Determinants of Out-of-pocket Health Expenditure in China: Analysis Using China Health and Nutrition Survey Data

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China Health and Nutrition Survey のデータ分析

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Supervisor: Professor Yasuki Kobayashi

Department of Public Health, Graduate School of Medicine,
the University of Tokyo

Admission Date: April 2006

A Dissertation Submitted to the Graduate School of Medicine,
the University of Tokyo in Partial Fulfillments
for the Degree of Doctor of Public Health

尤　雪　丹
You Xuedan

March 2010

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ABSTRACT

Background: Out-of-pocket health expenditure has become the primary source of health financing in China. Its share in the total health expenditure increased to 49 percent from 20 percent with a peak at 60 percent since 1978 to 2006. To estimate the determinants of individual out-of-pocket health expenditure in China, we conducted this study.

Methods: We used a sub-sample of adults aged eighteen and over from 2004 China Health and Nutrition Survey data. Heckman selection model was conducted to control for potential sample selection bias.

Results: 24.6 percent of the sampled population (n=9,860) reported recent health problems; among them, 80.7 percent utilized health care. The median out-of-pocket health expenditure was 55 Renminbi (7 Renminbi = US$ 1). Poor health status, perceived quite serious illness and age over 65 have the highest coefficients at 3.345, 2.024 and 1.172, respectively. Income elasticity is positive at 0.18. Urban residents and individuals with chronic diseases, with health insurance, from a higher educated-head household, or reside in the middle or eastern region pay more for health care.

Conclusion: Need, predisposing and enabling factors work together to determine out-of-pocket health expenditure. Appropriate medical relief policies focusing on the population with high financial burden need to be considered.

Key words: Determinants; Out-of-pocket health expenditure; Sample selection bias; China

Chapter 1   Introduction

1.1   Background

From 1978 to 2006, the total expenditure on health care in China increased from 11.0 billion

Renminbi (7 Renminbi = US$ 1) to 984.3 billion Renminbi, in terms of gross domestic product

(GDP), it was an increase from 3.0 percent to 4.7 percent (Figure 1) (Data source: National Bureau of

Statistics, 2008; World Bank, 2005). The average growth rate of real total health expenditure was

11.6 percent annually, which was notably faster than annual GDP growth rate of 9.2 percent (Table

1) (Data source: National Bureau of Statistics, 2008; World Bank, 2005).

Within the total health expenditure, direct out-of-pocket health expenditure paid by individuals

rose the most. The share of out-of-pocket health expenditure increased from 20.4 percent in 1978 to

49.3 percent in 2006, peaking at 60.0 percent in 2001 (Figure 2) (Data source: National Bureau of

Statistics, 2008; World Bank, 2005), leading China to be one of the countries with the highest

out-of-pocket payment share in Asia (Figure 3) (Data source: World Health Organization, 2009). In

contrast, the share of government health expenditure decreased from 32.2 percent to 18.1 percent, and

the share of social health expenditure fell from 47.4 percent to 32.6 percent during the same period.

The average out-of-pocket payment by an individual to get health care services was 369.2

Renminbi in 2006 and about 158 times (in nominal terms) what it was in 1978 (Figure 4) (Data

source: National Bureau of Statistics, 2008; World Bank, 2005), in real terms, it increased more

than 34 times. The average growth rate of real per capita out-of-pocket health expenditure was

14.6 percent during the same period (Table 3) (Data source: National Bureau of Statistics, 2008;

World Bank, 2005). The spending share devoted to health care in per capita annual living expenditure was about 2.7 percent in 1993, and this rose greatly to 7.5 percent in 2006 (Figure 5) (Data source: National Bureau of Statistics, 1994-2007).

Out-of-pocket health expenditure has become the primary source of health financing in China. The average cost of a single hospital admission was almost equivalent to the national per capita annual income (Ministry of Health, 2004), as a result, high out-of-pocket health spending puts individuals at great financial risk. According to the results of the third National Health Services Survey conducted in 2003, 27.8 percent of urban residents and 30.3 percent of rural residents, who reported health problems within the past two weeks, forwent inpatient hospital services recommended by health professionals, and the main reason was that they could not afford expensive payment for treatment (Ministry of Health, 2004). For households, medical issue has become a larger concern than any other issue in China now (Watts, 2008).

The role of individual finances in the funding of health care underscores the importance of understanding the determinants of individuals' decisions on whether to utilize health care and, to some extent, how much to pay for health care in China. Furthermore, these estimates are useful to provide important contextual and baseline information for planning the health care services and health financing reforms, and for measuring the impacts of implemented and proposed policy changes on financial access to health care services, the efficiency of resource allocations, and the equity of paying for health care services.

However, the process of determining health care utilization and the amount of health

expenditure has not been well examined in China. Existing studies on out-of-pocket health

expenditures have just described the long-term trend of out-of-pocket health expenditure and the

share of out-of-pocket payment in national total health expenditure (Hu, Tang, Liu, Zhao, Escobar

and de Ferranti, 2008; Zhang and Kanbur, 2005) or focused primarily on the impacts of health

insurance scheme or health project on individual's out-of-pocket health spending (Wagstaff and Yu,

2007; Wagstaff and Lindelow, 2008). To fill this gap, we conducted this study.

1.2   Objective and structure

The objectives of this study are to present a detailed analysis of the determinants of

out-of-pocket health expenditure, and to improve the understanding of the contributing factors to

out-of-pocket health expenditure in China. This paper is structured in the following way. In chapter 2

we reviewed the literature on the determinants of health expenditure at both the macro level and the

micro level; in chapters 3 and 4 we presented the methods and results; in chapter 5 we discussed the

main results; and in the last chapter we gave the conclusion.

Chapter 2　Literature review

2.1　Macro level study

At the macro level, most of the studies which analyze the determinants of health expenditure are international comparison of total health expenditure at national level in high-income countries (Barros, 1998; Gerdtham, Sogaard, Andersson and Jönsson, 1992a; Gerdtham, Søgaard, Jönsson and Andersson, 1992b; Gerdtham, Jönsson, MacFarlan and Oxley, 1998; Hitiris and Posnett, 1992; Hitiris, 1997; Narayana and Narayana, 2008; Newhouse, 1977; Newhouse, 1987; Okunade, 2004; Parkin, McGuire and Yule, 1987; Schieber, 1990; Sen, 2005). Only A few studies used data from Africa countries (Gbesemete and Gerdtham, 1992; Okunade, 2005) and one study (Chou, 2007) used China data to analyze the contributing factors of rising total health expenditure.

The approach of analyzing total health expenditure did not consider the components of health expenditure, which may mask the existence of a different pattern of behavior in public and private health expenditures (Clemente, Marcuiello, Montanes and Pueyo, 2004). Recently, several studies in developed countries analyzed the determinants of public health expenditure at provincial/state/ regional level (Crivellia, Filippinia and Moscaa, 2006; Di Matteo and Di Matteo, 1998; Di Matteo, 2005; Gianonni and Hittris, 2002; Murthy and Okunade, 2000). Since the great bulk of health expenditure in developed countries is publicly financed, for example, financed by taxes or compulsory social insurance contributions, no study has analyzed the determinants of private health expenditure.

The rising trends of health expenditure have been propelled by three main drivers: income,

demography and technology.

2.1.1 Income

An extensive empirical literature has sought to determine whether health care behaves more like a "luxury" good (income elasticity greater than one, responding with a more than proportional increase to income growth) or as a "necessity" (income elasticity below one, responding with a less than proportional increase to income growth). The results, however, remain largely inconclusive (Gerdtham and Jönsson, 2000; Getzen, 2000). Nevertheless, rising income is a main driver of rising health spending which has been largely reported (Barros, 1998; Di Matteo, 2005; Gbesemete and Gerdtham, 1992; Gerdtham, Sogaard, Andersson and Jönsson, 1992a; Gerdtham, Søgaard, Jönsson and Andersson, 1992b; Gerdtham, Jönsson, MacFarlan and Oxley, 1998; Gerdtham and Lothgran, 2000; Hitiris and Posnett, 1992; Hitiris, 1997; Newhouse, 1977; Newhouse, 1987; Parkin, McGuire and Yule, 1987; Pfaff, 1990; Sen, 2005).

2.1.2 Demography

The aging population, commonly expressed as an increase in the proportion of the population aged over 65, is often identified as one of the primary drivers of health expenditures (Di Matteo and Di Matteo, 1998; Di Matteo, 2005; Gerdtham, Sogaard, Andersson and Jönsson, 1992a; Gerdtham, Søgaard, Jönsson and Andersson, 1992b; Gerdtham, Jönsson, MacFarlan and Oxley, 1998; Hitiris and Posnett, 1992; Meara, White and Cutler, 2004; Seshamani and Gray, 2002; White, 2007). With aging of the baby-boom generation (who will start turning 65 years and older in 2010s), further gaining in life expectancy, and declining fertility rate, the proportion of the elder people will continue

to increase. Latest research suggests that the increasing share of the older population will accelerate up to 2035 and decelerate after that (Lutz, Sanderson and Scherbov, 2008). Thus, the inflationary effect of demography on health expenditure is set to increase in the future if the projection becomes reality.

Instead, recent studies indicated that approaching death, rather than age, may be the main demographic driver of health expenditure (Scitovsky, 1994; Seshamani and Gray, 2004a; Stooker, van Acht, van Barneveld, van Vliet, van Hout, Hessing and Busschbach, 2001). The treatment costs increased sharply in the final years before death, which has been documented convincingly in many studies with data from various countries (Lubitz and Riley, 1993; Miller, 2001; Seshamani and Gray, 2004a; Seshamani and Gray, 2004b; Stearns and Norton, 2004; Zweifel, Felder and Meier, 1999). However, some scholars argued that health costs in the last years of life depended on age of death (Busse, Krauth and Schwartz, 2002; Felder, Meier and Schmitt, 2000; Lubitz, Beebe and Baker, 1995; Polder, Barendregt and van Oers, 2006; Schellhorn, Stuck, Minder and Beck, 2000; Zweifel Felder and Meier, 1999). Costs were high for people dying at comparatively younger ages, and turned out to decrease with increasing age of death. Lubitz, Beebe and Baker (1995) showed that Medicare expenditures in the last 2 years of life for decedents aged 70 were around 50 percent higher than for persons who died at age 90. It is claimed that the improvements in life expectancy will dampen rather than accelerate the growth of health expenditures (Miller, 2001; Payne, 2009).

2.1.3 Technology

Once demographic and income effects are taken into account in explaining the increases in

health expenditure, a residual growth remains. It has been suggested that technological changes underlies this residual expenditure growth (Berndt, Cutler, Frank, Griliches, Newhouse and Triplett, 2000; Cutler and McClellan, 2001; Newhouse, 1992; Okunade and Karakus, 2001; Okunade and Murthy, 2002; Zweifel, 1984). Some forms of technological progress can be cost-saving and reduce the price of individual treatments and improve cost effectiveness (Cutler, McClellan and Newhouse, 1998). However, if new technologies increase the variety and quality of medical products available, even if their price remains the same or increases, demand for new treatments is also likely to increase. The net effect of technological innovation therefore on health expenditure tends to be inflationary.

Since the early 1980s, some scholars have already linked technology utilization, insurance coverage, and rising health expenditures theoretically (Cutler and McClellan, 1996; Newhouse, 1981; Weisbrod, 1991). However, empirically, the research estimating the potential effects of technology on the rising health expenditure has been very scanty. One possible reason for this neglect is the difficulty of selecting an appropriate proxy for technological changes in medical care (Ahern, 1993). Surgical procedures (Weil, 1995), the number of specific medical equipments, such as MRI (Baker, 2001), a time index (Di Matteo, 2005; Gerdtham and Lothgran, 2000), total research and development (R&D) spending and R&D spending specific to health care (Okunade and Murthy, 2002) have been used as indicators of technological progress. However, what is the best indicator of technological change is still debatable.

2.2   Micro level study

Although a large number of studies have analyzed the determinants of health expenditure at the macro level, little attention has been given to the micro aspects of the health expenditure determinants by the researchers. According to our knowledge, only several studies (Chaze, 2005; Hjortsberg, 2003; Musgrove, 1983; Okunade, Suraratdecha and Benson, 2009; Parker and Wong, 1997; Rous and Hotchkiss, 2003; Rubin and Koelln, 1993; Su, Pokhrel, Gbangou and Flessa, 2006) conducted detailed analysis for the determinants of health expenditure at the micro level. Microeconomic survey data has been used to study individuals' and households' behaviors of paying for health care services. Most of these studies focus on the out-of-pocket health expenditures and are carried out in developing countries.

Theoretically, expenditures by individuals on health care are directed toward particular goods and services in order to satisfy desires for a more general good ('health'). The individual seeks maximum utility or satisfaction in life, which is derived from her/his own health and from the consumption of other commodities. The process by which health is built up by investment or lost by depreciation or accident can be described by models of utility maximization under a variety of constraints and suppositions (Grossman, 1982).

Empirically, all the studies (Chaze, 2005; Hjortsberg, 2003; Musgrove, 1983; Okunade, Suraratdecha and Benson, 2009; Parker and Wong, 1997; Rous and Hotchkiss, 2003; Rubin and Koelln, 1993; Su, Pokhrel, Gbangou and Flessa, 2006) documented the positive statistical significance of economic status on health expenditure. The reported income elasticities vary greatly across studies, ranging from 0.32 among households that are both small (less than 5 members) and

in the poorest income quintile in Tailand (Okunade, Suraratdecha and Benson, 2009) to 1.6 among

households that are both uninsured and in the poorest half of the sample (Parker and Wong, 1997)

Age has been reported to be a significant positive driver of greater health expenditure,

although different studies used different specification for age in the expenditure equation, for

example, Okunade, Suraratdecha and Benson (2009) used median household age; Rous and

Hotchkiss (2003) categorized individual's age into seven groups; and Rubin and Koelln (1993) used

age of reference person in the household. In addition, one recent study (Okunade, Suraratdecha and

Benson, 2009) tried to include proximity to death into the expenditure equation and found a

significant positive effect on health expenditure.

Health insurance status (Hjortsberg, 2003; Rubin and Koelln, 1993) and urban/rural status

(Hjortsberg, 2003; Musgrove, 1983; Rous and Hotchkiss, 2003) are significantly associated with

health expenditure. Because of the different situations in different countries, the reported signs of

the association are inconclusive. Type of illness (using malaria as a reference) (Hjortsberg, 2003; Su,

Pokhrel, Gbangou and Flessa, 2006) and perceived severity of illness (Su, Pokhrel, Gbangou and

Flessa, 2006) are also significant determinants of health expenditure.

Household head characteristics, such as age, sex and education are reported to be associated

with health expenditures. Generally, individuals living in households with older head spend less on

health care (Rous and Hotchkiss, 2003), while living in female-headed households (Okunade,

Suraratdecha and Benson, 2009; Su, Pokhrel, Gbangou and Flessa, 2006), and households with

higher educated head (Okunade, Suraratdecha and Benson, 2009; Rubin and Koelln, 1993; Su,

Pokhrel, Gbangou and Flessa, 2006) spend more on health care. In addition, household size

(Okunade, Suraratdecha and Benson, 2009; Rous and Hotchkiss, 2003; Rubin and Koelln, 1993),

household housing and sanitary conditions (Rous and Hotchkiss, 2003) are found to have a

substantial effect on health expenditures.

Chapter 3   Methods

3.1   Data

Data is derived from the China Health and Nutrition Survey (CHNS), an international

collaborative project between the University of North Carolina and the Chinese Center for Disease

Control and Prevention. It is an ongoing longitudinal survey initially conducted in 1989 in eight

provinces and increased to nine provinces since 1997. While the survey is not nationally

representative, the provinces do vary substantially in geography, stage of economic development and

health status. A multistage, random cluster process was used to draw the sample surveyed in each of

the provinces. For each province, four counties (1 low-income, 2 middle-income, and 1 high-income,

based on per capita income reported by the National Bureau of Statistics) were selected using a

weighted sampling scheme. The provincial capital city and a lower-income city were also selected.

One county capita and three villages within each county, and two urban and two suburban

neighborhoods within each city were selected randomly, for a total of 190 primary sampling units

(PSU) at baseline. Twenty randomly selected households were surveyed within each PSU, and all

individuals within the selected households were interviewed.

The present study uses a dataset from the 2004 CHNS (China Health and Nutrition Survey

Research Team, 2004), which covers about 4,400 households from nine provinces. A sub-sample of

adults aged eighteen and over is included in this study. Information on a wide range of topics,

including individual demographic and socioeconomic background, household characteristics, type

of health insurance, self-reported health status, self-perceived severity of illness, utilization of

curative health care services, and out-of-pocket health payments are available in the dataset. To get

curative health care utilization, individuals were asked "During the past 4 weeks, have you been

sick or injured? Have you suffered from a chronic or acute disease?". Individuals who answered

"yes" were asked whether health care was utilized, and were asked to provide the amount of health

expenditures for the episode if utilized health care.

3.2   Variable specification and measurement

3.2.1   Outcome variable

We used out-of-pocket health expenditure as outcome variable. Out-of-pocket health

expenditures are expenditures paid by the individuals themselves when they obtained all kinds of

health care services, including the payments for consultations, examinations, medicines, and

additional payments related to the treatment, and are net of any reimbursement that the individuals

have received or expect to receive from their health insurance programs.

A series of questions were asked to get the amount of health expenditures for recent health

problems. Individuals who reported illness within 4 weeks prior to the survey were asked "what

did you do when you felt ill?". Those who answered "self care" were asked "How much money

did you spend on the illness or injury?" (HE1). Those who answered "saw the local health

worker" or "saw a doctor" were firstly asked "Where did you see a doctor?", and followed by two

questions on the amount of health expenditures. One is "How much did this treatment cost or has

this treatment cost so far (including all registration fees, medicines, treatment fees, bed fees,

etc.)?" (HE2), the other one is "How much money was spent or has been spent on treating your illness or injury in addition to the costs mentioned above?" (HE3).

For the three questions (HE1, HE2 and HE3) on health expenditures, individuals were asked to give the specific amount of money. However, if health insurances covered all expenses, the answers for HE1 and HE2 were recorded as -888 and -8888, respectively. -888 and -8888 were replaced by zero when deriving out-of-pocket health expenditure. Additionally, another question on reimbursement by health insurance was also asked after the question of HE2, which was "What percentage of these costs was paid by insurance or may be paid by insurance? (%) (HE4)". For those who self cared, the amount reported in question HE1 was the out-of-pocket health expenditure. For those who sought care in health care providers, out-of-pocket health expenditures were derived from the other three questions (HE2, HE3 and HE4) through the following simple formula.

AHE2 * (1 - PHE4/100) + AHE3

AHE2 is the amount of health payment reported in question HE2. PHE4 is the percentage of health payment reported in question HE2 paid or may be paid by health insurance programs. AHE3 is the amount of health payment reported in question HE3.

3.2.2 Explanatory variable

We assume that individuals decide whether to seek health care or not when they are injured or ill based on weighing the potential benefits and costs of health care. As perceived by the individuals, many factors affect the costs and benefits of treatment options. We used Andersen's Behavioral

Model (Aday and Andersen, 1974), which has been frequently used in North America and China (Lin, Wu and Lee, 2003; Ruy, Young and Kwak, 2002), to specify the explanatory variables for determining individual out-of-pocket health expenditure. In this behavioral model, the variables that determine the demand for health care fall into three categories: predisposing, enabling, and need factors.

Based on the survey data, age, sex, ethnicity, and household head characteristics are classified as predisposing factors; rural-urban status, geographic region, education, per capita household income, and health insurance status are classified as enabling factors; and perceived severity of illness, self-reported health status, presence of physician-diagnosed chronic diseases, and overweight are classified as need factors. The description of these explanatory variables is summarized in Table 3.

Age is categorized into four groups since it may have a nonlinear relationship with health expenditure. Ethnicity is divided into two groups: Han (the largest ethnicity in China) and minority (the other 55 minority groups). Per capita household income is calculated by dividing total household income from all sources by the number of household members and log transformed. We replaced zeros and negative values of per capita household income by 1 so that they could stay in the dataset after log transformation. To see the disaggregated effect of income, categorized income variables were also created.

Health insurance status is defined according to the survey questions about coverage by government insurance (gongfei yiliao), labor insurance (laobao yiliao), cooperative medical

schemes (hezuo yiliao), commercial insurance (shangye baoxian), and unified planning medical

service (tongchou yiliao). Government insurance is mainly for government employees, labor

insurance is employee-based health insurance for non-government workers, cooperative medical

scheme is a kind of community-based health insurance in rural area, and unified planning medical

service is the health insurance scheme that covers only catastrophic conditions.

Self-reported health status is categorized into three groups, which are good or excellent, fair

and poor, based on the answers to one simple question that "Right now, how would you describe

your health compared to that of other people with your age?". The individuals who reported recent

illness or injury were asked that "How severe was the illness or injury?" with the answers of "not

severe", "somewhat severe" and "quite severe" to find the self-perceived severity of the recent

health problem. Physician-diagnosed chronic conditions included in the dataset were high blood

pressure, diabetes, myocardial infarction and apoplexy. These information came from four

independent yes-no questions which were "Has a doctor ever told you that you suffer from high

blood pressure?", "Has a doctor ever told you that you suffer from diabetes?", "Has a doctor ever

given you the diagnosis of myocardial infarction?", and "Has a doctor ever given you the diagnosis

of apoplexy?". We define overweight as a body mass index equal to or higher than $24kg/m^2$, based on

the diagnostic criteria in China (Chen and Lu, 2004).

China is geographically grouped into urban and rural areas, and economically grouped into

eastern, middle and western regions. Urban residents refer to all those residing in towns and urban

neighborhoods of cities, and rural residents refer to those residing in villages and suburban

neighborhoods of cities. Economically, the eastern region is the most developed, the middle region

is less developed, and the western region is the least developed. Among the provinces in the survey,

Liaoning, Shandong and Jiangsu are in the eastern region, Heilongjiang, Henan, Hubei and Hunan

are in the middle region, and Guizhou and Guangxi are in the western region (Figure 6).

3.3   Econometric model

Health expenditure data is characterized by a large cluster of data at zero, and a right skewed

distribution of the remaining observations. People who did not get sick or did not seek medical care

even though they reported illness generally spend zero. Those who do perceive themselves as ill and

do seek medical care, spend a varying amount of money on treating the illness. There are a large

number of outliers with extremely expensive medical care. We trimmed outliers, the top one percent

of cases, in the individual out-of-pocket health expenditure distribution. The natural log of

out-of-pocket health expenditure was used to reduce the effects of the skewed nature of the health

expenditure variable.

The analysis of individuals' health expenditure decisions, which is based on a sample that

excludes individuals who did not report paying for health care, is problematic (Hjortsberg, 2003;

Rous and Hotchkiss, 2003; Su, Pokhrel, Gbangou and Flessa, 2006). Traditional Ordinary Least

Square (OLS) regression models are inadequate (Wooldridge 2002). Individuals in developing

countries generally do not seek health care unless they perceive themselves as ill or injured. If there

are unobserved factors that are correlated with perception of illness and the amount they spent on

health care, the coefficients in the expenditure equation will be biased (Rous and Hotchkiss, 2003).

In this paper, we use a full maximum likelihood procedure of Heckman selection model to control for potential sample selection bias. Cluster effect within the same household was controlled for in the model.

The model considered in this study is:

$$y_{1i} = \beta x_i + \mu_i \tag{1}$$

$$y_{2i} = \alpha w_i + v_i \tag{2}$$

$$s_i = I\,(y_{2i} > 0),\ i = 1,2,\ldots,n \tag{3}$$

s_i is a sample selection indicator, where $I\,(\,.\,)$ is an indicator function such that $I\,(\,.\,) = 1$ if $.$ is true and 0 otherwise. y_{2i} is positive only if the individual reported themselves recently ill and had sought health care. y_{1i} is the level of out-of-pocket health spending, which is observed only when $s_i = 1$. In the first two equations, x_i and w_i are a set of covariates, α and β represent a set of parameters to be estimated, and μ_i and v_i are error terms.

We used SAS 9.1 to clear the original dataset, and STATA 10.0 to conduct the econometric analysis.

Chapter 4   Results

4.1   Descriptive results

A total of 9,860 respondents aged eighteen and over are included in the analysis. The mean age of the sampled population is 47.6 years (SD 15.5). Table 4 shows the percentage of individuals who reported illness and utilized health care. Overall, 24.6 percent of the sampled population reported to have experienced an illness or injury within the four weeks prior to the survey; among them, 80.7 percent utilized health care. Urban residents reported a higher rate of illness compared with the rate reported by those living in rural area (31.0 percent vs. 21.3 percent). Among those who sought care, 82.3 percent reported the amount of direct payment for health care. The median out-of-pocket health expenditure is 55 Renminbi.

Table 5 presents the type of symptoms reported in the past four weeks. The most common symptoms reported are fever, sore throat or cough (35.4 percent), joint or muscle pain (26.5 percent), headache or dizziness (24.3 percent), and diarrhea or stomachache (15.5 percent). Symptom types show different patterns by age. The median age of those people reported experiencing heart, eye or ear problems is above 60 years, which is much higher than the median age (around 50 years) of those reported to have experienced respiratory or gastroenteric problems. 64.2 percent of those experienced recent health problems reported only one type of symptom, 19.5 percent reported 2 types, and about 11 percent reported three or more types of symptoms (Table 6).

Table 7 gives the percentage distribution of the individuals who sought care based on the type of health care utilized. Self-medication is found to be very extensive among the sampled individuals.

36.1 percent of the individuals who reported recent illness chose self-medication, with a higher percentage among those living in urban area (46.7 percent) and from the wealthiest households (44.3 percent). 23.5 percent of the individuals reported going to a county or higher level hospital to seek health care, and this rate was higher among urban residents and richer people.

Figure 7 shows the median out-of-pocket expenditures made for each type of health care by income quintile. Median payment is the lowest for self-medication (20 Renminbi) and at village clinic (30 Renminbi) and the highest at county or higher level hospitals (230 Renminbi). The poorer paid more than the richer at higher level hospitals, where the poorest quintile has the highest median payment, which is 450 Renminbi and about twice the median payment among all respondents. At private clinic, the richest and the second-richest quintile paid more than the poorer. However, the Kruskal Wallis test shows that there are no significant differences in the distribution of payments by income quintile for each type of health care provider.

Descriptive statistics for outcome variable and explanatory variables are presented in Table 8. Among the sampled individuals, 15.6 percent are older than 65 years, 48.1 percent are male, 10.5 percent are minority groups, 15 percent have no formal school education, 74.3 percent have no any kind of health insurance, and 34.6 percent live in urban area. 40.4 percent reported fair or poor health status, 10 percent have chronic disease, and 36.9 percent are overweight. The median per capita household income is 4320 Renminbi. About the household heads, the average age is 53.3 years (SD 12.6), 85.1 percent are male and 55.5 percent have middle school or above education. 11.6 percent of the sampled households have no piped water supply, 25.1 percent have excreta

around their houses, and 58.1 percent have no flush toilet.

Compared with those who did not report any payment for health care, those who reported out-of-pocket payment are older, with lower level of education, with health insurance, with poor or fair health status, with chronic disease, overweight, with higher income, from a household where the head is older, female or has lower education, and from a household with good water, poor sanitation or good toilet. More female, more individuals belonging to Han group or living in urban area or eastern region reported the amount of out-of-pocket health expenditure.

4.2 Regression results

Table 9 presents the Probit estimation results of the Heckman selection model for the probability of health care utilization. Model I, the base model, shows that self-reported health status is the most important factor for the probability of using health care, with the coefficients of 0.574 ($P<0.01$) and 1.391 ($P<0.01$) for fair and poor health status, respectively. Older people, male, those with health insurance, those with chronic diseases, and those living in urban area are more likely to seek health care than their counterparts. Good sanitation around the household significantly decreases the probability of health care utilization. The effects of education and income are not significant.

Model II adds the effect of the regional block area to the base model. Compared with those living in western region, those living in the east are more likely to utilize health care. Model III performs the same analysis using disaggregated health insurance and disaggregated income indicators, and shows that only those with access to labor insurance and cooperative medical

scheme have a significantly higher probability of seeking health care than do those without insurance. The coefficients of the other explanatory variables remain largely unchanged. The income-insurance interaction variable is added in Model IV. An insignificant result suggests that the effect of health insurance on health care utilization does not change as income increases.

Table 10 shows the estimated OLS results of the Heckman selection model for out-of-pocket health expenditures. Statistical significance of rho, the correlation between the error terms (μ and ν) in equation (1) and (2) implies that it is inappropriate to assume there is no sample selection bias when analyzing the individuals decisions on the amount to spend on health care.

Model I shows the base model with the aggregate health insurance and income variables. Perceived severity of illness and self-reported health status are the most important factors, with the coefficients of 2.024 ($P<0.01$) and 3.345 ($P<0.01$) for quite serious illness and poor health status, respectively. People spend more as they grow older, especially as they exceed age 65, with the coefficient of 1.172 ($P<0.01$). Health insurance significantly increases the out-of-pocket spending on health care. The effect of income is significantly positive, and the income elasticity is 0.18. People who are overweight, have chronic disease, reside in urban area, or live in a household with a head having middle school or higher education pay more for health care. Sex and education are not significant after controlling for other variables.

Regional variable is included in Model II. Those living in middle or eastern region spend more on health care than those living in the west. The independent effect of overweight disappears after controlling for the effect of region. It is possible that the regional variable captures its effect.

Model III shows the disaggregated insurance and disaggregated income effects. The coefficients of insurance programs are positive, except for commercial insurance, and significant for labor insurance, with the coefficient of 0.616 ($P<0.05$). Although the aggregate income effect shows that people with higher income spend more on health care, only those in the highest income quintile spend significantly more than those in the lowest income quintile. No significant differences are found among those in the lower four income quintiles.

The interaction term between insurance and income quintile is not significant in Model IV, which suggests that the effect of health insurance on the amount of out-of-pocket health expenditure does not differ among people with different income levels.

Table 11 presents the results of Heckman selection model using all observations. The estimated income elasticity is about 0.20, which is a little higher than the estimate without the outliers, who reported relatively high income and extremely high out-of-pocket health expenditure. No much difference on the estimates of other coefficients was found between the regressions with and without outliers.

Chapter 5   Discussion

5.1   Health needs

The results of our analysis are consistent with the common perception that the decision concerning whether to use health care and how much to pay for health care depend on the severity of the illness. Our analysis also shows that self-reported health status, as a proxy measure of health need, is the most important contributor to health care utilization and health expenditure. The importance of self-reported health status on health care utilization have been reported by existing studies on other countries (Geitona, Zavras and Kyriopoulos, 2007; Mulunpalo, Vuori I, Oja P, Pasanen and Urponen, 1997; Nelson, McHorney, Manning, Rogers, Zubkoff, Greenfield, Ware and Tarlov, 1998). Furthermore, several studies (Chou and Chi, 2004; Dunlop, Coyte and McIsaac, 2000; Fleishman, Cohen, Manning and Kosinski, 2006; Lam, Fong, Lauder and Lam, 2002) have also identified self-reported health status as an important predictor of the health expenditure.

It should be noted that the measure of self-reported health status may suffer potential bias. First, respondents are being asked for subjective judgments and there is no reason to expect that these judgments will be entirely comparable across respondents (Bound, 2000; Waidmann, Bound and Schoenbaum, 1995). Second, respondents may assess their own health with some "error" (Waidmann, Bound and Schoenbaum, 1995). For example, Tourangeau and Smith (1996) suggest that people respond less candidly to sensitive questions when being personally interviewed as opposed to self completing a form. With respect to health questions particularly, Grootendorst, Feeny and Furlong

(1997) reported that self-completed questionnaires revealed more morbidity than face-to-face interview. Lastly, a single question scale was used to elicit health status in CHNS. Ornstein (1998) suggests that the single item measures are not as reliable as multiple item measures.

The lack of comparability across individuals and the underlying uncertainty of self-assessment represent measurement error that is likely to lead to a prediction of attenuation bias, the coefficient is biased towards zero, so the impact of health on outcome variable may be underestimated (Bound, 2000; Crossley and Kennedy, 2002). To get consistent estimates, one alternative would be to use the multiple measures of self-reported health status to first gauge the magnitude of the errors and then correct the bias introduced by these errors; the other alternative would be to choose to use the second measurement to instrument the first measurement (Bound, 2000; Crossley and Kennedy, 2002). However, the lack of information in the dataset does not allow us to try these methods.

Although there are a number of reasons to be suspicious of the measurement of health status, some researchers have argued in favor of using self-reported information (Sickles and Taubman, 1986). Some studies reported the reliability and predictive validity of self-reported health measures (Ferraro, 1980; Idler and Benyamini, 1997; LaRue, Bank, Jarvic and Hewtland, 1979; Maddox and Douglas, 1973; Mossey and Shapiro, 1982). Additionally, we believe that the respondents who participated in China Health and Nutrition Survey know relatively well about their health status considering it is a longitudinal survey, where most of the respondents have responded to a number of detailed questions about some aspects of their health status for several times.

In addition, individuals with chronic diseases, including high blood pressure, diabetes,

myocardial infarction and apoplexy, reported significantly higher out-of-pocket health expenditures. This result deserves concern since China has experienced an epidemiological transition shifting from the infectious to the chronic diseases in a short time (Yang, Kong, Zhao, Wan, Zhai, Chen and Koplan, 2008). In 2003, the chronic diseases accounted for 85 percent in urban area and 84 percent in rural area of all deaths in China (Ministry of Health, 2004). The prevalence and financial burden of chronic diseases suggest a need to develop effective polices to guarantee the patients with chronic conditions to receive necessary treatment.

5.2   Age, sex and education

An age of 65 years and over is another important contributor to the amount of out-of-pocket health expenditure, which finding is consistent with those of other studies (Bertakis, Azari, Helm, Callahan and Robbins, 2000; Murphy and Hepworth, 1996; Rous and Hotchkiss, 2003). As of the end of 2008, Chinese population aged 65 and over was 109 million, accounting for 8.3 percent of the nation's total population (People's Daily Online, 2009). This age group is expected to increase to 235 million (15.7 percent) and 334 million (22.7 percent) by 2030 and 2050, respectively (United Nations, 2002). Meeting the long term health care needs of this growing elderly population poses special challenges to the current Chinese health care system.

Sex and education variables, although commonly used as the major medical-risk adjustment factors, are not significant contributors to the amount of out-of-pocket health expenditure. Several other studies (Hornbrook and Goodman, 1996; Hulka and Wheat, 1985; Nelson, McHorney, Manning, Rogers, Zubkoff, Greenfield, Ware and Tarlov, 1998) have also found that the

socioeconomic effects on health care service utilization disappear when perceived severity of illness and self-reported health status are controlled for. Our findings are similar to those of the other study that specifically refers to China (Lam, Fong, Lauder and Lam, 2002).

5.3 Income

The income elasticity at individual level is estimated to be 0.18, which signifies that 10 percent higher per capita household income is associated with 1.8 percent higher out-of-pocket health expenditure. Our estimated income elasticity is comparable with the estimate using data prior to 1960 in developed countries (Weeks, 1961; Anderson, Collette and Feldman, 1960), when health insurance was less prevalent and most payment was made out-of-pocket.

Compared with the estimates from the studies using recent data in developed countries, where the income elasticities are around zero or negative (Manning, Newhouse, Duan, Keeler, Benjamin, Leibowitz, Marquis and Zwanziger, 1987; Wagstaff, van Doorslaer and Paci, 1991; Wedig, 1988), our estimate of income elasticity is higher. It is reasonable given that in China, where the government financial input to health care is small and the coverage of effective health insurance is low, the individual's decisions of how much care to use and how much money to spend on health care depend much on their budget constraints and ability to pay. However, in many developed countries, where health care is heavily subsidized and health insurances remove the individual's budget constraint, the ability to pay is a less important determinant of health expenditure.

On the other side, our estimate of income elasticity is smaller than the estimates from the studies carried out in developing countries, where the income elasticities are usually larger than one.

For example, using the 1974 data from Brazilian, Musgrove (1983) measured an income elasticity

of 1.17, using the 1989 data from Mexico, Parker and Wong (1997) measured the income

elasticities of 0.96 to 1.60, using the 1995 data from Nepal, Rous and Hotchkiss (2003) measured

an income elasticity of 1.10, using 1998 data from Zambia, Hjortsberg (2003) measured an income

elasticity of 0.646. We noticed that these elasticities are obtained from the population almost

uncovered by health insurance, for whom the ability to pay is a much more important determinant

of health expenditure.

Our result that the economic status of the household is positively related to the magnitude of

out-of-pocket health expenditure is consistent with the studies on other developing countries in Asia

(Roy and Howard, 2007; van Doorslaer, O'Donnell, Rannain-Eliya, Somanathan, Adhikari, Garg, et

al, 2007). This finding suggests that individuals who are better off spend more on health care than

those worse off, which seems to be fair considering the vertical equity in health care financing

(Wagstaff and van Doorslaer, 2000). However, some cautions should be exercised in interpreting this

result.

On one hand, the disaggregated income effect shows that only those in the highest income

quintile spend significantly more than those in the lowest income quintile, suggesting that, except for

the richest respondents, the poor are spending out-of-pocket as much on health care as everyone else.

On the other hand, in the absence of effective risk-pooling mechanisms as the situation in China, the

poor are highly possible to report less illness and use less health care despite a greater incidence of

illness than the rich. If so, the out-of-pocket health payments being in accordance with the ability to

pay cannot be interpreted as "equity" in the finance of health care. Unfortunately, our data does not allow us to identify the impediment of the utilization of needed health care among the poor.

5.4   Urban/rural status and region

After controlling for the effects of health need variables and income, people living in urban area still pay more for health care than those living in rural area. One possible explanation is that considering the time and travel costs would be incurred when seeking health care, urban residents are more convenient to access to the health suppliers charging relatively higher cost for health care services, as Table 7 shows that more urban residents reported recent health problems go directly to a county or higher level hospital. Another possible explanation is that rural and urban residents may have different preferences for utilizing health care. Urban residents may be more likely to pay for the expensive services suggested by the physicians which may be unnecessary for them, while rural residents may tend to decline the expensive services and to choose cheap alternatives.

In addition, out-of-pocket health expenditures are significantly higher among the individuals residing in the eastern and middle regions than those among the individuals living in the west. One possible explanation is that the region of residence acts as an indicator of regional variation in the prices of providing health care serves. In China, the price of health care services and the level of physicians' salaries are decided mainly by the local governments, so it is possible that these costs are higher in richer areas. The other possible reason is that most of the health care subsidy from the central government has been given to the western region to improve health care access and utilization, so it is likely that the health expenditures for those who accessed and received services in the western

region could be effectively subsidized.

5.5   Health insurance

Health insurance programs are designed to provide financial relief to enrollees by subsidizing

payments for health care services and prescribed medicines. Contrary to the expectation that

insurance coverage would lead to lower out-of-pocket health expenditures, the coefficient of

insurance is significantly positive in the aggregate models. This finding is consistent with a recent

study in China that health insurance raises rather than reduces out-of-pocket health spending

(Wagstaff and Lindelow, 2008). A possible explanation is that those with higher risk are more

likely to enroll into an insurance program than others (adverse selection). However, the coefficient

on insurance may be biased upwards if some unobserved variables are correlated with selection into

the insurance scheme, and this selection is adverse to the insurer.

Another possible explanation is that insured people may have less price consciousness when it

comes to medical expenses and a greater willingness to incur those expenses than would a person

who is responsible for the entire medical bill (moral hazard) (Rubin and Koelln, 1993). Moral

hazard may be more common among the enrollees of labor insurance program since its coefficient

is significantly positive in the disaggregate model, which is contrary to the general believe that

people enrolling into a labor insurance program are healthier and incur lower out-of-pocket health

expenditure.

Additionally, in China, the basic interventions are set the price below the cost, so as to make

them affordable, while more sophisticated interventions are priced above the cost and a margin is

added to drug sales (15% for western medicine and 25% for traditional Chinese medicine) to enable providers to make profits on them that can be used to cross-subsidize the delivery of basic interventions (Zhan, Tang, Guo and Bloom, 1997). This had encouraged health providers to purchase high technological equipments and prescribe a large number of drugs (Dong, Yan and Wang, 2008; Zheng and Hillier, 1995). The overuse of high technological examinations and over-prescription of medicines (Chen, 2006; Chen, 2007) make the problem of moral hazard even worse.

5.6 Self-treatment

An important finding not demonstrated in the multivariate analysis is self-treatment phenomenon. Many individuals self treated, rather than consulting a physician when experiencing a health problem. Individuals may purchase drugs based on their own knowledge about the illness and the effectiveness of these drugs in treating their illness. In 2004, the China State Food and Drug Administration registered approximately 10,000 "new" drugs, while only 148 new drugs were approved in the United States (Li and Wan, 2006). As a result of the rapid approval of potentially ineffective medications, long-term consequences of self-medication on the population's health could be unfavorable, ultimately increasing the instance of disease and impairing health. Self-treatment could also cause challenges in monitoring infectious and epidemic diseases. However, there is no systematic research on the reasons for and consequences of self-medication in China.

5.7 Limitation

The analysis of individual survey data has several limitations. Data was collected through a

survey, so it is subject to recall errors. The estimates of health expenditure are sensitive to the

survey instrument design. The sources of potential bias are the number of expenditure categories

used and the recall period (Battistin, Miniaci and Weber, 2003; Beckett, DaVanzo, Sastry, Panis

and Peterson 2001; Bound, 2000; Browning, Crossley and Weber 2003; Eisenhower, Mathiowetz

and Morganstein, 1991; Lu, Chin, Li and Murray, 2009; Neter and Waksberg, 1964; Winter,

2004). A lower level of disaggregation (i.e. fewer items in CHNS) gave a lower estimate for

average health spending (Lanjouw and Lanjouw, 2001; Lu, Chin, Li and Murray, 2009; Pradhan,

2001; Winter, 2004), and a shorter recall period (i.e. 4 weeks in CHNS) yielded a larger estimate

for average annual health spending (Lu, Chin, Li and Murray, 2009). Additionally, the reported

out-of-pocket payment may be lower than the actual amount since those in the hospital at the time

of the interviews were not included. For some individuals who were covered by health insurance,

the reported out-of-pocket payment may be higher than the actual amount because some of them

do not know how much their payments would be reimbursed. When all these effects are combined,

it is difficult to predict which one has the greater influence. Finally, it would have been useful to

consider factors related to health care supply, such as number and characteristics of doctors,

community health care programs, and medical care quality, because health care service utilization

could be influenced by the availability and quality of health care service providers. Unfortunately,

the information on supply factors is not available in our data.

5.8   Policy Recommendation

How to reduce current level and growth rate of out-of-pocket health expenditure without

reducing access to needed health care services or creating undue burdens for health care providers?

We gave some policy recommendations briefly in this section.

1) Increasing investment and public expenditure on health to fully implement effective health interventions. Our estimate of income elasticity of 0.18 indicates that health care behaves as a "necessity" in China, so that greater public involvement in health care is needed rather than leaving health care to market forces alone.

2) Establishing the universal health insurance system by increasing the use of prepayment mechanisms, such as through social health insurance, tax-based financing of health care, or some mix of prepayment mechanisms. Additionally, to increase the social expenditure on health, coverage of private health insurance could also be extended, particularly among middle- and high-income groups, so that the limited public resources available could be allocated largely to the poor population.

3) Reducing the copayment and improving the benefit package design to increase the effectiveness of current prepayment schemes, especially in the Rural Cooperative Medical Scheme. A restricted benefit package will cost less than a more generous package, but will also be less successful in protecting against catastrophic expenditure. A short term solution might be to focus particularly on funding services and interventions that have been proven to be cost-effective and to expand the services available over time as funding increases. Using different cost sharing level to different group of population could also be considered.

4) Developing appropriate medical relief policies, social assistance and safety net programs, particularly for the poor and other vulnerable groups, such as the elderly and those with chronic health conditions, to help them gain access to necessary health care services. These programs will be also important to protect people from financial catastrophe and impoverishment as a result of using health care services.

5) Using prospective provider payment methods and professional third-party purchaser of health services to decrease health service price, strengthen efficiency, and control moral hazard, such as over prescription, overuse of high technological examinations and long hospital stays.

Chapter 6   Conclusion

This paper uses cross-sectional survey data to examine the determinants of out-of-pocket health expenditure at individual level in China. Our results make clear that need, predisposing and enabling factors work together to determine the amount of out-of-pocket health expenditure. First, perceived severity of illness and self-reported health status are found to be the most significant determinants of the amount of individual out-of-pocket health expenditure. It may cause bias to parameter estimates if not controlled for these health need variables. Second, the effect of aging is substantial that people aged 65 and over spend significantly more on health care than those young. Meeting the long term health care needs of this growing elderly population poses special challenges to the current Chinese health care system. Third, the ability to pay is positively associated with the amount of out-of-pocket health expenditure. Income elasticity is positive but small at 0.18, which indicates that health care behaves as a "necessity" in China. Fourth, health insurance programs, despite designed to relief individuals' financial burden, tend to increase out-of-pocket health expenditures, which finding highlights the need for analysts and decision-makers to continuously monitor and rigorously evaluate the impact of ongoing health insurance reform in China.

ACKNOWLEDGEMENT

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Table 1   Total health expenditure and gross domestic product in China

Year	Total health expenditure (THE)			Gross domestic product (GDP)			THE as % of GDP
	THE (billion RMB)	Real term THE (1977 billion RMB)	Growth rate (%)	GDP (billion RMB)	Real term GDP (1977 billion RMB)	Growth rate (%)	
1978	11.0	10.9	--	364.5	362.0	--	3.0
1979	12.6	12.3	12.3	406.3	395.5	9.3	3.1
1980	14.3	13.2	7.1	454.6	417.5	5.6	3.2
1981	16.0	14.4	9.2	489.2	438.7	5.1	3.3
1982	17.8	15.6	8.8	532.3	468.6	6.8	3.3
1983	20.7	18.0	15.1	596.3	517.1	10.4	3.5
1984	24.2	20.4	13.5	720.8	608.1	17.6	3.4
1985	27.9	21.5	5.4	901.6	695.9	14.4	3.1
1986	31.6	22.9	6.3	1027.5	744.6	7.0	3.1
1987	38.0	25.6	12.0	1205.9	814.4	9.4	3.1
1988	48.8	27.7	8.2	1504.3	855.2	5.0	3.2
1989	61.6	29.7	6.9	1699.2	818.7	-4.3	3.6
1990	74.7	34.9	17.8	1866.8	872.4	6.6	4.0
1991	89.3	40.4	15.6	2178.2	984.4	12.8	4.1
1992	109.7	46.6	15.4	2692.4	1143.6	16.2	4.1
1993	137.8	51.0	9.5	3533.4	1308.5	14.4	3.9
1994	176.1	52.6	3.0	4819.8	1438.3	9.9	3.7
1995	215.5	54.9	4.5	6079.4	1549.2	7.7	3.5
1996	270.9	63.8	16.1	7117.7	1674.8	8.1	3.8
1997	319.7	73.2	14.8	7897.3	1807.6	7.9	4.0
1998	367.9	84.9	16.0	8440.2	1947.5	7.7	4.4
1999	404.8	94.7	11.6	8967.7	2098.6	7.8	4.5
2000	458.7	106.9	12.9	9921.5	2312.5	10.2	4.6
2001	502.6	116.3	8.8	10965.5	2538.1	9.8	4.6
2002	579.0	135.1	16.1	12033.3	2807.7	10.6	4.8
2003	658.4	151.8	12.4	13582.3	3131.5	11.5	4.8
2004	759.0	168.4	11.0	15987.8	3547.8	13.3	4.7
2005	866.0	188.8	12.1	18386.8	4008.0	13.0	4.7
2006	984.3	211.4	12.0	21087.1	4528.7	13.0	4.7
Average growth rate			11.6			9.2	

RMB represents Renminbi, which is Chinese currency

Data source: Data from 1978 to 2003 is from Assessing Government Health Expenditure in China (World Bank, 2005). Data for later years is from China Statistical Yearbook (National Bureau of Statistics, 2008)

Table 2   Out-of-pocket health expenditure in China

Year	Real OOP (1977 billion RMB)	Real per capita OOP (1977 RMB)	Growth rate of real per capita OOP (%)
1978	2.24	2.32	--
1979	2.50	2.56	10.3
1980	2.79	2.82	10.2
1981	3.41	3.41	20.6
1982	3.38	3.33	-2.4
1983	5.66	5.49	65.2
1984	6.66	6.39	16.3
1985	6.13	5.79	-9.3
1986	6.04	5.62	-3.0
1987	7.77	7.11	26.6
1988	8.68	7.82	10.0
1989	10.11	8.97	14.7
1990	12.48	10.91	21.6
1991	15.14	13.07	19.8
1992	18.55	15.83	21.1
1993	21.51	18.15	14.6
1994	23.10	19.27	6.2
1995	25.48	21.04	9.2
1996	32.28	26.38	25.4
1997	38.66	31.27	18.6
1998	46.56	37.32	19.3
1999	52.90	42.06	12.7
2000	63.05	49.75	18.3
2001	69.76	54.66	9.9
2002	77.98	60.71	11.1
2003	84.83	65.64	8.1
2004	90.34	69.50	5.9
2005	98.56	75.38	8.5
2006	104.21	79.28	5.2
Average growth rate			14.6

OOP is out-of-pocket health expenditure; RMB represents Renminbi, which is Chinese currency

Data source: Data from 1978 to 2003 is from Assessing Government Health Expenditure in China (World Bank, 2005). Data for later years is from China Statistical Yearbook (National Bureau of Statistics, 2008)

Table 3 Description of variables

Variable	Description
Outcome variable	
out-of-pocket health expenditure	expenditure paid directly by the individual when he/she sought care in the four weeks prior to the survey
Explanatory variable	
individual characteristics	
age 18-34 years old	reference
age 35-49 years old	=1 if 35-49 years old, =0 otherwise
age 50-64 years old	=1 if 50-64 years old, =0 otherwise
age >=65 years old	=1 if >=65 years old, =0 otherwise
sex	=1 if individual is male, =0 if female
group	=1 if minority, =0 if majority
no school	reference
1-6 years of school	=1 if 1-6 school years, =0 otherwise
7-9 years of school	=1 if 7-9 school years, =0 otherwise
>=10 years of school	=1 if >=10 school years, =0 otherwise
health insurance	=1 if with any kind of health insurance, =0 if no insurance
no health insurance	reference
government insurance	=1 if government insurance, =0 otherwise
labor insurance	=1 if labor insurance, =0 otherwise
cooperative medical scheme	=1 if cooperative medical scheme, =0 otherwise
commercial insurance	=1 if commercial insurance, =0 otherwise
unified planning medical service	=1 if unified planning medical service, =0 otherwise
not serious	reference
somewhat serious	=1 if somewhat serious, =0 otherwise
quite serious	=1 if quite serious, =0 otherwise
good or excellent health status	reference
fair health status	= 1 if fair health status, =0 otherwise
poor health status	= 1 if poor health status, =0 otherwise
chronic disease	=1 if has diagnosed chronic disease, =0 if no
overweight	=1 if BMI>=24, =0 if BMI<24
household characteristics	
income	per-capita household income calculated by dividing total household income from all sources by the number of household members
inc_quint	=1 if 1st quintile, =2 if 2nd quintile, =3 if 3rd quintile, =4 if 4th quintile, =5 if 5th quintile
1st income quintile	reference
2nd income quintile	=1 if 2nd income quintile, =0 otherwise
3rd income quintile	=1 if 3rd income quintile, =0 otherwise
4th income quintile	=1 if 4th income quintile, =0 otherwise
5th income quintile	=1 if 5th income quintile, =0 otherwise
age of household head	age of household head
sex of household head	=1 if household head is male, =0 if female
education of household head	=1 if middle school or above, =0 if below middle school
good water	=1 if drinking water from piped water supply, =0 otherwise
good sanitation	=1 if no excreta around the dwelling place, =0 otherwise
good toilet	=1 if household has flush toilet, =0 otherwise
community & regional characteristics	
urban	=1 if community is urban, =0 if rural
western region	reference
middle region	=1 if middle region, =0 otherwise

| eastern region | | =1 if eastern region, =0 otherwise | |

Table 4   Percentage of individuals who reported illness and utilized health care

| | Total | Area | |
		Rural	Urban
n	9860	6434	3408
Reported illness (%)	24.6	21.3	31.0
Sought care (%)	80.7	80.8	80.6

Table 5 Type of symptoms reported in the past four weeks

Type of symptoms	Individual		Age	
	n	%	Mean	SD
Reported illness	2427	24.6	54.4	15.5
Fever, sore throat, cough	859	35.4	50.4	16.1
Joint pain, muscle pain	644	26.5	57.7	14.1
Headache, dizziness	589	24.3	55.7	15.3
Diarrhea, stomachache	377	15.5	51.8	15.3
Heart disease, chest pain	228	9.4	61.5	12.8
Eye/ear disease	134	5.5	63.2	12.2
Rash, dermatitis	69	2.8	53.5	15.4
Other infectious diseases	111	4.6	54.8	14.8
Other non-communicable diseases	473	19.5	59.7	13.2

Table 6   Number of the types of symptoms reported in the past four weeks

Number of symptom type	Number of individual	Percentage (%)
1	1559	64.2
2	473	19.5
3	165	6.8
4	66	2.7
>=5	27	1.6

Table 7 Percentage distribution of individuals who sought care by the type of care

Type of care	Total	Area		Per capital income				
		Rural	Urban	Poorest	Second	Third	Fourth	Richest
n	1957	1106	851	385	363	375	369	456
Self-medication	36.1	28.0	46.7	29.6	32.0	35.7	36.9	44.3
Village clinic	14.7	21.5	5.8	22.1	19.6	13.6	13.6	6.6
Township health center	9.8	13.9	4.4	15.1	11.0	9.6	6.8	7.0
County or higher level hospital	23.5	21.2	26.4	15.3	19.8	24.5	26.6	30.0
Private clinic	9.7	12.0	6.6	14.8	11.6	12.3	7.3	3.1
Others	6.3	3.4	10.2	3.1	6.1	4.3	8.9	9.0

Table 8   Descriptive statistics of the study subjects who reported out-of-pocket health expenditure and those not

Variable	Total		Reported OOP		Not reported OOP	
n	9860		1611		8249	
Dependent variable						
OOP (RMB)	--		55	*	--	
Explanatory variable						
individual characteristics						
age 18-34 years old	22.2		12.1		24.1	
age 35-49 years old	33.3		26.5		34.6	
age 50-64 years old	28.9		34.6		27.8	
age >=65 years old	15.6		26.8		13.5	
sex	48.1		44.3		48.8	
group	10.5		8.8		10.8	
no school	15.0		18.3		14.3	
1-6 years of school	28.2		34.2		27.1	
7-9 years of school	33.5		26.7		34.9	
>=10 years of school	23.3		20.9		23.8	
no health insurance	74.3		66.1		75.0	
government insurance	7.9		9.9		7.5	
labor insurance	4.5		6.8		4.1	
cooperative medical scheme	7.4		9.1		7.1	
commercial insurance	1.5		1.4		1.5	
unified planning medical service	4.4		5.6		4.1	
not serious	39.8		38.3		--	
somewhat serious	48.5		48.7		--	
quite serious	11.7		13.0		--	
good or excellent health status	59.6		31.3		65.1	
fair health status	33.2		46.5		30.6	
poor health status	7.2		22.2		4.3	
chronic disease	10.0		22.8		7.6	
overweight	36.9		40.4		36.3	
household characteristics						
income (RMB)	4320	*	4513	*	4294	*
age of household head	53.3 (12.6)	**	56.5 (13.0)	**	52.6 (12.5)	**
sex of household head	85.1		83.4		85.5	
education of household head	55.5		52.2		56.1	
good water	88.4		89.9		88.1	
good sanitation	74.9		73.8		75.2	
good toilet	41.6		44.5		41.1	
community & regional characteristics						
urban	34.6		41.5		33.3	
western region	24.0		22.4		24.3	
middle region	43.4		38.6		44.4	
eastern region	32.6		39.0		31.4	

* Median; ** Mean (SD); other values are percentage

OOP is out-of-pocket health expenditure; RMB represents Renminbi, which is Chinese currency

Table 9　Estimated coefficients of Heckman selection model for reported health care utilization (n=7880)

Explanatory variable	Model I Coef.	Model I 95% CI		Model II Coef.	Model II 95% CI		Model III Coef.	Model III 95% CI		Model IV Coef.	Model IV 95% CI	
individual characteristics												
age 18-34 years old												
age 35-49 years old	0.144	(0.027 0.261)	*	0.147	(0.030 0.264)	*	0.151	(0.034 0.268)	*	0.146	(0.029 0.263)	*
age 50-64 years old	0.255	(0.132 0.377)	**	0.260	(0.137 0.383)	**	0.269	(0.145 0.392)	**	0.261	(0.138 0.385)	**
age >=65 years old	0.407	(0.250 0.564)	**	0.411	(0.254 0.569)	**	0.430	(0.272 0.588)	**	0.413	(0.255 0.570)	**
sex	-0.075	(-0.146 -0.004)	*	-0.073	(-0.143 -0.002)	*	-0.072	(-0.143 -0.001)	*	-0.073	(-0.144 -0.003)	*
group	-0.111	(-0.244 0.023)		-0.101	(-0.241 0.020)		-0.100	(-0.241 0.040)		-0.104	(-0.245 0.036)	
no school												
1-6 years of school	0.207	(0.090 0.325)	**	0.213	(0.094 0.331)	**	0.225	(0.106 0.343)	**	0.217	(0.099 0.335)	**
7-9 years of school	0.134	(-0.010 0.277)		0.142	(-0.002 0.286)		0.157	(0.013 0.301)	*	0.146	(0.002 0.290)	*
>=10 years of school	0.097	(-0.063 0.258)		0.112	(-0.049 0.273)		0.144	(-0.019 0.307)		0.119	(-0.042 0.281)	
health insurance	0.187	(0.098 0.277)	**	0.152	(0.060 0.244)	**				0.112	(-0.143 0.367)	
no health insurance												
government insurance							0.031	(-0.114 0.177)				
labor insurance							0.214	(0.033 0.394)	*			
cooperative medial scheme							0.199	(0.056 0.342)	**			
commercial insurance							0.111	(-0.206 0.429)				
unified planning medical service							0.121	(-0.072 0.314)				
good or excellent health status												
fair health status	0.574	(0.491 0.657)	**	0.579	(0.497 0.662)	**	0.576	(0.494 0.659)	**	0.577	(0.495 0.660)	**
poor health status	1.391	(1.261 1.522)	**	1.402	(1.271 1.532)	**	1.401	(1.271 1.532)	**	1.398	(1.268 1.529)	**
chronic disease	0.393	(0.281 0.506)	**	0.382	(0.270 0.495)	**	0.385	(0.272 0.498)	**	0.383	(0.271 0.496)	**
overweight	0.043	(-0.033 0.120)		0.027	(-0.050 0.104)		0.034	(-0.043 0.111)		0.028	(-0.049 0.105)	
household characteristics												
ln (income)	0.028	(-0.005 0.061)		0.022	(-0.010 0.055)							
inc_quint										-0.003	(-0.041 0.035)	
1st income quintile												
2nd income quintile							0.020	(-0.106 0.145)				
3rd income quintile							0.019	(-0.110 0.148)				
4th income quintile							-0.051	(-0.186 0.084)				
5th income quintile							0.057	(-0.091 0.205)				
age of household head	0.003	(-0.002 0.007)		0.003	(-0.002 0.007)		0.003	(-0.002 0.007)		0.002	(-0.002 0.007)	
sex of household head	0.009	(-0.108 0.125)		-0.004	(-0.121 0.113)		-0.008	(-0.125 0.108)		-0.001	(-0.117 0.116)	
education of household head	0.084	(-0.026 0.194)		0.074	(-0.036 0.183)		0.080	(-0.030 0.190)		0.077	(-0.033 0.187)	
good water	0.032	(-0.067 0.130)		0.038	(-0.063 0.139)		0.042	(-0.060 0.144)		0.045	(-0.056 0.147)	
good sanitation	-0.155	(-0.235 -0.075)	**	-0.163	(-0.246 -0.080)	**	-0.158	(-0.241 -0.075)	**	-0.162	(-0.245 -0.078)	**
good toilet	-0.053	(-0.131 0.024)		-0.048	(-0.127 0.031)		-0.033	(-0.112 0.047)		-0.039	(-0.119 0.041)	
community & regional characteristics												
urban	0.155	(0.065 0.245)	**	0.160	(0.071 0.250)	**	0.170	(0.080 0.261)	**	0.165	(0.075 0.256)	**
western region												
middle region				0.012	(-0.101 0.125)		0.009	(-0.104 0.122)		0.011	(-0.102 0.124)	
eastern region				0.145	(0.024 0.265)	*	0.140	(0.017 0.263)	*	0.149	(0.029 0.270)	*
interaction of inc_quint and insurance										0.014	(-0.053 0.081)	
intercept	-2.130	(-2.507 -1.754)	**	-2.115	(-2.498 -1.731)	**	-1.977	(-2.301 -1.652)	**	-1.945	(-2.271 -1.619)	**

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

Table 10 Estimated coefficients of Heckman selection model for out-of-pocket health expenditure (n=1266)

| Explanatory variables	Model I Coef.	95% CI low	95% CI high	sig	Model II Coef.	95% CI low	95% CI high	sig	Model III Coef.	95% CI low	95% CI high	sig	Model IV Coef.	95% CI low	95% CI high	sig
individual characteristics																
age 18-34 years old																
age 35-49 years old	0.460	0.098	0.822	*	0.472	0.117	0.826	**	0.493	0.141	0.846	**	0.466	0.112	0.820	*
age 50-64 years old	0.659	0.277	1.041	**	0.648	0.272	1.023	**	0.658	0.285	1.032	**	0.646	0.271	1.021	**
age >=65 years old	1.172	0.697	1.648	**	1.124	0.653	1.594	**	1.146	0.676	1.617	**	1.116	0.645	1.588	**
sex	-0.056	-0.276	0.164		-0.064	-0.282	0.153		-0.069	-0.288	0.149		-0.064	-0.282	0.153	
group	-0.373	-0.755	0.010		-0.142	-0.533	0.250		-0.132	-0.522	0.258		-0.168	-0.559	0.223	
no school																
1-6 years of school	0.371	0.032	0.709	*	0.377	0.041	0.712	*	0.388	0.046	0.729	*	0.379	0.042	0.717	*
7-9 years of school	0.183	-0.219	0.585		0.179	-0.222	0.580		0.200	-0.206	0.606		0.181	-0.221	0.582	
>=10 years of school	0.023	-0.428	0.473		-0.011	-0.462	0.440		0.003	-0.461	0.468		0.003	-0.452	0.458	
health insurance	0.392	0.123	0.661	**	0.347	0.070	0.624	*					0.416	-0.294	1.125	
no health insurance																
government insurance									0.269	-0.186	0.725					
labor insurance									0.616	0.132	1.099	*				
cooperative medical scheme									0.355	-0.045	0.756					
commercial insurance									-0.026	-0.973	0.921					
unified planning medical service									0.147	-0.461	0.754					
not serious																
somewhat serious	0.728	0.520	0.936	**	0.727	0.519	0.934	**	0.711	0.506	0.917	**	0.722	0.515	0.928	**
quite serious	2.024	1.705	2.342	**	1.986	1.665	2.307	**	1.971	1.648	2.294	**	1.975	1.655	2.296	**
good or excellent health status																
fair health status	1.585	1.289	1.880	**	1.578	1.286	1.870	**	1.571	1.277	1.866	**	1.569	1.277	1.861	**
poor health status	3.345	2.885	3.805	**	3.286	2.823	3.748	**	3.299	2.838	3.761	**	3.284	2.823	3.746	**
chronic disease	0.808	0.479	1.136	**	0.779	0.454	1.104	**	0.783	0.454	1.112	**	0.783	0.457	1.108	**
overweight	0.252	0.018	0.485	*	0.173	-0.060	0.407		0.177	-0.057	0.412		0.171	-0.062	0.405	
household characteristics																
ln (income)	0.181	0.068	0.294	**	0.179	0.070	0.289	**								
inc_quint													0.132	0.021	0.243	*
1st income quintile																
2nd income quintile									0.238	-0.119	0.595					
3rd income quintile									0.257	-0.111	0.624					
4th income quintile									0.221	-0.178	0.619					
5th income quintile									0.666	0.241	1.090	**				
age of household head	0.007	-0.005	0.020		0.010	-0.002	0.022		0.010	-0.002	0.022		0.010	-0.002	0.022	
sex of household head	-0.121	-0.463	0.221		-0.130	-0.470	0.210		-0.109	-0.450	0.231		-0.108	-0.448	0.232	
education of household head	0.357	0.036	0.678	*	0.352	0.033	0.672	*	0.343	0.020	0.666	*	0.341	0.017	0.664	*
community & regional characteristics																
urban	0.293	0.029	0.556	*	0.324	0.064	0.584	**	0.337	0.072	0.602	*	0.330	0.066	0.593	*
western region																
middle region					0.594	0.278	0.911	**	0.592	0.274	0.910	**	0.583	0.267	0.899	**
eastern region					0.531	0.200	0.862	**	0.500	0.161	0.839	**	0.523	0.189	0.856	**
interaction of inc_quint and insurance													-0.019	-0.209	0.170	
intercept	-3.984	-5.310	-2.658	**	-4.410	-5.749	-3.070	**	-3.219	-4.281	-2.158	**	-3.318	-4.377	-2.260	**
rho	0.876	0.821	0.915	**	0.870	0.811	0.911	**	0.872	0.813	0.913	**	0.871	0.811	0.912	**
sigma	2.538	2.332	2.763	**	2.491	2.286	2.713	**	2.494	2.289	2.718	**	2.493	2.288	2.715	**
lambda	2.224	1.929	2.519	**	2.167	1.868	2.465	**	2.175	1.877	2.473	**	2.170	1.872	2.468	**

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

Table 11   Estimated coefficients of Heckman selection model with outliers

Explanatory variables	OOP Equation (n=7891)				Selection Equation (n=1277)			
	Coef.	95% CI			Coef.	95% CI		
individual characteristics								
age 18-34 years old								
age 35-49 years old	0.524	(0.160	0.888	) **	0.152	(0.036	0.269	) *
age 50-64 years old	0.691	(0.307	1.076	) **	0.262	(0.139	0.384	) **
age >=65 years old	1.174	(0.694	1.654	) **	0.408	(0.251	0.565	) **
sex	-0.071	(-0.296	0.153	)	-0.072	(-0.143	-0.001	) *
group	-0.170	(-0.571	0.232	)	-0.104	(-0.244	0.037	)
no school								
1-6 years of school	0.405	(0.061	0.749	) *	0.215	(0.098	0.333	) **
7-9 years of school	0.185	(-0.226	0.596	)	0.138	(-0.005	0.282	)
>=10 years of school	0.039	(-0.428	0.507	)	0.117	(-0.044	0.278	)
health insurance	0.356	(0.070	0.643	) *	0.152	(0.060	0.244	) **
not serious								
somewhat serious	0.719	(0.510	0.928	) **				
quite serious	2.079	(1.752	2.406	) **				
good or excellent health status								
fair health status	1.659	(1.367	1.950	) **	0.581	(0.499	0.664	) **
poor health status	3.541	(3.084	3.998	) **	1.426	(1.296	1.556	) **
chronic disease	0.820	(0.488	1.152	) **	0.379	(0.267	0.491	) **
obesity	0.166	(-0.074	0.405	)	0.027	(-0.050	0.103	)
household characteristics								
lnincome	0.196	(0.081	0.311	) **	0.024	(-0.008	0.057	)
age of household head	0.011	(-0.001	0.024	)	0.003	(-0.002	0.007	)
sex of household head	-0.102	(-0.452	0.247	)	0.002	(-0.115	0.119	)
education of household head	0.397	(0.069	0.725	) *	0.083	(-0.026	0.192	)
good water					0.036	(-0.061	0.134	)
good sanitation					-0.160	(-0.242	-0.079	) **
good toilet					-0.047	(-0.123	0.030	)
community & regional characteristics								
urban	0.344	(0.079	0.609	) *	0.162	(0.073	0.251	) **
western region								
middle region	0.603	(0.279	0.928	) **	0.016	(-0.097	0.129	)
eastern region	0.579	(0.238	0.919	) **	0.151	(0.032	0.271	) *
intercept	-5.008	(-6.385	-3.630	) **	-2.167	(-2.553	-1.781	) **
rho	0.886	(0.839	0.920	) **				
sigma	2.603	(2.407	2.815	) **				
lambda	2.307	(2.034	2.579	) **				

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

Figure 1   China total health expenditure since 1978
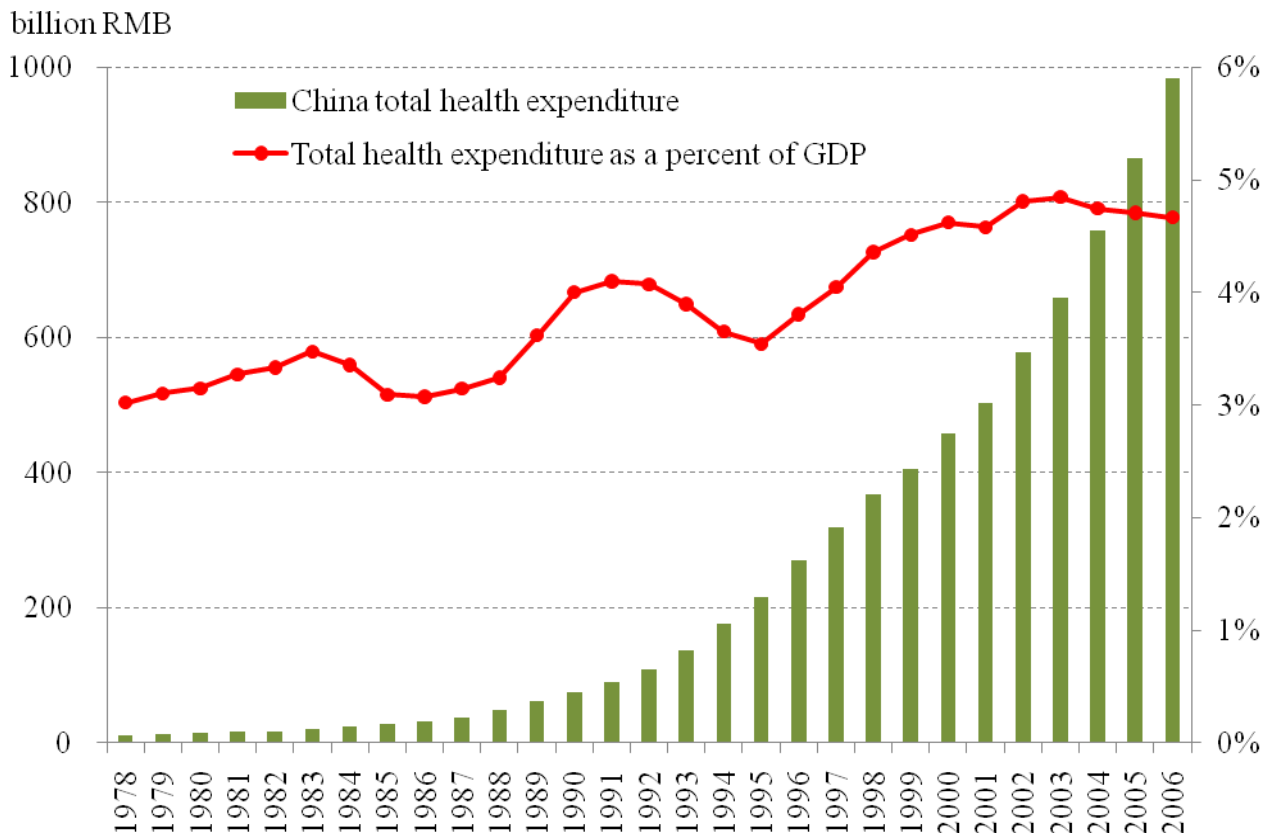
Data source: Data from 1978 to 2003 is from Assessing Government Health Expenditure in China (World Bank, 2005). Data for later years is from China Statistical Yearbook (National Bureau of Statistics, 2008)

Figure 2   Funding sources of China total health expenditure since 1978
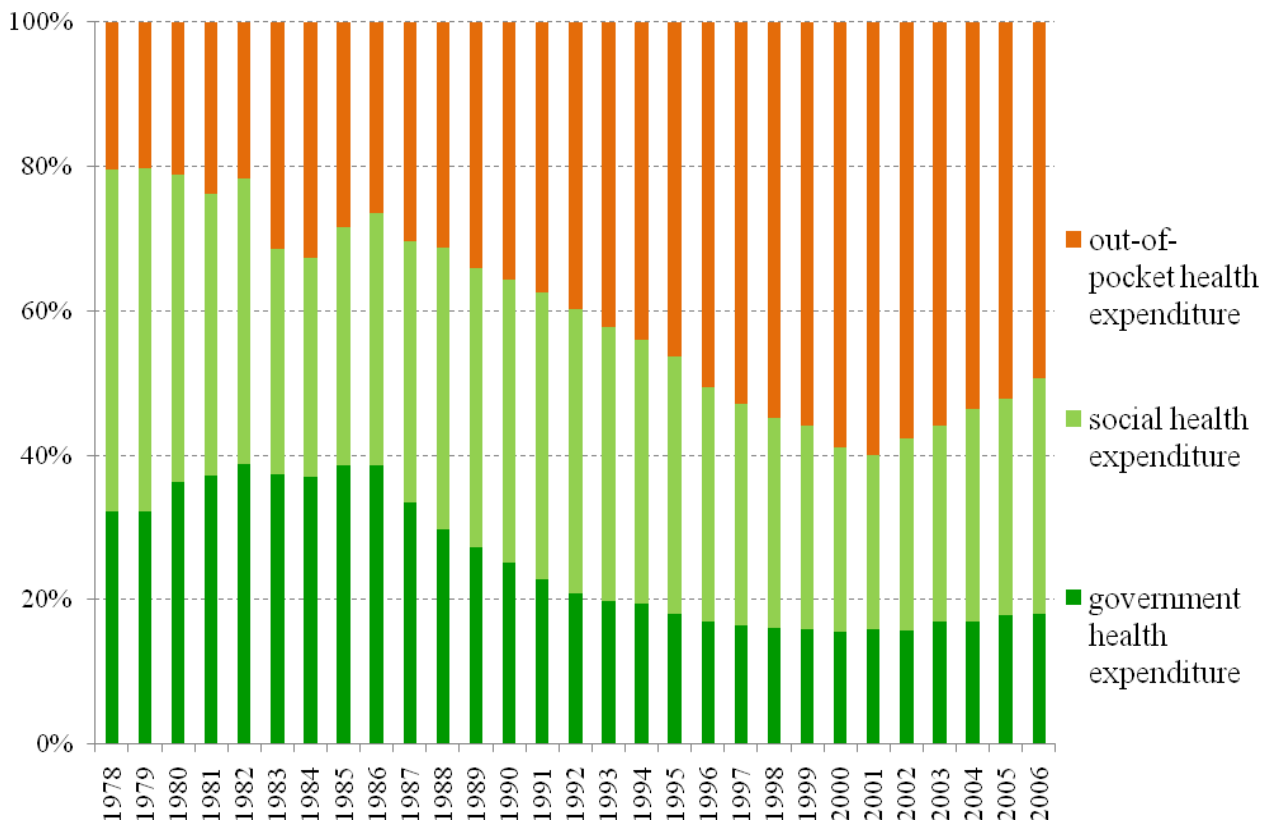
Data source: Data from 1978 to 2003 is from Assessing Government Health Expenditure in China (World Bank, 2005). Data for later years is from China Statistical Yearbook (National Bureau of Statistics, 2008)

Figure 3   Out-of-pocket health expenditure as a percent of total health expenditure in Asia countries in 2006
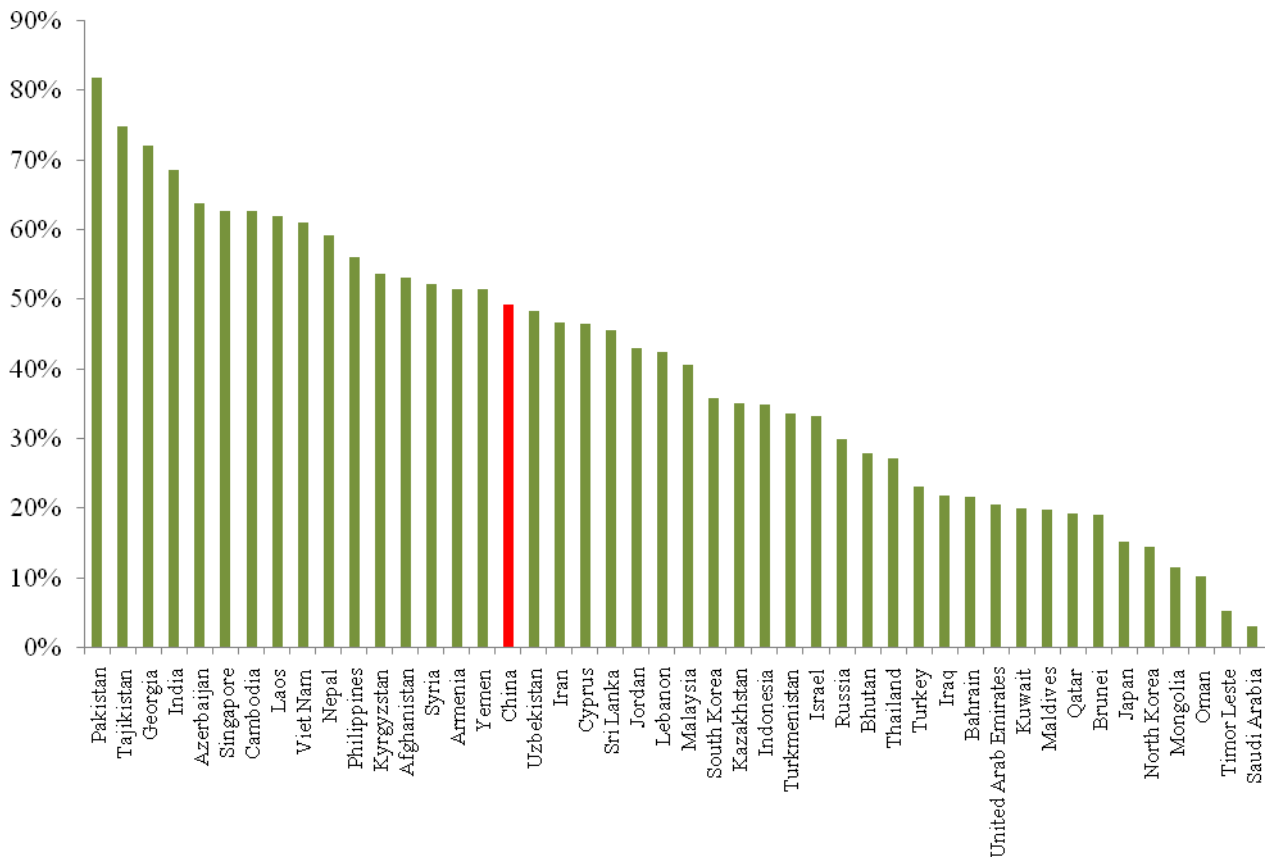
Data source: World Health Statistics (World Health Organization, 2009)

Figure 4   Per capita out-of-pocket health expenditure in China since 1978
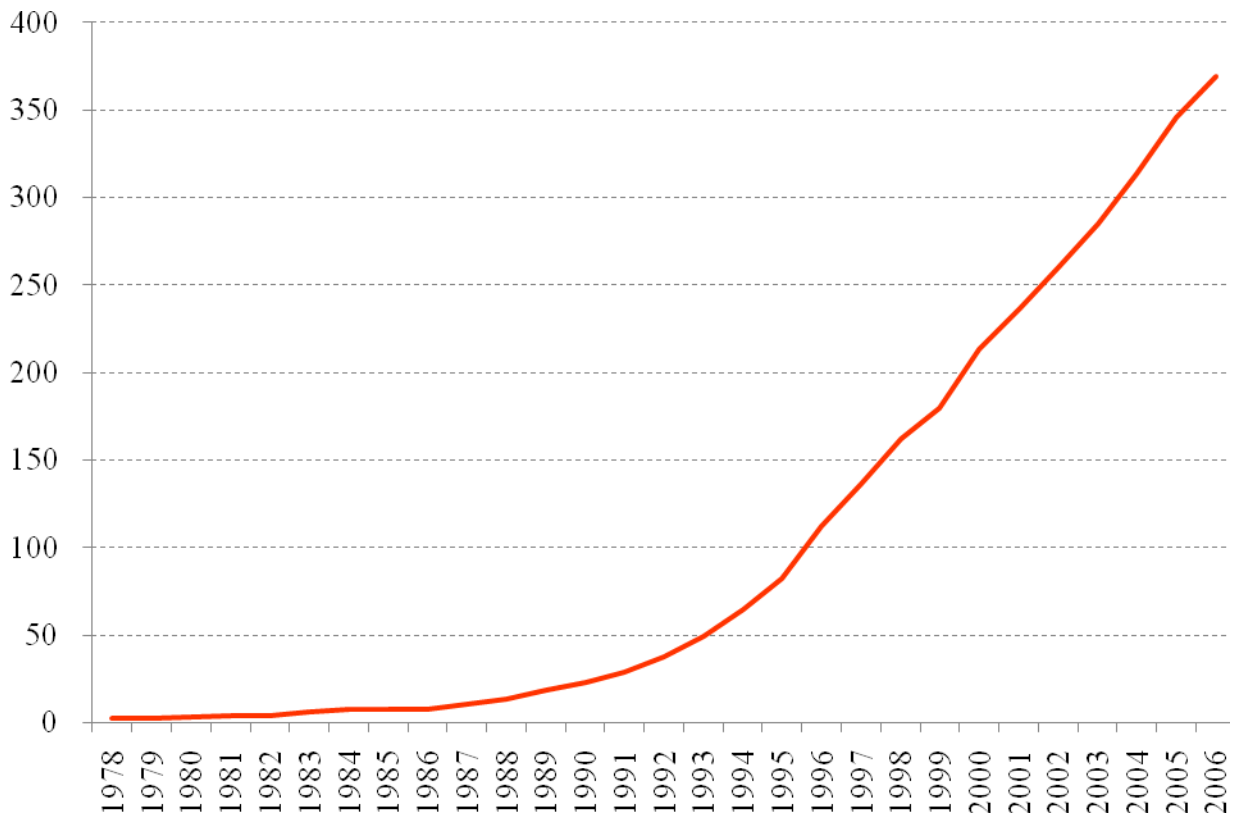
Data source: Data from 1978 to 2003 is from Assessing Government Health Expenditure in China (World Bank, 2005). Data for later years is from China Statistical Yearbook (National Bureau of Statistics, 2008)

Figure 5   Per capita spending on health care as a percent of annual living expenditure
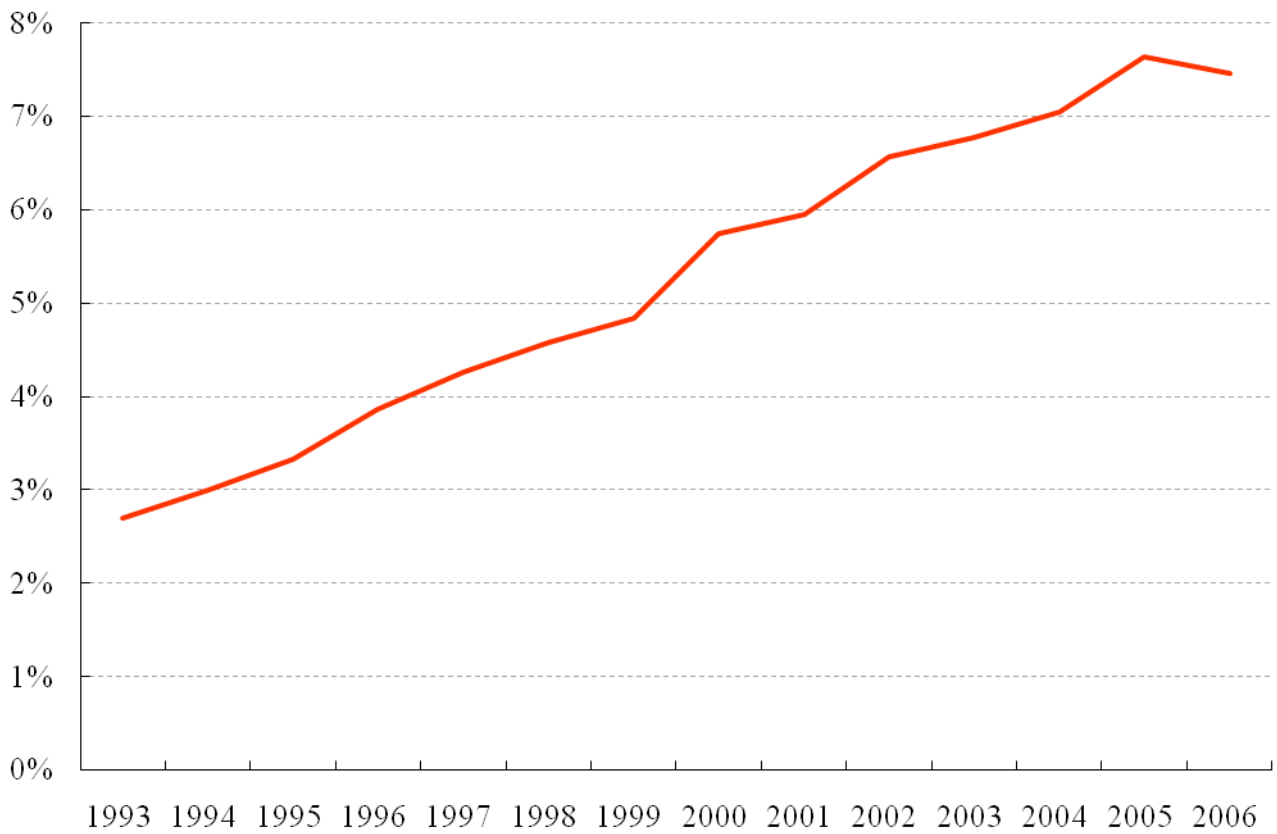
Data source: China Statistical Yearbook & China Population Statistical Yearbook (National Bureau of Statistics, 1994-2007)

Figure 6   Map of survey provinces for 2004 China Health and Nutrition Survey
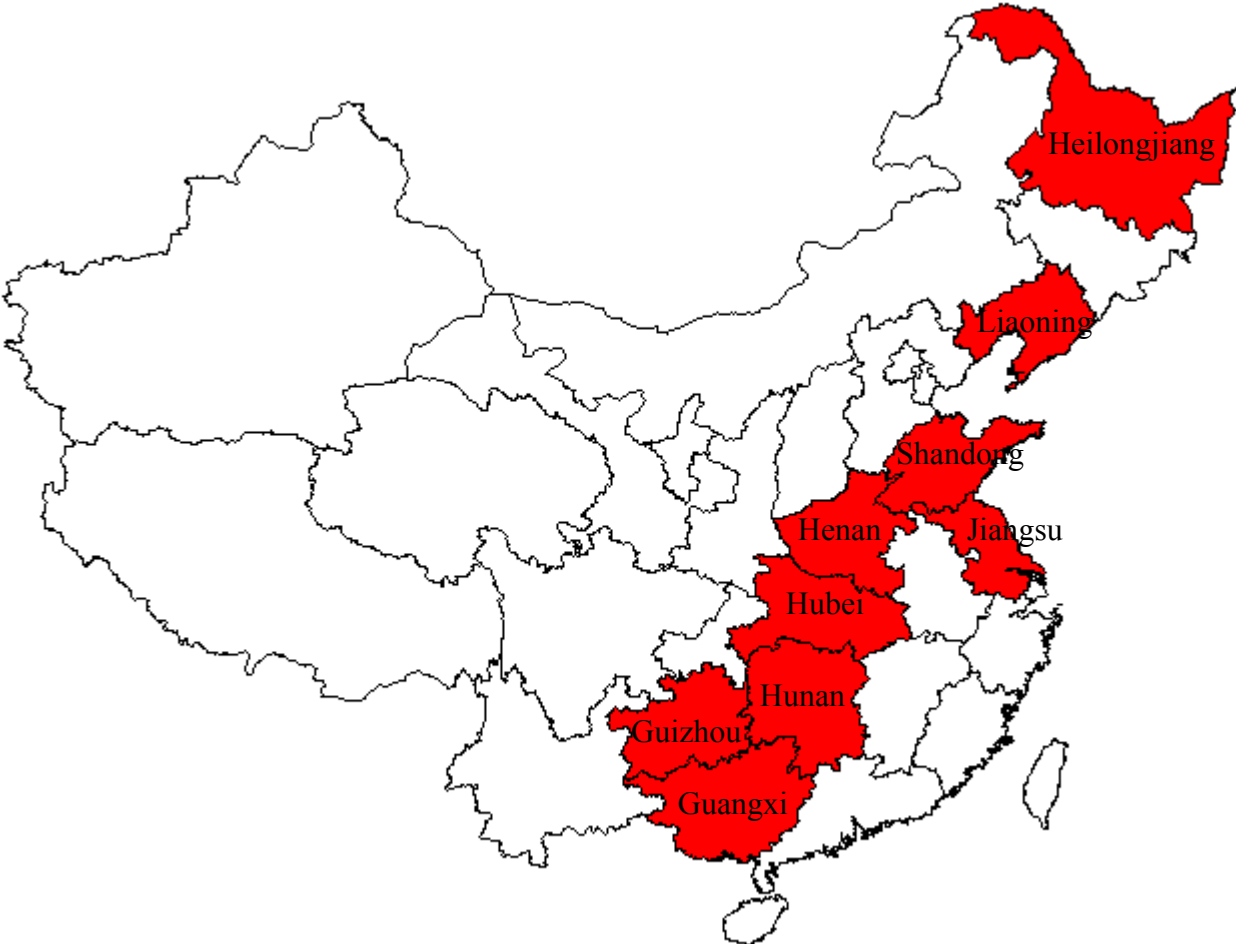
Figure 7   Median out-of-pocket expenditure made for each type of health care by income quintile

Self-medication

RMB

| 500 |
| 400 |
| 300 |
| 200 |
| 100 |
| 0 |

Total Poorest Second Third Fourth Richest

Village Clinic

RMB

| 500 |
| 400 |
| 300 |
| 200 |
| 100 |
| 0 |

Total Poorest Second Third Fourth Richest

Township Health Center

RMB

| 500 |
| 400 |
| 300 |
| 200 |
| 100 |
| 0 |

Total Poorest Second Third Fourth Richest

Above County Hospital

RMB

| 500 |
| 400 |
| 300 |
| 200 |
| 100 |
| 0 |

Total Poorest Second Third Fourth Richest

Private Clinic

RMB

| 500 |
| 400 |
| 300 |
| 200 |
| 100 |
| 0 |

Total Poorest Second Third Fourth Richest

CHINA ECONOMIC, POPULATION, NUTRITION, AND HEALTH SURVEY

2004 ADULT QUESTIONNAIRE
(for all adults age 18 and older)

Province:	21 Liaoning	23 Heilongjiang	32 Jiangsu	37 Shandong	41 Henan	T1
	42 Hubei	43 Hunan	45 Guangxi	52 Guizhou	

Urban Site: 1   Rural Site: 2   T2

City: _____   County: _____   T3

1 First city   1 First county
2 Second city   2 Second county
                                                                        3 Third county
                                                                        4 Fourth county

Neighborhood: _____   Village (Town): _____   T4
01 First [urban] neighborhood   01 County town neighborhood
02 Second [urban] neighborhood   02 First village
03 Third suburban village (neighborhood)   03 Second village
04 Fourth suburban village (neighborhood)   04 Third village
05 Fifth [urban] neighborhood   05 County town neighborhood
06 Sixth [urban] neighborhood   06 Fourth village
07 Seventh suburban village (neighborhood) 07 Fifth village
08 Eighth suburban village (neighborhood)   08 Sixth village
09 Ninth [urban] neighborhood   09 County town neighborhood
10 Tenth [urban] neighborhood   10 Seventh village
11 Eleventh suburban village (neighborhood) 11 Eighth village
12 Twelfth suburban village (neighborhood)   12 Ninth village

Household Number: _____   T5

Age (years): _____   A3a
* Record 018 if 18.00-18.99 years, 019 if 19.00-19.99 years, etc.

Sex: _____   AA2a
    1 male
    2 female

Height (cm): _____   U3

Weight (kg): _____   U2

What is the member's ethnicity (nationality)?   AA7a

01 Han	08 Zhuang	15 Tujia
02 Mongolian	09 Buyi	16 Hani
03 Hui	10 Korean	17 Hasake
04 Tibetan	11 Man	18 Dai
05 Vaguer	12 Dong	19 Li
06 Miao	13 Yao	20 other (specify: _____)
07 Yi	14 Bai	- 9 unknown

What is the member's relationship to the head of this household?   A5

00 head of household   06 father-in-law/mother-in-law

01 spouse   07 son-in-law/daughter-in-law

02 father/mother   08 other relative (specify: _____)

03 son/daughter   10 other non-relative (specify: _____)

04 brother/sister

05 grandson/granddaughter/grandson-in-law/granddaughter-in-law

How many years of formal education have you completed in a regular school?   A11

00 no school completed (skip to Q16)   26 3 years upper middle school

11 1 year primary school (skip to Q16)   27 1 year technical school

12 2 years primary school (skip to Q16)   28 2 years technical school

13 3 years primary school (skip to Q16)   29 3 years technical school

14 4 years primary school (skip to Q16)   31 1 year college/university

15 5 years primary school   32 2 years college/university

16 6 years primary school   33 3 years college/university

21 1 year lower middle school   34 4 years college/university

22 2 years lower middle school   35 5 years college/university

23 3 years lower middle school   36 6 years college/university or more

24 1 year upper middle school   - 9 unknown

25 2 years upper middle school

Do you have medical insurance?   M1

0 no (skip to the next section)

1 yes

Which of the following types of medical insurance do you have?

(0) Commercial insurance	0 no	1 yes	9 unknown	M3a_0
(1) Free medical service	0 no	1 yes	9 unknown	M3a_1
(2) Worker's compensation	0 no	1 yes	9 unknown	M3a_2
(3) Insurance for family members	0 no	1 yes	9 unknown	M3a_3
(4) Cooperative insurance	0 no	1 yes	9 unknown	M3a_4
(5) Unified planning medical service	0 no	1 yes	9 unknown	M3a_5
(6) Health insurance for women and children	0 no	1 yes	9 unknown	M3a_6
(7) EPI (expanded program of immunization)	0 no	1 yes	9 unknown	M3a_7
(8) Other (specify: _____)	0 no	1 yes	9 unknown	M3a_8

<u>During the past 4 weeks</u>, have you been sick or injured? Have you suffered from   M23
a chronic or acute disease?

    0 no   1 yes

    9 unknown

Did you have any of these symptoms during the past 4 weeks (including today)?

(1) Fever, sore throat, cough	0 no	1 yes	9 unknown M24b_1
(2) Diarrhea, stomachache	0 no	1 yes	9 unknown M24b_2
(3) Headache, dizziness	0 no	1 yes	9 unknown M24b_3
(4) Joint pain, muscle pain	0 no	1 yes	9 unknown M24b_4
(5) Rash, dermatitis	0 no	1 yes	9 unknown M24b_5
(6) Eye/ear disease	0 no	1 yes	9 unknown M24b_6
(7) Heart disease/chest pain	0 no	1 yes	9 unknown M24b_7
(8) Other infectious disease (specify: _____)	0 no	1 yes	9 unknown M24b_8
(9) Other noncommunicable disease (specify: _____)	0 no	1 yes	9 unknown M24b_9

* If no symptoms, skip to Question 7. Otherwise, ask Questions 3-14 about the most recent illness.

3. How severe was the illness or injury?   M25

    1 not severe

    2 somewhat severe

    3 quite severe

5. What did you do when you felt ill?   M26

    1 self care

    2 saw the local health worker (skip to Question 8)

    3 saw a doctor (clinic, hospital) (skip to Question 8)

    4 did not pay any attention

    9 unknown

6. How much money did you spend on the illness or injury? (yuan)   M39

* If insurance covered all expenses, record -888. If "unknown," record -999.

7. Did you seek care from a formal medical provider during the past 4 weeks?   M52

    0 no (skip to Question 15)

    1 yes

8. Where did you see a doctor?   M27b

    01 village clinic   09 city maternal and child hospital

    02 private clinic   10 city hospital

    03 work unit clinic   11 worker's hospital

    04 other clinic   12 other hospital

    05 town family planning service   14 at home

    06 town hospital   15 other (specify: _____)

    07 county maternal and child hospital   - 9 unknown

    08 county hospital

11. How much did this treatment cost or has this treatment cost so far (including all registration fees, medicines, treatment fees, bed fees, etc.)? (yuan)   M30
* If insurance covers all expenses, record -8888. If "unknown," record -9999.

12. What percentage of these costs was paid by insurance or may be paid by insurance? (%)   M31
* If does not have medical insurance, record -88. If "unknown," record -99.

13. How much money was spent or has been spent on treating your illness or injury in addition to the costs mentioned above? (yuan)   M38
* If "unknown," record -99.

Right now, how would you describe your health compared to that of other people your age?   U48a
    1 excellent
    2 good
    3 fair
    4 poor
    9 unknown

Has a doctor ever told you that you suffer from high blood pressure?   U22
    0 no (skip to Question 4)
    1 yes
    9 unknown (skip to Question 4)

Has a doctor ever told you that you suffer from diabetes?   U24a
    0 no (skip to Question 7)
    1 yes
    9 unknown (skip to Question 7)

Has a doctor ever given you the diagnosis of myocardial infarction?   U24j
    0 no (skip to Question 9)
    1 yes
    9 unknown (skip to Question 9)

Has a doctor ever given you the diagnosis of apoplexy?   U24l
    0 no (skip to Question 11)
    1 yes
    9 unknown (skip to Question 11)

How does your household obtain drinking water?   L1
* If more than one method, record the most important one.
    1 in-house tap water (skip to Question 3)
    2 in-yard tap water (skip to Question 3)
    3 in-yard well (skip to Question 3)
    4 other place (specify: _____)

What is the source of this water?   L3
* If more than one source, record the most important one.
    1 ground water (>5 meters)
    2 open well (# 5 meters)
    3 creek, spring, river, lake
    4 ice/snow
    5 water plant
    6 other (specify: _____)
    9 unknown

What kind of toilet facilities does your household have?   L5
    0 no bathroom
    1 flush, in-house
    2 no flush, in-house
    3 flush, outside house, public restroom
    4 no flush, outside house, public restroom
    5 cement openpit
    6 earth openpit
    8 other (specify: _____)

Is there any excreta around the dwelling place?   L6
* Record your own observation instead of asking the respondent.
    1 no excreta
    2 very little excreta
    3 some excreta
    4 much excreta

Note: Only the questions used to derive variables in this study were listed here.
    The questions used to derive household income were not listed here because we used an independent
    dataset for constructed household income variables provided by the University of North Carolina.

中国健康与营养调查

2004 成人调查表（所有18岁及以上成人）

调查省(区)：　　　21 辽宁　23 黑龙江　　32 江苏　37 山东　41 河南　　　　　T1
　　　　　　　　　42 湖北　43 湖南　45 广西　52 贵州

城市点　1　　　　　　　　　　　　　　农村点 2　　　　　　　　　　　T2
　　城市 _____　　　　　　　　　县：_____　　　　　　T3
　　1 第一城市　　　　　　　　　　　　　　1 第一县
　　2 第二城市　　　　　　　　　　　　　　2 第二县
　　3 第三县
　　4 第四县

　　居委会 _____　　　　　　　　　　　村（县城）：_____　　T4
　　01 第一(城市)居委会　　　　　　　　　01 县城居委会
　　02 第二(城市)居委会　　　　　　　　　02 第一村
　　03 第三郊区村(居委会)　　　　　　　　03 第二村
　　04 第四郊区村(居委会)　　　　　　　　04 第三村
　　05 第五（城市）居委会　　　　　　　　05 县城居委会
　　06 第六（城市）居委会　　　　　　　　06 第四村
　　07 第七郊区村(居委会)　　　　　　　　07 第五村
　　08 第八郊区村(居委会)　　　　　　　　08 第六村
　　09 第九（城市）居委会　　　　　　　　09 县城居委会
　　10 第十（城市）居委会　　　　　　　　10 第七村
　　11 第十一郊区村(居委会)　　　　　　11 第八村
　　12 第十二郊区村(居委会)　　　　　　12 第九村

调查户编号：_____　　　　　　　　　　　　　　　　　　　　　T5

年龄（岁）：_____　　　　　　　　　　　　　　　　　　　　　　A3a
* 如果18.00-18.99 岁记录018, 如果19.00-19.99岁记录019，依此类推。

性别 _____　　　　　　　　　　　　　　　　　　　　　　　　　　AA2a
　　1 男
　　2 女

身高(cm)：_____　　　　　　　　　　　　　　　　　　　　　U3

体重(kg)：_____　　　　　　　　　　　　　　　　　　　　　U2

该家庭成员是什么民族?   AA7a

01 汉	08 壮族	15 土家族
02 蒙古族	09 布依族	16 哈尼族
03 回族	10 朝鲜族	17 哈萨克族
04 藏族	11 满族	18 傣族
05 维族	12 侗族	19 黎族
06 苗族	13 瑶族	20 其它(请注明 _____)
07 彝族	14 白族	-9 不知道

该家庭成员同户主是什么关系?   A5

00 户主	06 岳父/岳母
01 伴侣	07 女婿/儿媳
02 父亲/母亲	08 其他亲属(请注明 _____)
03 儿子/女儿	10 其他非亲属(请注明 _____)
04 兄弟/姐妹	
05 (外)孙子/(外)孙女/孙女婿/孙媳妇	

你在正规学校里受过几年正规教育?   A11

00 没上过学(跳到问题16)	26 3年高中
11 1 年小学(跳到问题16)	27 1年中等技术学校
12 2 年小学(跳到问题16)	28 2年中等技术学校
13 3 年小学(跳到问题16)	29 3年中等技术学校
14 4 年小学(跳到问题16)	31 1年大学
15 5 年小学	32 2年大学
16 6 年小学	33 3年大学
21 1年初中	34 4年大学
22 2年初中	35 5年大学
23 3年初中	36 6年大学或更多
24 1年高中	- 9 不知道

您是否享有医疗保险?   M1

0 无(跳到下一部分)

1 是

您享受有什么类型的医疗保险?

(0) 商业保险	0 无	1 有	9 不知道	M3a_0
(1) 公费医疗	0 无	1 有	9 不知道	M3a_1
(2) 劳保医疗	0 无	1 有	9 不知道	M3a_2
(3) 家属享受的保险	0 无	1 有	9 不知道	M3a_3
(4) 合作医疗	0 无	1 有	9 不知道	M3a_4
(5) 统筹医疗	0 无	1 有	9 不知道	M3a_5
(6) 妇幼健康保险	0 无	1 有	9 不知道	M3a_6
(7) 计免保险	0 无	1 有	9 不知道	M3a_7
(8) 其它(注明: _____)	0无	1有	9不知道	M3a_8

过去的四周中，你是否生过病或受过伤？是否长期患有慢性病或急性病？　　　　M23

    0 无

    1 有

    9 不知道

过去四周你是否有下列症状（包括今天）？

(1) 发烧、咽候痛、咳嗽	0 无	1 有	9 不知道	M24b_1
(2) 腹写、胃痛	0 无	1 有	9 不知道	M24b_2
(3) 头痛、眩晕	0 无	1 有	9 不知道	M24b_3
(4) 关节、肌肉酸痛	0 无	1 有	9 不知道	M24b_4
(5) 皮疹、皮炎	0 无	1 有	9 不知道	M24b_5
(6) 眼、耳疾病	0 无	1 有	9 不知道	M24b_6
(7) 心脏病、心口痛	0 无	1 有	9 不知道	M24b_7
(8) 其他感染或疾病（注明 _____ ）	0 无	1 有	9 不知道	M24b_8
(9) 其他慢性病（注明 _____ ）	0 无	1 有	9 不知道	M24b_9

*如果没症状，跳到问题7，否则，就最近疾患询问问题3-14。

3. 疾病的严重程度？　　　　　　　　　　　　　　　　　　　　　M25

    1 不严重

    2 一般

    3 相当重

5. 当你感到不舒服时，你怎么做的？　　　　　　　　　　　　　　M26

    1 自己治疗

    2 找当地卫生员(跳到问题8)

    3 去看医生(诊所，医院) (跳到问题8)

    4 没理会

    9 不知道

6. 您为治这病或伤花了多少钱？（元）　　　　　　　　　　　　　M39

*若保险支付所有费用，填888。若不知道，则记录-999。

7. 在过去四周，你是否去过正规的医疗机构看病？　　　　　　　　M52

    0 否(跳到问题15)

    1 是

8. 您在哪个医院看的病？　　　　　　　　　　　　　　　　　　　M27b

01 村诊所	09 市妇幼保健医院
02 私人诊所	10 市医院
03 单位诊所	11 职工医院
04 其他诊所	12 其他医院
05 乡计生服务机构	14 在家
06 乡医院	15 其他(注明 _____)
07 县妇幼保健医院	-9 不知道

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08 县医院

11. 这次看病花了多少钱或至今已经花了多少钱(包括所有挂号费、药费、治疗   M30
费、床费等等)？(元)
*若保险支付所有费用记录8888。若不知道费用有多少，则记录9999。

12. 所花费用中百分之几由医疗保险支付或可能由医疗保险支付？(%)   M31
*若此人无医疗保险，则记录88。若不知道，则记录99。

13. 除了前面所说的费用之外，为治病还额外花了多少钱?(元)   M38
* 若回答'不知道'，则记录99。

与同龄人相比，你觉得自己的健康状况怎么样？   U48a
     1 非常好
     2 好
     3 一般
     4 差
     9 不知道

医生给你下过高血压的诊断吗？   U22
     0 没有（跳到问题4）
     1 有
     9 不知道（跳到问题4）

医生给你下过糖尿病的诊断吗?   U24a
     0 没有（跳到问题7）
     1 有
     9 不知道（跳到问题7）

医生给你下过心肌梗死的诊断吗？   U24j
     0 没有（跳到问题9）
     1 有
     9 不知道（跳到问题9）

医生给你下过中风的诊断吗?   U24l
     0 没有（跳到问题11）
     1 有
     9 不知道（跳到问题11）

你家的饮用水是通过什么方式来的？   L1
* 如果有多种方式，记录最主要的一种。
     1 室内自来水(跳到问题3)
     2 院内自来水(跳到问题3)
     3 院内井水(跳到问题3)
     4 其他地方(请注明 _____)

是什么水源?   L3

* 如果有多种，记录最主要的一种。

    1 地下水（>5米）

    2 敞开井水(≤5米)

    3 小溪、泉水、河、湖白

    4 冰雪水

    5 水厂

    6 其它(请注明 _____)

    9 不知道

您家的厕所是什么类型的?   L5

    0 没有

    1 室内冲水

    2 室内马桶（无冲水）

    3 室外冲水公厕

    4 室外非冲水公厕

    5 开放式水泥坑

    6 开放式土坑

    8 其它(请注明 _____)

居室周围有粪便吗?   L6

* 本项由调查员观察，而不要询问。

    1 没有

    2 很少

    3 有一些

    4 很多