<td>7,192</td>
<td>1,055</td>
<td>4,516</td>
<td>55,777</td>
</tr>
<tr>
<td>Total</td>
<td>156,627</td>
<td>130,074</td>
<td>34,664</td>
<td>9,329</td>
<td>15,018</td>
<td>345,712</td>
</tr>
<tr>
<td>Number of injuries</td>
<td>746</td>
<td>558</td>
<td>267</td>
<td>78</td>
<td>91</td>
<td>1,740</td>
</tr>
<tr>
<td>Unit costs</td>
<td>210</td>
<td>233</td>
<td>130</td>
<td>120</td>
<td>165</td>
<td>199</td>
</tr>
</tbody>
</table>
By transforming the one-year economic costs of unintentional injuries in Bavi District into the annual income per person, we have a picture of the economic burden of unintentional injuries on households. As the average monthly income per person was VND 158,000 (USD10.9) we infer that the average annual income per person is VND 1,896,000 (USD130.8). The one-year economic costs of unintentional injuries in Bavi District are thus equal to the yearly income of 1,800 people. Of these costs 90% fall on victims, only 8% on the government, and 2% on the insurance agencies. Looking at health care costs only, 79% were paid out-of-pocket, reflecting correctly the health care financing situation in Vietnam.117

5.1.2. Cost distribution

Injuries to males accounted for the larger share numerically (57%) as well as of total cost (56%), although the average unit costs for males and females were similar (VND196,243 [USD 13.5] and VND 201,854 [USD 13.9]) (paper I, table 2). The greatest gender differences were found in school injuries where males accounted for 80%, despite the fact that both genders spent equal time in the school system. It was also assumed that boys and girls have the same “restricted normal activity” costs. Men and women also differed substantially in “other” injuries, where men accounted for 70%, while women accounted for 30%. For men, the highest proportion of costs occurred in the age group 19 – 39 (47%), while for women, it was in the age group 60 and above (37%). Men between 19 and 39 years of age had the highest unit costs, while the highest unit costs among women were found in the age group of 60 and above. Specifically, for home, traffic and work-related injuries, women 40 years and older accounted for a higher proportion of the total cost than younger women, while the share of total cost for men 39 years and younger was greater than that of older men.

Very serious injuries had the highest unit costs, especially in traffic injuries where unit cost was VND 1,501,000 (USD 103.5). The unit cost was correlated with the severity of injury. Very serious injuries accounted for 17% of the total cost, but constituted only 2.5% of all injuries, while minor injuries accounted for only 8% of the total cost but made up 25% of all injuries. Serious injuries accounted for 47% of the total cost and made up 25% of all injuries, while moderate injuries accounted for 28% of the total cost and constituted 47% of all injuries (paper I, table 4).
Comparisons with similar studies from low-income countries have not been possible owing to a lack of previous work in this area. Although similar methods have been applied in high-income countries, substantial differences apply in many relevant respects.

Therefore, it seems unreasonable to compare our results directly with those from high-income countries in terms of total injury cost. However, cost distribution by cost holders, age, sex, severity level and types of injury can be compared. A study was performed in Motala municipality, Sweden, recording all unintentional injuries occurring within a 12-month period and requiring medical care. Costs for loss of production were dominant and accounted for 77% of the cost to society, while medical costs amounted to a total of 23%. In the current study, costs for loss of production were 32%, while costs for health care were 50% of the total cost.
In 1991, a study\textsuperscript{118} at Rauma Municipality, Norway estimated costs using hospital accounts and insurance outlays. Traffic injuries accounted for the largest proportion at 36%. In the current study, traffic injuries accounted for 44% – the largest proportion of the total cost. Home injuries, which accounted for 43% in our study, caused 29% of the total cost in the Norwegian study, possibly reflecting a safer domestic environment.

Another study investigated the health care costs of injuries in a Swedish population.\textsuperscript{119} All unintentional injuries in the district, treated at a university hospital, were registered. People aged 60 and above were compared with those younger than 60. The elderly comprised slightly less than 20% of the population, but accounted for 42% of the costs. In the current study we found that the elderly comprised 10% of the population but 16% of the costs.

The differences in the results in the current study and the “high-income” studies discussed above could be due to substantial differences in socioeconomic and injury patterns, as well as research approaches. However, despite these differences they show two similar findings. One is that men account for a higher share of the total cost. A reason for this could be that the incidence of unintentional injuries was higher among men than among women. The other similarity is that the higher the severity levels of injury, the higher the unit cost.

5.1.3. Economic burden on household

In table 8, the unit costs for different severity levels and different types of injury were transformed to the equivalent number of working months to show the economic burden of injuries on the victims. In the case of a minor injury, a victim needed to work for 0.3 months to earn the money that the minor injury cost. If someone suffered a very serious injury, 7.3 months of work was needed to cover the cost.

Table 8. Unit cost of injuries measured as working time (months) classified according to types of injury and severity levels of injury.

<table>
<thead>
<tr>
<th>Types of injury</th>
<th>Severity levels</th>
<th>Home</th>
<th>Traffic</th>
<th>Work</th>
<th>School</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
<td>0.3</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.7</td>
<td>0.8</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Serious</td>
<td>2.1</td>
<td>2.6</td>
<td>1.5</td>
<td>1.4</td>
<td>1.7</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Very serious</td>
<td>7.8</td>
<td>8.6</td>
<td>2.7</td>
<td>-</td>
<td>5.3</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>Not known</td>
<td>6.9</td>
<td>1.2</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>All levels</td>
<td>1.2</td>
<td>1.3</td>
<td>0.7</td>
<td>0.7</td>
<td>0.9</td>
<td>1.1</td>
<td></td>
</tr>
</tbody>
</table>
Furthermore, if someone has unfortunately experienced a traffic injury with very serious consequences, he/she has to work for 8.6 working months to recover the costs. Victims and their families are likely to experience significant difficulties in everyday life as a result of this economic pressure. These results in some ways demonstrate the concept of a “disease poverty trap” – in this case, an “injury poverty trap”. A severe disease or injury is expensive to treat and many people have substantial problems finding the required money. Consequently, some people do not receive appropriate care and others try to finance it by loans or by selling valuable assets such as land, cattle, and so on. Thus expensive treatment following an injury may throw people into poverty – which may in turn be a risk factor for further injury. These issues are addressed in the following sections.

5.2. Do non-fatal unintentional injuries increase the risk of being poor?

5.2.1. Relationship between non-fatal unintentional injuries and SES mobility

Dropping into poverty

Two hundred and twenty one households that sustained injuries in 2000 were classified as non-poor in 1999. Of these 221, 60 households were reclassified as poor in 2001. For non-injured non-poor households, the corresponding number was 613 out of 2727 households. Therefore, the relative risk of dropping into poverty for non-poor households with and without injuries is $(60/221)/(613/2727) = 1.21$ (p=0.08).

Escaping from poverty

Of 1784 households, 572 households who were poor in 1999 and did not sustain injuries in 2000, escaped from poverty in 2001. This compares to the 51 out of 153 households who were poor in 1999 and had injuries in 2000 and who escaped from poverty. Therefore, the relative risk of escaping from poverty between poor households without and with injuries is $(572/1784)/(51/153) = 0.96$ (p=0.39).

5.2.2. Relationship between non-fatal unintentional injuries and income loss

The changes in income between 1999 and 2001 or 2003 of different groups is presented in tables 9 and 10 for the sensitivity analysis of normalized and original (skewed) income variables respectively, together with the bias-corrected 95% confidence intervals. For both poor and non-poor individuals, the results show that injured individuals’ households have a lower increase in income between 1999 and 2001 or 2003, than non-injured individuals’ households. The differences between 1999 and 2003 are statistically significant with normalized
income, but not with the original income variable. However, the differences between 1999 and 2001 are statistically significant with the original income variable in the non-poor group.

Table 9. Income changes 1999-2001 and 1999-2003 in injured groups compared to non-injured [sqrt(sqrt(income))]

<table>
<thead>
<tr>
<th></th>
<th>Non poor</th>
<th>Poor</th>
<th>All groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2001</td>
<td>Income change</td>
<td>-0.11</td>
<td>-0.24</td>
</tr>
<tr>
<td></td>
<td>95% CI</td>
<td>(-0.36 – 0.11)</td>
<td>(-0.44 – -0.05)</td>
</tr>
<tr>
<td>1999-2003</td>
<td>Income change</td>
<td>-0.42</td>
<td>-0.41</td>
</tr>
<tr>
<td></td>
<td>95% CI</td>
<td>(-0.81 – -0.08)</td>
<td>(-0.75 – -0.08)</td>
</tr>
</tbody>
</table>

Bold numbers indicate significance

Between 1999 and 2003, the average loss of income for injured individuals’ households compared to non-injured individuals’ households was approximately VND 2,279,000 (USD 151.9) when considering all groups together, VND 1,084,000 (USD 72.3) in the poor group, and approximately VND 2,598,000 (USD 173.2) in the non-poor group. For non-poor individuals’ households the loss of income between 1999 and 2001 due to injuries was as much as VND 3,477,000 (USD 231.8).

Table 10. Income changes 1999-2001 and 1999-2003 in injured groups compared to non-injured (VND’000) (USD 1~VND 15,000).

<table>
<thead>
<tr>
<th></th>
<th>Non poor</th>
<th>Poor</th>
<th>All groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>95% CI</td>
<td>(-11621 – -584)</td>
<td>(-2436 – 474)</td>
</tr>
<tr>
<td>1999-2003</td>
<td>Income change</td>
<td>-2,598</td>
<td>-1084</td>
</tr>
<tr>
<td></td>
<td>95% CI</td>
<td>(-5787 – 3107)</td>
<td>(-2529 – 296)</td>
</tr>
</tbody>
</table>

Bold numbers indicate significance

This is the first longitudinal study of the medical poverty trap caused by injuries that has continued for several years. The setting was Bavi in the north of Vietnam and the study was done during a period of exceptional economic growth that would be expected to affect the findings. For the whole studied population, incomes grew by 58% from 1999 to 2003. Income growth was 47% for non-poor and 132% for the poor. The social mobility was strong during the studied
period. In all, 33\% escaped poverty and 23\% dropped into poverty between 1999 and 2001. Thus the size of the poor group was decreasing.

Despite this economic growth that seemed to be of particular benefit to the poor, some affected households lost their incomes due to injuries. On average, the loss is estimated at VND 1,084,000 (USD 72) in the poor group, and approximately VND 2,598,000 (USD 173) in the non-poor group. These figures correspond to 11 (9) and 15 (13) working months of an average person in the poor and non-poor group, respectively, during 1999 (2001). The most pronounced effect is the non-poor households’ loss of income during the earlier time period (VND 3,477,000 [USD 232]). This coincides with the elevated and almost significant risk for an injured household to drop into poverty (RR=1.21 p=0.08). However, considering the whole time period the non-poor seem to recover since the loss for the whole time period (1999-2003) was less than the loss during 1999-2001.

Despite the large effects, the confidence intervals are wide and we judge this to be of borderline significance. These wide confidence intervals are caused by large variations in the consequences of injuries between households. The extent of variability is reasonable since the studied households are heterogeneous in some respects. Firstly, the severity of the injury was based on the victim’s perception and no external verification was possible. However, this is not necessarily a bad proxy because in a previous study the correlation between perceived severity and reported days of disability was very high. Secondly, within the category of “severe” injury there may be large variations. The chance of and duration to achieve complete recovery varies for instance between injury locations (a leg versus the head). Unfortunately, this sample is too small for further subdivisions but future studies ought to strive for a higher degree of homogeneity. It is possible that households with catastrophic costs are mixed with the non-affected in our sample.

Case studies seem to be important for understanding the nature of the poverty trap, yet they do not give much information about the size and duration of the effects. However, Dercon and Krishnan studied the effects of illness in Ethiopian rural households by econometric methods. They compared the number of days a person was not able to work during the preceding month with body mass index (BMI), and observed a large and significant decrease for women but not for men. An extra day of unexpected illness would reduce BMI by 0.3-0.42\% in the next month.

There has been a considerable interest in “informal insurance” in developing countries and we expect that this phenomenon plays a major role also in Bavi.
Nevertheless, there are expected to be large variations between households. It has been described that people in developing countries “rely on private informal coping mechanisms such as drawing on savings, selling assets, transfers from their families and social support networks, and borrowing from local credit markets”.  

The coping strategies, and their success, depend to a large extent on the nature of the “shock”.  Injuries, and at least non-communicable diseases, are idiosyncratic shocks and differ from common shocks such as drought or the Asian economic crisis in 1997. In general, it is easier to cope with idiosyncratic shocks because the infrastructure, price levels for assets, social networks and so forth are not affected and many of the victims may have received income support from one or several of these informal insurance mechanisms. For instance, Hanoi is a large city situated only 60 kilometers from Bavi and many households have migrated members in Hanoi who regularly send back money.

An interesting but unstudied question is the long-term health consequences for injured persons. Negative income consequences can be caused both by high treatment costs and by non-treatment. The mechanism in the latter case is through permanent disability and therefore reduced capacity in the labour market. It would be interesting to be able to distinguish the two poverty pathways.

5.3. Does poverty lead to non-fatal unintentional injuries?

Results from the univariate analyses showed that crude injury incidence rates among the poor and middle-income groups were 1.40 and 1.27 times higher, respectively, than those of the rich, and these differences were statistically significant. This relationship was consistent for both males and females in all age groups. Separate models for each age group showed similar patterns remains but did not reach significance in all cases. Mountainous communes also showed significantly higher injury rates than communes in the lowlands (paper II, table 1).

For both sexes together, poverty was a risk factor for home, work and other injuries; a protective factor for school injuries, and neither a risk nor protective factor for traffic injuries. More types of injury were significantly related to poverty among males than females. Living in the mountains was a risk factor for home injuries among men, while among women, it was significant for traffic and other injuries (paper II, table 2).
Poverty played a complicated role in the youngest age group. It was a risk factor for home injuries and other injuries but a protective factor for school injuries and the middle-income group were exposed to the highest risk of traffic injuries. In the working age group, the poor group were at significantly higher risk for work and other injuries (2.38 and 2.19 respectively). In the elderly group, poverty was only a significant risk factor for home injuries (1.61). Mountainous areas were associated with higher rates, particularly in the working age group (paper II, table 3).

Results from the multivariate analyses show that poverty was a consistent risk factor for unintentional injuries overall, and a risk factor for home, work and other injuries, but a protective factor for school injuries. In the case of traffic injuries, it was neither a risk nor a protective factor, although the middle-income group were at significantly higher risk in this category (table 11).

In summary, poverty in general was a significant risk factor for non-fatal unintentional injuries in Vietnam. However, the relationship between economic status and unintentional injury varied by sex, age and type of injury. These findings are broadly in accordance with results reported by others.124,125,126,127
Table 11. Poisson regression model of type specific incidence rate ratios for unintentional injuries observed in rural Vietnam during 24,776 person-years by economic group, location, age and sex.

<table>
<thead>
<tr>
<th>Type</th>
<th>All injury types</th>
<th>Home injury</th>
<th>Traffic injury</th>
<th>Work injury</th>
<th>School injury</th>
<th>Other injury</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IRR(95%CI)</td>
<td>IRR(95%CI)</td>
<td>IRR(95%CI)</td>
<td>IRR(95%CI)</td>
<td>IRR(95%CI)</td>
<td>IRR(95%CI)</td>
</tr>
<tr>
<td>Economic group</td>
<td>Rich</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Middle income</td>
<td>1.33(1.18-1.50)*</td>
<td>1.29(1.06-1.56)*</td>
<td>1.37(1.10-1.70)*</td>
<td>1.89(1.38-2.57)*</td>
<td>0.60(0.38-0.96)*</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>1.43(1.23-1.66)*</td>
<td>1.43(1.13-1.81)*</td>
<td>1.18(0.88-1.59)</td>
<td>2.32(1.59-3.38)*</td>
<td>0.30(0.14-0.65)*</td>
</tr>
<tr>
<td>Location</td>
<td>Lowlands</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Mountains</td>
<td>1.34(1.21-1.49)*</td>
<td>1.41(1.20-1.65)*</td>
<td>1.23(1.00-1.51)*</td>
<td>1.53(1.20-1.96)*</td>
<td>0.70(0.42-1.18)</td>
</tr>
<tr>
<td>Sex</td>
<td>Female</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.41(1.30-1.54)*</td>
<td>1.23(1.07-1.41)*</td>
<td>1.34(1.14-1.59)*</td>
<td>1.41(1.13-1.76)*</td>
<td>2.41(1.50-3.85)*</td>
</tr>
<tr>
<td>Age group</td>
<td>15 – 59 years</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>0 – 14 years</td>
<td>1.09(0.99-1.21)</td>
<td>1.16(0.99-1.36)</td>
<td>1.19(0.99-1.44)</td>
<td>0.21(0.14-0.32)*</td>
<td>11.5(6.24-20.1)*</td>
</tr>
<tr>
<td></td>
<td>&gt;=60 years</td>
<td>1.37(1.20-1.57)*</td>
<td>2.50(2.10-2.99)*</td>
<td>0.92(0.68-1.25)</td>
<td>0.51(0.35-0.76)*</td>
<td>-</td>
</tr>
</tbody>
</table>

* statistically significant p < 0.05; N = number of injuries observed
According to a previous review, morbidity from traffic injuries is often higher among children from lower social positions and in more deprived socio-economic areas. Our results do not fit this pattern; instead, the highest risk was in the middle-income group. It is likely that middle-income households, rather than poor ones, can afford bicycles for their children and cyclists are probably the most vulnerable road users in Bavi District. This may be an example of increasing wealth and modernisation creating new situations and risks, with the result that during transition periods some groups can be exposed to double risks – poverty and modernity. They remain exposed to the “old” risks of poverty (housing and working environment) but at the same time are exposed to emerging modern hazards such as bicycles or motorbikes in combination with bad roads. Different social classes and age groups may be exposed to these double risks at different stages.

An American study shows that poverty is associated with an increased risk of pedestrian injuries and the same was true in Bavi. Since most poor people do not own any form of transportation, they have to walk, sometimes rather long distances, and are thus extremely vulnerable to cars, motorbikes and bicycles.

One interesting result in the present study is that poverty was a protective factor for school injuries. We could not find any published study on the school injuries for comparisons. However, poor children may attend school less than rich ones, because poverty may force them to do other things - either never attending or dropping out to go to work or engage in farming. This suggests further efforts are needed to find ways to help poor children attend school as well as preventing injuries at schools.

The finding that children living in poverty are at greater risk of injury in the home is supported by earlier studies. Low housing quality exposes children to higher risks of injury, due mainly to falls and fires. In Vietnamese rural areas such as Bavi District, poor households usually use straw for cooking, which is a major cause of fire injuries. Injuries caused by fire are also more common among the poor in developed countries. For instance, an American study reports that poor tenants may be less likely to receive and comply with fire safety messages, not have smoke alarms, and not afford or maintain safe heating systems. While these findings do not relate directly to an environment like Bavi, other factors such as slippery or rough floors which may lead to falls in Vietnam may also be linked to poverty. In mountainous communes people live in houses on sloping sites, with different levels and where the stairs are often of bad quality. This may also explain the significantly higher risk for home injuries among children in mountainous areas.
As expected, our results showed that poor adults were at greater risk of injuries at work. People living under harsh economic conditions may be willing, or forced, to accept jobs that expose them to extremely high risks, as has been confirmed in other studies.\(^\text{132}\)

For traffic injuries in the working age group, the household’s economic status played no significant role in the incidence rate, but the location did. People living in mountainous communes, where road conditions are very poor, were more likely to be involved in traffic injuries than those who lived in the lowlands. This pattern has also been reported elsewhere.\(^\text{132}\)

Normally, the elderly spend most of their time at home, so it is not surprising that they were at higher risk for home injuries, especially the poor elderly. Table 11 shows that the incidence of home injuries among the poor elderly was \(1.43 \times 2.50 = 3.58\) times higher than among younger, rich adults. This finding coincides with results from a study in the USA\(^\text{133}\) and can be explained by similar factors regarding poor children as discussed above.
Chapter 6. The injury poverty trap: Possible solutions

In the previous chapter, the injury poverty trap has been described, analyzed and discussed. One of the reasons for the trap is lack of prepaid health care. This chapter discusses whether any solutions for the trap are available in relation to people’s preferences and willingness to pay for different prepaid schemes.

6.1. People’s preferences for different health care financing options

6.1.1. People’s preferences

People’s preferences for different health care financing options are shown in figure 5. More than half of the respondents (51.6%) stated that they preferred the out-of-pocket payment option, while 48.4% preferred health insurance options. Among health insurance choosers, the proportion of people preferred the compulsory scheme was higher than those who preferred the voluntary scheme (58.9% versus 41.1%).

Figure 5. People’s preferences for different health care financing options.

Theoretically, health insurance is attractive because most people are assumed to be risk averse. Even disregarding this assumption, health insurance has a feature of humanity because resources are redistributed from healthy to ill people. However, in reality, to offer an attractive health insurance scheme in a country
Injury poverty trap: Possible solutions

such as Vietnam is not easy. Its success depends on a wide range of factors such as
the price, personal experiences and the reputation of insurance, the trust in the
institution and so forth.

The results show that a surprisingly low percentage (48.4%) of people preferred
health insurance in Bavi district. In comparison, 90% were willing to join a
proposed National Health Insurance scheme in Ghana,\textsuperscript{134} and a rural health
insurance scheme in India was supported by 91.8%.\textsuperscript{135} However, the hypothetical
scenarios of the three studies are different, therefore it is difficult to make
interpretations.

Results from the qualitative question showed that the respondents preferred not
to have health insurance because of “health insurance related problems” (48.7%),
“poverty” (27.0%), “being healthy” (8.0%) and “other reasons” (16.3%). The
health insurance related problems included “complicated procedures”, “not
convenient”, “long waiting time”, “low and limited quality of care”, “don’t believe in
health insurance”, and “have to pay under the table”. We believe that all these
problems occur frequently in the existing health insurance systems in Vietnam.
This makes people generalize the problems to the scenarios used in this study.
Furthermore, the Vietnamese system has a low ceiling of re-imbursement
resulting in “low and limited quality of care” for insured patients and a surplus
greater than VND 3000 billion (~ USD 200 million) for the Health Insurance
Agency in 2003.\textsuperscript{136} Consequently, the voluntary health insurance coverage in
Vietnam is as low as 0.2%.\textsuperscript{137}

In addition, according to the Vietnam National Health Survey,\textsuperscript{137} insured patients
have to pay a significant part of the total cost (44% and 48% in out- and in-
patient care respectively at district health centres). Corresponding figures were
40% and 78% for out-patient, and 32% and 32% for in-patient care at
provincial and central levels respectively. Cost of gifts to health staff from insured
patients was higher than that for the un-insured at provincial and central levels of
care. The report concluded that these circumstances may be good reasons for not
participating in the health insurance schemes.

From one perspective, the coverage offered in scenarios B and C is fully
comprehensive: free medical care in public institutions located in Bavi district
and free (prescribed) drugs, but a deductible fee is introduced for care at higher
levels. Thus adequate care (according to national standards) can be received in
the case of all possible diseases or injuries. From a different perspective, some
respondents may feel that the offered schemes do not fully cover their expected
future use of health care, which naturally lowers their support for the two
insurance schemes. The limitation to public care in the offered coverage can be compared with present health care utilization patterns. Public facilities are used by 23.2% of injured patients and 26.0% of all kinds of patients. Almost an equal proportion of patients use private health care - 22.4% of injured and 18.0% of all kinds of patients.

6.1.2. Determinants of people’s preferences

Table 12 shows odds ratios which illustrate how the determinants influenced people’s preferences. If preference for either compulsory or voluntary health insurance were considered as one group in comparison with out-of-pocket preference, the significant determinants are sex, occupation, number of household members and household having people with chronic disease (“chronic household”). Men, farmers and “chronic households” had odds ratios of 1.29 (95%CI 1.06-1.58), 1.35 (95%CI 1.06-1.71) and 1.45 (95%CI 1.15-1.83) respectively (the second column of table 12). Respondents from larger households preferred health insurance. If the number of household members increased by 1, the support for health insurance increased by 1.11 (95%CI 1.04-1.19). Respondents from poor or insurance experienced households did not significantly prefer health insurance to out-of-pocket payments. However, both determinants were close to significance in the expected direction with OR=1.27 (95%CI 0.98-1.89) and 1.23 (95%CI 0.94-1.60), respectively.
Table 12. Determinants of Preferences: odds ratios (95% CI) from logistic and nested logistic regressions respectively.

<table>
<thead>
<tr>
<th>Determinants</th>
<th>HI compared to OOP</th>
<th>CHI compared to OOP</th>
<th>VHI compared to OOP</th>
<th>VHI compared to CHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>1.09 (0.91-1.32)</td>
<td>1.01 (0.81-0.25)</td>
<td>1.13 (0.88-1.43)</td>
<td>1.12 (0.86-1.46)</td>
</tr>
<tr>
<td>Male</td>
<td>1.29 (1.06-1.58)*</td>
<td>1.36 (1.08-1.72)**</td>
<td>1.25 (0.97-1.63)</td>
<td>0.92 (0.69-1.23)</td>
</tr>
<tr>
<td>Age</td>
<td>1.00 (0.99-1.01)</td>
<td>0.99 (0.98-1.00)*</td>
<td>0.98 (0.97-0.99)**</td>
<td>1.00 (0.99-1.00)</td>
</tr>
<tr>
<td>Farmer</td>
<td>1.35 (1.06-1.71)*</td>
<td>1.33 (1.00-1.76)*</td>
<td>0.89 (0.66-1.19)</td>
<td>0.67 (0.48-0.92)*</td>
</tr>
<tr>
<td>N² of household member</td>
<td>1.11 (1.04-1.19)**</td>
<td>1.12 (1.03-1.21)**</td>
<td>1.00 (0.92-1.10)</td>
<td>0.9 (0.81-0.99)</td>
</tr>
<tr>
<td>N² of children 0-5 years old</td>
<td>1.05 (0.89-1.23)</td>
<td>0.83 (0.69-1.01)</td>
<td>1.13 (0.93-1.38)</td>
<td>1.36 (1.09-1.69)**</td>
</tr>
<tr>
<td>N² of elderly 65+</td>
<td>0.87 (0.73-1.03)</td>
<td>0.85 (0.69-1.05)</td>
<td>1.03 (0.82-1.29)</td>
<td>1.22 (0.94-1.57)</td>
</tr>
<tr>
<td>Poor</td>
<td>1.27 (0.98-1.89)</td>
<td>1.18 (0.83-1.68)</td>
<td>1.38 (0.94-2.02)</td>
<td>1.16 (0.77-1.76)</td>
</tr>
<tr>
<td>Rich</td>
<td>1.11 (0.84-1.47)</td>
<td>0.89 (0.64-1.24)</td>
<td>1.39 (0.99-1.97)</td>
<td>1.56 (1.05-2.31)*</td>
</tr>
<tr>
<td>Household income</td>
<td>1.00 (0.99-1.01)</td>
<td>1.00 (1.00-1.00)</td>
<td>1.00 (1.00-1.00)</td>
<td>1.00 (1.00-1.00)</td>
</tr>
<tr>
<td>More than primary school</td>
<td>1.20 (0.96-1.50)</td>
<td>0.93 (0.72-1.20)</td>
<td>1.05 (0.78-1.39)</td>
<td>1.13 (0.83-1.52)</td>
</tr>
<tr>
<td>Chronic disease</td>
<td>1.45 (1.15-1.83)**</td>
<td>1.49 (1.14-1.95)**</td>
<td>1.40 (1.03-1.89)*</td>
<td>0.94 (0.68-1.30)</td>
</tr>
<tr>
<td>In need of health care</td>
<td>0.82 (0.59-1.14)</td>
<td>0.72 (0.56-1.04)</td>
<td>0.69 (0.45-1.06)</td>
<td>1.33 (0.88-2.00)</td>
</tr>
<tr>
<td>Insurance experience</td>
<td>1.23 (0.94-1.60)</td>
<td>1.28 (0.94-1.75)</td>
<td>1.18 (0.84-1.67)</td>
<td>0.92 (0.64-1.34)</td>
</tr>
<tr>
<td>Radio</td>
<td>0.88 (0.72-1.08)</td>
<td>0.94 (0.74-1.19)</td>
<td>0.82 (0.62-1.07)</td>
<td>0.87 (0.64-1.17)</td>
</tr>
<tr>
<td>Television</td>
<td>0.88 (0.69-1.12)</td>
<td>0.77 (0.58-1.02)</td>
<td>0.87 (0.63-1.20)</td>
<td>1.14 (0.80-1.61)</td>
</tr>
</tbody>
</table>

NB: *significant with P< 0.05; **significant with P<0.01; ***significant with P<0.001
The 3rd and 4th columns of table 12 show how the determinants influence people’s preferences for either compulsory or voluntary health insurance in comparison with out-of-pocket payment. The significant determinants of preferences for compulsory health insurance versus out-of-pocket were the same as in model 1 except age of respondents. The 4th column, voluntary versus out-of-pocket, had two significant determinants, “chronic disease” and “age”. The younger the respondents were, the higher the support for either compulsory or voluntary health insurance.

The model comparing voluntary and compulsory health insurance (5th column of table 12) identified four significant determinants. Farmers and respondents from larger household sizes did not prefer the voluntary to the compulsory with OR = 0.67 (95%CI 0.48-0.92) and 0.9 (95%CI 0.81-0.99), respectively. The other two determinants were that respondents from households classified as rich by the local authority and from households with a greater number of children aged 0-5 years preferred the voluntary to the compulsory with OR=1.56 (95%CI 1.05-2.31) and 1.36 (95%CI 1.09-1.69).

The variable “head” was not significant in any of the models so we could not show any difference in preferences between heads and spouses. There were some results that were obviously not in line with our expectations. One was that the number of children and elderly did not increase support for health insurance. Even more surprising, in the choice between the two insurance models, households with many children preferred voluntary. Also, our hypothesis regarding households in need of health care during the 12 month period prior to the interview date was incorrect; instead of health insurance these households preferred out-of-pocket payments.

Regarding the two insurance schemes, the important aspect of price was unknown to the respondents. We believe that this uncertainty regarding the price probably intimidated some of the poor respondents. Even if they sympathize with the principles of compulsory insurance, they may consider the regular fees as too heavy a burden. To trust fate or God and hope for health and thereby no treatment costs may seem to them to be the only achievable option.

Women and elderly were expected to support community-based insurance, but this hypothesis appears to be incorrect. The uncertainty about cost may have affected these groups. Regarding the age variable, we can expect young people to be more prepared to adapt to and accept new initiatives, such as insurance. This higher adaptation capacity may outweigh the higher illness risk among the elderly.
Quality of care is qualified as a main determinant of the demand for health insurance. Children – the future inhabitants of the country and inmates of the households specifically – are highly esteemed in Vietnam by all people including heads of households. Parents, therefore, give priority to children’s health care and hold a widespread view that the way to get the best quality medical care is through out-of-pocket payment:

“My kids are all I have. They are my future. Treatments with health insurance are usually low quality, not enough drugs. I am willing to pay out-of-pocket if needed, provided that my kids receive high quality of care and soon fully recover”. (40 years old mother of four children, including one aged between 0 and 5 years old).

This view on children in combination with people’s experiences of the health care system may explain the surprising result that the number of children within a household is not a positive determinant for insurance preference. The limitations of the existing health insurance system in Vietnam may also explain why respondents from households in need of health care during the previous 12 months preferred out-of-pocket payment to health insurance.

Finally, it is important to discuss the determinant that could not be fully hypothesized – that is the preferences of farmers compared with those in other occupations. It was hypothesized that farmers prefer health insurance because the magnitude of income loss due to illness can be catastrophic. Illness during sowing or harvesting seasons can easily have devastating economic consequences on the household. However, we could not find any reason to hypothesize that in general, farmers prefer compulsory or voluntary health insurance. The results showed that farmers, who accounted for three quarters of the population, preferred compulsory health insurance to both out-of-pocket payment and voluntary health insurance. Reasons given by them to explain their choices and describe the advantages of their preferred option, include: “all people have to participate in sharing the risk between the rich and the poor and between the healthy and the ill”; “this system was of community, people help each other when facing difficulties”; and “those with higher income pay more, those with lower income pay less and all can have access to health care”. Those choosing risk rating schemes considered the voluntary scheme as a fairer health care financing system: “don’t want it to be compulsory, everybody has the right to join or not”; “I can quit whenever I want, especially when I’m short of money”; and “it will be fairer if the more-likely-to-be-sick people have to pay more than the less-likely because they use more health services”.

We feel that many of the comments from respondents reveal a deep understanding of the pros and cons of the different options and that the majority
of respondents gave deliberated answers. These results also suggest that further studies on people’s perception of fairness are needed, probably using qualitative methods.

6.2. People’s willingness to pay for health insurance

6.2.1. People’s willingness to pay

The average people’s WTP for joining in health insurance schemes is shown in table 13. The average WTP was VND 17,873 (USD 1.2) and VND 15,588 (USD 1.06) per household per month for the compulsory and voluntary insurance respectively. If people who stated zero WTP or out-of-pocket choosers were excluded, the corresponding numbers would be VND 22,690 (USD 1.51) and VND 22,239 (USD 1.48) or VND 23,650 (USD 1.6) and VND 22,501 (USD 1.5), respectively.

In comparison with the recent average household health care expenditure in Bavi (around VND 45,000 per month [USD 3]), the WTP elicited in this study is much smaller even when the highest WTP of HI choosers (VND 23,650 [USD 1.6] for B and VND 22,501 [USD 1.5] for C) is used. Although the WTP is equal to around half of the total health care expenditure, it does cover the average household expenditure for public health care and self-treatment. (paper V, table 4).

Table 13. People’s WTP for the two forms of health insurance (VND) (VND 15,000 ~ USD 1).

<table>
<thead>
<tr>
<th></th>
<th>Per household per month</th>
<th>Per person per year*</th>
<th>% of respondents</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td><strong>Compulsory health insurance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WTP for all respondents</td>
<td>17,873</td>
<td>15,000</td>
<td>47,661</td>
<td>40,000</td>
</tr>
<tr>
<td>WTP for respondents with WTP&gt;0</td>
<td>22,690</td>
<td>20,000</td>
<td>60,507</td>
<td>53,333</td>
</tr>
<tr>
<td>WTP for respondents who prefer HI to OOP</td>
<td>23,650</td>
<td>20,000</td>
<td>63,067</td>
<td>53,333</td>
</tr>
<tr>
<td><strong>Voluntary health insurance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WTP for all respondents</td>
<td>15,588</td>
<td>10,000</td>
<td>41,568</td>
<td>26,667</td>
</tr>
<tr>
<td>WTP for respondents with WTP&gt;0</td>
<td>22,239</td>
<td>20,000</td>
<td>59,304</td>
<td>53,333</td>
</tr>
<tr>
<td>WTP for respondents who prefer HI to OOP</td>
<td>22,501</td>
<td>20,000</td>
<td>60,003</td>
<td>53,333</td>
</tr>
</tbody>
</table>

* Average household size is 4.5 persons
If the premium of the on-going community-based health insurance scheme is used for comparison, the WTP of people who have a WTP greater than zero is equal to the lower boundary of the premium range (VND 60,000 – 100,000 [USD 4 – 6.7] per person per year in rural areas). Noticeably, the number of people having WTP greater than zero accounted for 70 - 80% of the total respondents. If the premium of the school health insurance scheme is used, the general WTP is approximately equal to the upper boundary of the premium range (VND 10,000 – 45,000 [USD 0.67 – 3] per student per year).

Health insurance for all citizens by 2010 is a political goal in Vietnam. What information does the WTP reported in this thesis give about the feasibility of this goal for rural districts in Vietnam resembling the Bavi district? If this is judged using a comparison with actual health care expenditure, the outlook is rather pessimistic. About half of the population want to have an out-of-pocket system rather than health insurance, at least in the forms presented to them. If health insurance is implemented anyway, WTP in the population is low compared to present household health care expenditure. Even if the population is limited only to those who prefer health insurance to out-of-pocket, WTP for health insurance only corresponds to half of present household health care expenditure. On the basis of this, the legitimacy of a compulsory health insurance system, such as system B in the scenario, may be questioned. The prognosis for households signing up for a voluntary system, such as system C in the scenario, does not seem good.

The outlook is not quite as pessimistic if WTP is compared to premiums in the existing community-based health insurance schemes in Vietnam. The average WTP in the whole population is about VND 42,000 (USD 2.8) per person per year for the voluntary insurance and VND 48,000 (USD 3.2) for the compulsory insurance. This amounts to 70% - 80% of the lowest premiums in the existing systems, which is VND 60,000 (USD 4). For the section of the population who prefer health insurance to out-of-pocket (48%) and the section whose WTP is greater than zero (70% - 80%), WTP is equal (or nearly equal for voluntary insurance) to the VND 60,000 premium.

Another approach to assess feasibility of the hypothetical health insurance schemes is to compare the WTP with total health care costs incurred by the target population. To estimate the total health care costs, a range of assumptions were made, including: (1) all health insurance choosers enrolled in the scheme; (2) their number of sickness episodes per year and health care utilization patterns were the same as for the national average; (3) non- and self-treatment episodes were replaced by outpatient care at Community Health Centres; (4) private users...
turn to use public health care with the same patterns of public users, and (5) length of stay at the provincial and central levels is the same as at the district level. Using data of Vietnam National Health Survey,\textsuperscript{140} the total health care costs incurred by the target population per year were estimated to be VND 5.4 billion (USD 360,000), approximately equivalent to the total stated WTP of the same population (VND 5.6 [USD 373,000] for C and VND 5.9 billion [USD 393,000] for B) (paper V, table 5).

The estimations suggest that the hypothetical schemes seem to be feasible. A health insurance scheme would be financially supported through a premium of about VND 60,000 (USD 4) with a benefit package similar to the hypothetical scenarios used in this study. There are four major reasons why the costs estimated in the scheme are lower than the actual health care expenditure in the population. Firstly, the administrative costs for the insurance scheme are not included. The costs should therefore be increased by 5% - 10%. Secondly, over half of the household health care expenditure in Bavi is spent on private health care. Thirdly, the household health care expenditure includes both direct (e.g. medical costs) and indirect costs (e.g. transportation cost).\textsuperscript{22} Finally, in the hypothetical system, costs for care at the provincial and central levels are estimated based on cost per bed day at the district level.

6.2.2. Determinants of people’s willingness to pay

The determinants’ influence on people’s WTP for joining in the compulsory and voluntary health insurance schemes is shown in table 14. For the compulsory, significant determinants were age, occupation, education, number of household members, socio-economic status and health insurance preferences. For the voluntary, they were age, education, number of household members, chronic disease, the need for health care, and health insurance preferences.

As expected, the poor were willing to pay less and the rich were willing to pay more for health insurance. The different amounts of WTP between the poor and non-poor, and between the rich and non-rich were estimated to be VND 460 (USD 0.03) and VND 473 (USD 0.03), respectively in the compulsory scheme. Those who preferred health insurance, were from households with more members, chronic households or educated more than primary school were willing to pay more, while farmers, older individuals and respondents from households needing health care during the 12 months prior to the interview were willing to pay less for health insurance, generally. The different amounts of WTP for compulsory and voluntary health insurance schemes between those who preferred and those who did not prefer compulsory health insurance were VND 2,825 (USD 0.19) and VND 3,305 (USD 0.22), respectively. The corresponding
numbers for voluntary health insurance preferences were VND 2,245 (USD 0.15) and VND 4,123 (USD 0.27).

Table 14. Determinants of WTP for health insurance: coefficients from interval regressions and different amounts of WTP (VND) when determinants change by 1 unit (= coef.*1interval = coef.*2500).

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Compulsory Coef.</th>
<th>Compulsory Diff. amount</th>
<th>P</th>
<th>Voluntary Coef.</th>
<th>Voluntary Diff. amount</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>0.043</td>
<td>108</td>
<td>0.507</td>
<td>0.074</td>
<td>185</td>
<td>0.309</td>
</tr>
<tr>
<td>Male</td>
<td>0.030</td>
<td>75</td>
<td>0.638</td>
<td>0.075</td>
<td>188</td>
<td>0.294</td>
</tr>
<tr>
<td>Age</td>
<td>-0.010</td>
<td>-25</td>
<td>0.000</td>
<td>-0.007</td>
<td>-18</td>
<td>0.009</td>
</tr>
<tr>
<td>Farmer</td>
<td>-0.139</td>
<td>-348</td>
<td>0.036</td>
<td>-0.112</td>
<td>-280</td>
<td>0.131</td>
</tr>
<tr>
<td>&gt;primary school</td>
<td>0.139</td>
<td>348</td>
<td>0.025</td>
<td>0.170</td>
<td>425</td>
<td>0.015</td>
</tr>
<tr>
<td>No. of HH Members</td>
<td>0.083</td>
<td>208</td>
<td>0.000</td>
<td>0.065</td>
<td>163</td>
<td>0.002</td>
</tr>
<tr>
<td>No. of children</td>
<td>-0.001</td>
<td>-3</td>
<td>0.979</td>
<td>0.079</td>
<td>198</td>
<td>0.104</td>
</tr>
<tr>
<td>No. of elderly</td>
<td>-0.006</td>
<td>-15</td>
<td>0.907</td>
<td>-0.009</td>
<td>-23</td>
<td>0.870</td>
</tr>
<tr>
<td>Chronic disease</td>
<td>0.063</td>
<td>158</td>
<td>0.335</td>
<td>0.154</td>
<td>385</td>
<td>0.034</td>
</tr>
<tr>
<td>In need of HC</td>
<td>-0.093</td>
<td>-233</td>
<td>0.315</td>
<td>-0.337</td>
<td>-843</td>
<td>0.001</td>
</tr>
<tr>
<td>Insurance experience</td>
<td>-0.014</td>
<td>-35</td>
<td>0.844</td>
<td>-0.015</td>
<td>-38</td>
<td>0.855</td>
</tr>
<tr>
<td>Poor</td>
<td>-0.184</td>
<td>-460</td>
<td>0.027</td>
<td>-0.153</td>
<td>-383</td>
<td>0.100</td>
</tr>
<tr>
<td>Rich</td>
<td>0.189</td>
<td>473</td>
<td>0.010</td>
<td>0.126</td>
<td>315</td>
<td>0.129</td>
</tr>
<tr>
<td>Prefer CHI</td>
<td>1.130</td>
<td>2825</td>
<td>0.000</td>
<td>1.322</td>
<td>3305</td>
<td>0.000</td>
</tr>
<tr>
<td>Prefer VHI</td>
<td>0.898</td>
<td>2245</td>
<td>0.000</td>
<td>1.649</td>
<td>4123</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Bold numbers indicate significance

There were some results that were contrary to our expectations. These were that farmers, older individuals and respondents from households in need of health care during the 12 months prior to the interview date were willing to pay significantly less. In the case of farmers, our hypothesis was based on characteristics of such an occupation. If illness occurs during sowing or harvesting seasons, the loss of income would be catastrophic for them. Thus we hypothesized farmers were willing to pay more for health insurance because they had a higher perceived loss of income due to illness. However, our hypothesis was incorrect. A reason could be they have lower income than other occupations do and WTP may depend on income more than on the perceived loss. This reason is also supported by a WTP study in India\textsuperscript{135} where occupation is hypothesized to influence WTP through income.
The results of the estimations are mainly in line with expectations and suggest interesting policy implications. Variables reflecting risk aversion, perceived risk of illness/injuries, perceived size of the potential loss, and income are significant determinants. The larger a household is and the more children it has, the larger the WTP. If there is chronic disease in a household WTP is also higher. Furthermore, if the respondent is educated to higher than primary level, WTP is higher. The population in Bavi has little direct experience of health insurance. The bad reputation that health insurance has may come from rumours, rather than personal experience. People with higher education may be more willing to accept change and more confident adjusting to a new system. The unexpected result that WTP falls with increasing age may also be interpreted in light of this. Older persons may be less inclined to undergo change and therefore less ready to support a new system for health financing. This finding is in line with results reported by others.

These results are encouraging because they highlight a potential for public information schemes that could change the predominantly negative attitude towards health insurance that this study has uncovered. A key task for policymakers is to win the trust of the population for a health insurance system, particularly among the old and those with relatively low education.
Chapter 7. Policy implication

What can be learnt from this study from a policy perspective? The extent to which the results provide policy-makers with valuable information is discussed below.

7.1. Injury prevention?

It is clear that unintentional injuries impose a large economic burden on society, especially on the victims, and this certainly applies in resource-poor settings such as Vietnam. Thus there is a need to have unintentional injury prevention programmes especially for home and traffic injuries, which both result in the heaviest burden in terms of morbidity and economics. When defining a target population for injury prevention, our results suggest that information on specific injury incidence rates alone seems to be insufficient. Rather, information on injury costs for specific groups of people should also be taken into account. If possible, both frequency and severity of problems in terms of epidemiology as well as economics should be simultaneously considered in setting intervention priorities. In general, severity and costs point at the same problems because costs are mainly determined by severity. The more severe an injury is, the higher the cost will be.

We also suggest that the results can be considered as an economic baseline that can be used in evaluations of future interventions aimed at preventing injuries. It has sometimes been claimed that prevention in general can save money. One can question this, but in the case of non-fatal injuries the claim is likely to be correct. Since life expectancy is not affected, the calculation can be simplified to only consider health care costs and productivity through a time period equal for both alternatives, not injured versus injured. It is highly likely that a non-injured person uses less health care and produces more, and that this net saving counterbalances the intervention cost. It depends of course on the programme’s content and costs, but experiences from Europe indicate a particularly favorable relationship between costs and savings.72

7.2. Poverty pathways?

It has been argued that the introduction of user fees creates a poverty trap and thus their removal may be a solution. However, user fees are only a part of the burden on households. The loss of income during the illness period is likely to be a problem of the same or even greater magnitude. A successful solution must thus
follow two tracks: prepayment of health care and some insurance based compensation of income losses during the illness period. Both reforms, if they would be persistent, must mainly be done within the resource limits of the local society. If the risk of catastrophic illness could be more evenly spread it would increase the general welfare even if no more resources are provided.

Furthermore, the results show that the social mobility was strong during the study period (paper III). Besides illness or injury episodes, there are several kinds of shock driving people into poverty. In order to prepare a more comprehensive protection system, all poverty droppers deserve a deeper study probably both qualitative and quantitative methods should be combined to identify and quantify other kinds of shock. In addition, some droppers may be a result of misclassifications, which also need to be separated between unintentional or intentional mistakes motivated by personal benefits.

Conventionally, the poor are usually considered to be a vulnerable group. Recently the Vietnam government has launched the decision No 139 on health care funds for the poor to protect the poor from the medical poverty trap. However, the results suggest that the non-poor, probably the near poor are also vulnerable to the trap. This finding is supported by others. Thus they also need to be protected.

7.3. Economic growth – reducing poverty and injuries or widening gaps?

In general terms, poverty was shown to be a probable cause of non-fatal unintentional injuries. However, the relationship varied by sex, age and type of injury. Specifically, poverty led to home injuries among children and the elderly, and adults 15 – 49 years of age were particularly at risk in the workplace. In this Vietnamese setting, the middle-income group were at greatest risk for traffic injuries, probably due to the unsafe use of bicycles or motorbikes. The details of this effect may need further investigation against the background of rapid proliferation of transport in Vietnam.

Within Bavi there was a consistent pattern showing that poverty was a risk factor for injuries except traffic injuries. Inter-country comparisons show a somewhat different pattern, suggesting that the highest risk may not be in low-income countries but in lower-middle-income settings. New risks may be evident with economic development, arising from technology such as motorbikes, electricity etc. After passing the lower middle-income level on a country basis, the risk is likely to steadily decrease as a result of growing income. In the long term it is
thus increasing incomes that may give the best protection against injuries, even if risks may temporarily increase in a region such as Bavi during modernisation.

It is evident from our data that incomes grew with an exceptional rate during the studied time period, particularly in the poor group. To study the distribution of income between individual households in Bavi is beyond the scope of this thesis, but income dispersion has probably increased. However, as a general rule we believe it is less risk to be caught in the poverty trap if injured or ill during a period of economic growth compared to a period of economic stagnation or recession. The economic growth in this rural area is likely to bring new employment opportunities, even for the poor and disabled.

Inequalities among geographic areas in terms of health resource allocation, poverty and health outcomes in Vietnam have been well documented. People living in mountainous areas are always considered to be a disadvantaged group. They receive less health resources, but suffer more poverty and diseases than others. The results show that they are even more disadvantaged when also at higher risk of unintentional injuries. Their risks of unintentional injury mainly include poor infrastructures of roads and poor housing conditions. These are also noticeable results for policy makers in developing an efficient and equitable health care system.
7.4. Health insurance for all?

The World Health Organization, through its commission for macroeconomics and health, “strongly urge the middle-income countries to undertake fiscal and organizational reforms to ensure universal coverage for priority health interventions”\(^9\). The Government in Vietnam strives for complete health insurance coverage in 2010 and almost all economists sing the praises of insurance, but not the Bavi people. The format used in this study resembles a referendum, and a majority of the people voted for sticking to out-of-pocket payments for health care. However, we believe that this position is more a critique against the existing insurance system than a tribute to out-of-pocket payments. It seems that the present health insurance system has a very bad reputation and people with insurance are said to be treated worse than people paying out-of-pocket. It is plausible that a successful implementation of a compulsory reform requires support, or at least acceptance, from a satisfactory majority (not only 51%) of the people. To change attitudes, the existing insurance system must be improved – for instance, the problems mentioned in the qualitative part of this study must be addressed and overcome.

A health care financing reform is of course not only a matter of fairness, but also of effectiveness. In the present system the information asymmetry has too much scope, the uninformed patients allocate too much of their resources (mainly on drugs) without consulting professionals. A financing reform would reestablish trained medical staff as the patient’s agent and thereby increase the efficiency in the system.

7.5. Social mandatory or private voluntary?

Social mandatory insurance is usually considered to be more equitable since poor and disadvantaged people are included. However, it seems that this is not applicable for Bavi people for the time being, because the results show that only 29% of the population supports such a system. Perhaps even more important is that a working system for assessment of income and collecting taxes does not exist. Therefore, the way to “health insurance for all” must be voluntary. One can expect more private insurance initiatives if private income continues to grow rapidly in Vietnam. These private schemes will probably not only bring benefits to the buyers but also obstruct the implementation of compulsory insurance. It is likely that mainly healthy and wealthy people can afford private insurance. Poor and diseased people will meet two obstacles: high premiums due to high risk, and low ability to pay premiums due to low income. Thus those who are not able to pay for private insurance should be covered by the fully subsidized schemes.
Policy implication

financed by the government. This will be expensive for the government, however, because of the high illness risk in this segment of the society.

The support for mandatory insurance will of course be weak among those groups already having a private insurance. A key component in a welfare state is a universal right to benefits combined with public financing (taxes or compulsory fees). This creates a redistribution of resources between the rich and the poor, because people having higher income pay more in absolute figures compared to poor people, without consuming more because the risk of illness or injuries is less the higher the income is. This should be considered when long-term policies are developed.

7.6. Health insurance management?

The existing community based health insurance scheme offers a benefit package larger than the studied hypothetical schemes (in the case of treatment at provincial and central levels) while the premiums are similar to the average people’s WTP. However, its low target of 20% coverage has not been met, while the proportion of people who prefer health insurance to out-of-pocket payment is 48% of the population. A difference between the existing and hypothetical systems regarding the management of the scheme may be an explanation. In the hypothetical schemes, funds are managed by the Commune People Committee or an elected representative, while in the existing scheme, they are managed by the Vietnam Social Insurance, which for a rural person is a distant, anonymous and thus not particularly trustworthy body. This suggests that one way of making people trust the schemes can be through community participation. This observation needs to be considered in health insurance development and one consequence can be a call for local initiatives and trials.

The results also suggest that the hypothetical schemes are feasible. There are three main points making them feasible. One is that people’s WTP can cover the health care costs. The others are related to the hypothetical benefit package and unit of insurance. According to the scenarios, if care at higher levels is needed, the insured patient will be supported by an amount based on the cost per bed day at the District Health Centre level. This can strongly reduce the moral hazard relating to bypassing treatments. According to the scenarios also, the unit of the insurance is household instead of individual. This can strongly reduce the adverse selection.

In the short-term, involvement of private providers in health insurance schemes is facing difficulties due to they are not well controlled and regulated. However in
the long-term, health insurance schemes should contract with not only public, as the current schemes, but also private providers, to provide the insured with more choices of health care. This may attract more people to health insurance schemes because studies show that a lot of people choose private health care even though they have to pay out-of-pocket. Furthermore, private providers will share the workload with public providers when the health insurance coverage is high.

Finally, the results suggest that it is necessary to provide people with better information in order to expand health insurance schemes since the higher educated, and thus probably better informed people, are willing to pay more for health insurance.
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<th>Reference</th>
<th>Author(s) and Title</th>
</tr>
</thead>
</table>


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Appendix

Preference and WTP Questionnaire towards heads of household

(If all members in the selected household have been exempted for health care, please interview the next household)

1. Date of interview: _______________________
2. Cluster code: __________ HH code: ________ ID: ________
3. Name of interviewee: ____________________ Age: _____ Sex: ________

4. Education
   1=illiterate
   2=read or write-primary
   3=secondary
   4=high school
   5=more than high school

5. Occupation
   1=farmer
   2=Civil servants
   3=Workers
   4=Handicraft
   5=Dealer
   6=Retired
   7=Small
   8=Pupil
   9=Housewife/houseman
   10=Unemployed
   11=The old
   12=Others
   13=Constructor
   14=Service doer
6. Total number of HH members:_________
   children 5 or under:_________
   children 6 to 15:_________
   65 or elderly:_________

7. Are there any persons with at least one chronic disease in your HH?
   1=yes
   2=no

8. If yes, how many persons?_________

9. Thinking one year back, how many of your HH’s members have been ill/injured and therefore in need of health care?_________

10. Do you have insurance?
    1. Yes
    2. No

11. If yes, what kind of insurance?_______________________________________

12. How is your HH classified regarding economic status by local leaders?
    1=very poor
    2=poor
    3=average
    4=upper average
    5=rich

13. Do you have a radio? (with observation)
    1=yes
    2=no
14. Do you have TV? (with observation)
   1=yes
   2=no

Now I will present three different financing systems for public health care at CHS and DHC

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Households pay the full cost for each visit to the Communal Health Station or District Health Centre and for medicine prescribed by the doctor. Households that are not able to pay will not receive any services. A service is given at cost price – there is no profit. There are no exemption cards. The total annual cost for a household will depend on how many members will be ill and will visit the Communal Health Station or District Health Centre during the year.</td>
</tr>
<tr>
<td>B.</td>
<td>All households in the district are compulsory (obliged) to pay an annual premium to a local health care fund when crops are sold. There are no exemption cards. The fee is based on how much income the households have. The higher income, the higher the fee. Thereby all members in the household are entitled to free health care at the Communal Health Station or District Health Centre and free medicine if prescribed by the doctor. If care at higher levels is needed, the insured patient will be supported by an amount based on the cost per bed day at the District Health Centre level. The fund will be managed by the Commune People Committee (or voted representative).</td>
</tr>
<tr>
<td>C.</td>
<td>Each household can choose to voluntarily pay an annual premium to a local health care fund when crops are sold. The fee is based on the number of people in the household and the fee is higher for children under five and elderly over 65 because they are expected to use more health care. All persons in the household paying the fee are entitled to free health care at the Communal Health Station or District Health Centre and free medicine if prescribed by the doctor. If care at higher levels is needed, the insured patient will be supported by an amount based on the cost per bed day at the District Health Centre level. The fund will be managed by the Commune People Committee (or voted representative).</td>
</tr>
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15. Which of the systems do you prefer (one answer only)?
   1=A
   2=B
   3=C

   *(If A, ask 16 and 17)  (If B, ask 16 and 18)  (If C, ask 16 and 19)*
16. What are the reasons for your choice?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

17. If choosing A:

17.1 If B was compulsory and implemented, would you be willing to contribute 45 000 Dong per month to the health care fund?
   1 = yes
   2 = no

*If yes:* What is the maximum amount you would be willing to contribute per month?________
*If no:* What is the maximum amount you would be willing to contribute per month?________

17.2 If most people prefer C and that system was implemented, would you be willing to contribute 45 000 Dong per month to the health care fund?
   1 = yes
   2 = no

*If yes:* What is the maximum amount you would be willing to contribute per month?________
*If no:* What is the maximum amount you would be willing to contribute per month?________

18. If choosing B.

18.1 If B was compulsory and implemented, would you be willing to contribute 45 000 Dong per month to the health care fund?
   1 = yes
   2 = no

*If yes:* What is the maximum amount you would be willing to contribute per month?________
If no: What is the maximum amount you would be willing to contribute per month?__________

18.2 If most people prefer C and that system was implemented, would you be willing to contribute 45 000 Dong per month to the health care fund?
   1= yes
   2=no
If yes: What is the maximum amount you would be willing to contribute per month?__________
If no: What is the maximum amount you would be willing to contribute per month?__________

19. If choosing C
19.1 If most people prefer C and that system was implemented, would you be willing to contribute 45 000 Dong per month to the health care fund?
   1= yes
   2=no
If yes: What is the maximum amount you would be willing to contribute per month?__________
If no: What is the maximum amount you would be willing to contribute per month?__________

19.2. If B was compulsory and implemented, would you be willing to contribute 45 000 Dong per month to the health care fund?
   1= yes
   2=no
If yes: What is the maximum amount you would be willing to contribute per month?__________
If no: What is the maximum amount you would be willing to contribute per month?__________