



上海市疾病预防控制中心  
SHANGHAI MUNICIPAL CENTER  
FOR DISEASE CONTROL & PREVENTION



World Health  
Organization

CHINA

# Study on global AGEing and adult health (SAGE), Wave 1



WHO SAGE WAVE 1

The Study on global AGEing and adult health (SAGE) is part of a Longitudinal Survey Programme in WHO's Multi-Country Studies unit. The main SAGE surveys compile comparable longitudinal information on the health and well-being of adult populations and the ageing process from nationally representative samples in six countries (China, Ghana, India, Mexico, Russian Federation and South Africa). Financial support for SAGE was provided by the US National Institute on Aging and the World Health Organization. Each country's national report is a descriptive summary of results, including this report of SAGE Wave 1. Wave 2 will be implemented in 2012/13 and Wave 3 in 2014/15. More information is available at: [www.who.int/healthinfo/systems/sage/en/index.html](http://www.who.int/healthinfo/systems/sage/en/index.html)



# Study on global AGEing and adult health (SAGE) Wave 1

## China National Report

Shanghai Municipal Center For Disease Control & Prevention (SCDC)

**Study Report** October 2012



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Design and layout: Rick Jones, Exile: Design & Editorial Services, London (United Kingdom)

Printed by the WHO Document Production Services, Geneva, Switzerland



## Preface

The world's population is rapidly aging, and the aging population will lead to changes in adult health. As the world's most populous country and the largest developing country, China's aging process is also characterized by its own unique features, like uneven regional aging and sex distributions in the population. Superimposed on this is China's own modernization, which is causing a series of social, economic and public health issues that have created considerable challenges for the Chinese government and society. Therefore, access to valid, reliable and comparable data with regard to the socio-demographic characteristics, health status, risk factors, health resource utilization, social support networks, well-being and other aspects of the older age population becomes increasingly important.

The WHO Multi-Country Studies Unit initiated the Study on Global AGEing and Adult Health (SAGE) in China and five other countries across different regions of the world (Ghana, India, Mexico, Russia, and South Africa). It is a timely opportunity for China to understand the impact of aging on adult health and well-being, explore health trends and changes over time for people aged 50-plus, and improve the analytical capacities of researchers in China.

The WHO provided funding for research and technical support, and the Shanghai Municipal Center for Disease Control and Prevention (SCDC) undertook the SAGE survey in China together with the Center for Statistics and Information, Ministry of Health and the National Center for Chronic and Non-communicable Disease Control and Prevention (NCNCD).

SAGE used standardized survey instruments in the six participating countries. In China, SAGE covered eight provinces / municipalities (Guangdong, Hubei, Jilin, Shaanxi, Shandong, Shanghai, Yunnan and Zhejiang). Wave 1 was successfully completed in 2010, and consists of 10,218 households in total and 14,813 individual

respondents. While SAGE China obtained a wealth of data for longitudinal follow-up, this report focuses on a descriptive summary of key findings related to socio-demographic characteristics, health status, risk factors, quality of life, health care utilization and health systems responsiveness. This report is largely descriptive, which means that a number of unique methods and results from the study, including the anchoring vignette methodologies used to adjust self-reported health and social networks as a determinant of health, are not presented in this report, but instead will be analyzed in the near future.

SAGE China improved our understanding of the current aging situation and the effects of the aging process on human health trends. Meanwhile, valuable international experience in large-scale multi-country research was obtained through implementation of the study. These results will provide a good foundation and platform for China's aging health research, and the high-quality evidence for the Government to formulate health policy and planning for older adults. Because of the limited time and the wide range of content, please give us feedback if there are omissions and irregularities.

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## Acknowledgements

With the funding and technical support of World Health Organization (WHO) and the comprehensive support of the Center for Statistics Information of Ministry of Health in China, together with cooperation between the National Center for Chronic and Non-communicable Disease Control and Prevention (NCNCD) and the health administrative departments at all levels, the first round of field investigation of the Study of global AGEing and adult health (SAGE) was successfully completed in a nationally representative sample comprised of eight provinces/municipalities (Guangdong, Hubei, Jilin, Shaanxi, Shandong, Shanghai, Yunnan and Zhejiang) in China, 2010.

First of all, I thank Prof. Rao Keqin, expert on statistics and health information and former Director of the Center for Statistics Information, for providing guidance and a wealth of field survey experience. Secondly, thank you to the following experts from the Ministry of Health in China. Drs. Qian Junchen and Hu Jianping spent a lot of time and effort on training and supervising at the state level, and Ms. Hao Huiying developed survey software in a short period and helped realize the Computer Assisted Personal Interviewing (CAPI) in SAGE-China. Thirdly, thanks go to Prof. Jin Shuigao, supervisor of SAGE-China, for his valuable comments on data analysis.

In addition, I want to express my sincere thanks to the WHO for supporting SAGE in China. The WHO provided training and helped throughout the implementation and analysis phases of the project. Special thanks to Dr. Somnath Chatterji and Dr. Paul Kowal for the help throughout the project, and also thank you to Ms. Nirmala Naidoo for her support with data analysis and data management.

The WHO's Study on Global Ageing and Adult Health is supported by the US National Institute on Aging through Interagency Agreements (OGHA 04034785; YA1323-08-CN-0020; Y1-AG-1005-01) and through a research grant (R01-AG034479). The National Institute on Aging's Division of Behavioral and Social Research,

under the directorship of Dr Richard Suzman, has been instrumental in providing continuous intellectual and other technical support to SAGE and has made the entire endeavour possible.

Special thanks go to Dr. Jiang Yong, a core member in SAGE-China survey team and the Deputy Director of Monitoring Department of NCNCD, for the technical support and effort throughout implementation of the project. His colleagues Drs. Zhang Mei and Wang Yuan offered lots of help in training and field survey at the beginning stage of the project, thanks for their support.

The SAGE-China survey teams from seven fraternal provinces worked hard to overcome great difficulties in the field survey process, such as complex interviewing, inconvenient traffic and communication. They excellently completed the field investigation. I am indeed very grateful to the local coordinators and their 14 field survey teams, about 180 investigators. They are Drs. Yu Min, Ma Wenjun, Ma Jixiang, Zhang Qingjun, Liu Feng, Wang Yajuan and Xiao Yize.

My colleagues Dr. Li Xinjian, Dr. Ying Shaoxu, Dr. Lu Ye, Dr. Xu Jiyong, Ms Song Guixiang, Dr. Zheng Yang, Dr. Guo Yanfei, Dr. Chen Tao, Dr. Zhang Zongqi and Ms. Jin Ping spent lots of time and effort in preparatory work for the survey, in implementing the process, and in lab and data analysis. Drs. Zheng Yang and Guo Yanfei contributed substantially to drafting the report, and my special thanks go to them for their efforts and contributions.

Successful completion of the project was possible largely due to the painstaking efforts of the whole survey team at SAGE-China and the field investigators who patiently conducted the interviews and collected the required data. I sincerely thank all of them.

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## Fact sheet

### SAGE-China, Wave 1

Note: All data at the individual level are characteristics of respondents aged 50 years and over. The population aged 18-49 years included for comparison purposes in Wave 1 are not included in this report, but will be included in future publications.

Population	
Households covered	10,218
Household members covered	25,431
Individuals aged 50 years old and over covered	13,175
Individuals aged 18 to 49 years old covered	1,636
Numbers of PSUs	
Urban	32
Rural	32
Household basic characteristics	
Mean household size (persons)	2.6
Mean age of household head (in years)	59.3
Mean age of main income earner (in years)	55.9
Living arrangements (percent)	
Single person with household head aged 50+	13.5
Dual with household head aged 50+ and spouse <50	2.5
Dual with household head aged 50+ and spouse 50+	29.5
Empty nest household with household head aged 50+	45.5
Multigenerational household (percent)	
One generation	49.9
Continuous two generation	29.8
Skip generation	3.4
Three generation	14.6
More generation	2.3
Work history	
Past and current work status (percent)	
Currently working	43.6
Ever worked but currently not working	47.5
Never worked	8.9

Mean age of retirement or stopping work (in years)	
Overall	54.3
Urban	53.1
Rural	59.6
Male	56.7
Female	52.4
Reasons for work discontinuation (percent)	
Homemaker	3.3
Health/age	87.9
Laid off	3.7
Other	5.1
Employment type (percent)	
Public sector	37.8
Private sector	9.9
Self-employed	49.4
Informal employment	2.9
Income and transfers' (household level)	
Mean monthly income per household (RMB: yuan)	
Overall	2571
Urban	3822
Rural	1302
Income sources (percent)	
Wage, salary	61.7
Trading, business	16.4
Rental, interest, dividends	9.2
Pension, benefits	40.2
Other	18.5
Income sufficient to cover daily living needs (percent)	
Overall	72.1
Urban	77.7
Rural	66.4
Transfer source into household (percent)	
Family out of household	33.4
Community	2.6
Government	15.5

<b>Transfer source out of household (percent)</b>	
Family out of household	18.9
Community	4.6
<b>Consumption (household level)</b>	
Mean monthly consumption expenditure per household (RMB: yuan)	
Overall	1413
Urban	1841
Rural	948
Mean monthly out-of-pocket payment per household (RMB: yuan)	
Overall	211
Urban	270
Rural	148
<b>Poor household (percent)</b>	
Overall	29.5
Urban	10.1
Rural	50.6
<b>Impoverished household (percent)</b>	
Overall	6.1
Urban	4.4
Rural	8.0
<b>Owning catastrophic health expenditure household (percent)</b>	
Overall	20.5
Urban	19.0
Rural	22.1
<b>Structure of out-of-pocket health payment (percent)</b>	
Inpatient	10.8
Outpatient	12.9
Traditional	3.3
Drug	55.7
Other	17.3
<b>Financial sources for health services (percent)</b>	
Savings	17.1
Sold items	0.2
Family outside	10.0
Borrowed	1.1
Health insurance	45.8
Current income	92.6
Other	2.3
<b>Risk factors (percent)</b>	
<b>Percentage of smokers</b>	
Urban	28.7
Rural	42.3
<b>Percentage of non-heavy alcohol consumption "social drinkers"</b>	
Urban	15.4
Rural	20.7

<b>Insufficient intake of fruit and vegetables<sup>2</sup></b>	
Urban	34.7
Rural	36.6
<b>Physical activity</b>	
<b>Low level</b>	<b>28.2</b>
Moderate level	27.4
High level	44.4
<b>Access to improved drinking water source<sup>3</sup></b>	
Urban	99.9
Rural	93.3
<b>Access to improved sanitation<sup>4</sup></b>	
Urban	87.2
Rural	67.6
<b>Cooking with clean fuel<sup>5</sup></b>	
Urban	92.8
Rural	13.8
<b>Cooking with kerosene/paraffin</b>	
Urban	0.2
Rural	0.1
<b>Cooking with solid fuel<sup>6</sup></b>	
Urban	7.0
Rural	86.1
<b>Self-reported overall general health</b>	
<b>General health state rating<sup>7</sup> (percent)</b>	
Very good	3.3
Good	30.4
Moderate	45.2
Bad	19.0
Very bad	2.2
<b>Work or household activities difficulty rating<sup>8</sup> (percent)</b>	
None	61.0
Mild	25.6
Moderate	10.1
Severe	2.7
Extreme	0.5
<b>Composite health score<sup>9</sup></b>	
<b>Mean health score</b>	
Overall	67.9
Urban	70.7
Rural	65.3
Male	70.0
Female	65.7
<b>Functioning and health</b>	
<b>Mean WHODAS score<sup>10</sup></b>	
Overall	8.9
Urban	6.9
Rural	10.7

Male	7.7	Current therapy (in the last 2 weeks)	78.0
Female	10.1	Recent therapy (in the last 12 months)	84.7
<b>ADL deficiency of having problem and needing help (percent)</b>		<b>Chronic lung disease</b>	
Overall	6.2	Self-reported	7.9
Urban	3.5	Current therapy (in the last 2 weeks)	38.7
Rural	8.5	Recent therapy (in the last 12 months)	63.6
Male	5.1	<b>Edentulism prevalence</b>	9.1
Female	7.2	<b>Cataract prevalence</b>	8.1
<b>IADL deficiency of having problem and needing help (percent)</b>		<b>Breast cancer screening in female</b>	27.4
Overall	1.8	<b>Cervical cancer screening in female</b>	20.5
Urban	1.4	<b>Injury</b>	
Rural	2.1	Road injury prevalence	1.8
Male	1.6	Road injury with disability	24.5
Female	1.9	Other injury prevalence	5.2
<b>Non-communicable diseases and injury (percent)</b>		Other injury with disability	13.2
<b>Arthritis</b>		<b>Health examination</b>	
Self-reported	22.0	<b>BMI and health according to WHO standard<sup>11</sup> (percent)</b>	
Symptom-based	20.4	Underweight	4.3
Current therapy (in the last 2 weeks)	42.6	Normal	60.5
Recent therapy (in the last 12 months)	66.6	Overweight	29.6
<b>Stroke</b>		Obese	5.7
Self-reported	3.1	<b>BMI and health according to Chinese standard<sup>12</sup> (percent)</b>	
Current therapy (in the last 2 weeks)	60.1	Underweight	4.3
Recent therapy (in the last 12 months)	70.8	Normal	48.5
<b>Angina</b>		Overweight	34.3
Self-reported	7.9	Obese	12.9
Symptom-based	10.0	<b>Health risk (percent)</b>	
Current therapy (in the last 2 weeks)	61.0	Increased risk according to waist circumference <sup>13</sup>	21.5
Recent therapy (in the last 12 months)	78.4	Substantially increased risk according to waist circumference <sup>14</sup>	22.2
<b>Diabetes</b>		High risk according to waist-hip ratio <sup>15</sup>	57.5
Self-reported	6.6	<b>Central obesity according to Chinese standard<sup>16</sup> (percent)</b>	
Current therapy (in the last 2 weeks)	82.1	Overall	59.6
Recent therapy (in the last 12 months)	84.4	Urban	67.9
<b>Asthma</b>		Rural	52.6
Self-reported	2.0	Male	49.8
Symptom-based	3.9	Female	69.2
Current therapy (in the last 2 weeks)	23.0	<b>Measured hypertension prevalence<sup>17</sup> (percent)</b>	
Recent therapy (in the last 12 months)	34.3	Overall	54.5
<b>Depression</b>		Urban	48.0
Self-reported	0.3	Rural	60.0
Symptom-based	2.0	Male	54.0
Current therapy (in the last 2 weeks)	5.2	Female	55.0
Recent therapy (in the last 12 months)	9.3	<b>Isolated systolic hypertension in total hypertension<sup>18</sup> (percent)</b>	
<b>Hypertension</b>		Overall	45.9
Self-reported	26.8	Urban	43.7
Measured (diastolic or systolic)	54.5		

Rural	47.4
Male	42.6
Female	49.0
<b>Low vision (percent)</b>	
Near visual acuity	36.2
Distant visual acuity	9.4
<b>Mean grip strength (kilogram)</b>	
Overall	26.7
Urban	27.3
Rural	26.2
Male	32.8
Female	20.7
<b>Mean 4-meter walk time (seconds)</b>	
Normal walk	4.4
Rapid walk	3.3
<b>Mean score of cognition (scores)</b>	
Verbal recall (total score is 10 )	5.4
Verbal fluency	12.8
Forward digit span (total score is 9 )	7.0
Backward digit span (total score is 8 )	3.4
Overall cognition score	57.4
<b>Health service utilization (percent)</b>	
<b>Time of the last health care need</b>	
More than 3 years	15.8
Less than 3 years	78.7
Never need	5.5
<b>Received health care type in the last 3 years</b>	
Inpatient care	22.2
Outpatient care	49.0
<b>Inpatient care reasons in the last 3 years</b>	
Noncommunicable	34.9
Acute	4.8
Other	60.4
<b>Outpatient care reasons in the last 3 years</b>	
Noncommunicable	28.0
Acute	33.1
Other	38.9
<b>Health care responsiveness scores</b>	
<b>Inpatient</b>	
Urban	69.3
Rural	73.6
<b>Outpatient</b>	
Urban	63.2
Rural	65.8
<b>Health insurance coverage (percent)</b>	
<b>Urban</b>	
Mandatory	67.1
Voluntary	8.0

Both	6.9
None	17.9
<b>Rural</b>	
Mandatory	85.3
Voluntary	4.3
Both	6.9
None	3.5
<b>Well-being and quality of life (WHOQoL scores<sup>19</sup>)</b>	
Overall	47.9
Urban	46.3
Rural	49.3
Male	47.1
Female	48.6

- Reference period of transfer is last 12 months.
- Insufficient intake of fruit/vegetables: less than 5 servings (1 serving=80g) in a typical day on average in the last 7 days.
- Improved water source includes: piped water into dwelling, piped water to yard/plot, public tap/standpipe, tube well/borehole, protected dug well, protected spring, rainwater collection, bottled water.
- Improved sanitation includes: flush/pour flush to piped sewer system, flush/pour flush to septic tank, flush/pour flush to pit latrine, flush/pour flush to unknown place/not sure, ventilated improved pit latrine (VIP), pit latrine with slab, composting toilet.
- Clean fuel is gas and electricity.
- Solid fuel includes coal/charcoal, wood, agricultural residue, animal dung, shrubs/grass, other.
- Rating on current days of survey.
- Rating on the last 30 days from survey.
- Reference period is last 30 days. Including eight health domains (affect, mobility, sleep and energy, cognition, interpersonal activities, vision, self-care and pain). Higher the score, better the health state.
- Reference period is last 30 days. The 12-item version of WHODAS II used to collect information. The range of score is from 0 to 100. A lower score indicates lower levels of disability.
- WHO standard: BMI<18.5, underweight; BMI=18.5-24.9, normal; BMI=25.0-29.9, overweight; BMI≥30, obesity.
- Chinese standard: BMI<18.5, underweight; BMI=18.5-23.9, normal; BMI=24.0-27.9, overweight; BMI≥28, obesity.
- Increased risk: waist circumference>=94cm for males or >=80cm for females;
- Substantially increased risk: waist circumference>=102cm for males or >=88cm for females.
- High risk: waist-hip ratio >=0.90 for males or >=0.85 for females
- Waist circumference >=85cm for males or >=80cm for females
- Hypertension: systolic >=140 mmHg, or/and diastolic >=90 mmHg
- Isolated Systolic Hypertension, systolic >=140mmHg and diastolic <90mmHg
- WHOQoL score is the indicator of quality of life. The score is from 0 to 100, where a higher score reflects better quality of life



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# 1. Introduction

## 1.1 Global ageing

Population ageing refers to a process whereby the proportion of older people in a population increases over time. Ageing is an inevitable consequence of two trends: decreasing total fertility and increasing life expectancy at birth. The world is rapidly ageing[1]. Eight percent of the total population worldwide was at least 60 years of age in 1950. This proportion had increased to 11 percent by 2010, and is projected to reach 22 percent by 2050[2]. In the major regions of the world, particularly in wealthier regions, the older adult population has increased steadily in the past 50 years (see Table 1.1). From the year 2000 to 2050, the world’s population aged 60 years old and over will more than triple, from 600 million to 2 billion. Most of this increase will occur in less developed countries, where the number of older people will rise from 400 million in 2000 to 1.7 billion by 2050. By the year 2046, the global population of persons aged 60 years old and over will exceed the number of persons younger than 15 years for the first time in history [2].

Declining fertility and mortality, resulting in increasing life expectancies, have led to a marked increase in the

older population globally both in relative and absolute terms. This is true not just of high income countries but also of the rest of the world. Major epidemiological changes have reduced mortality and morbidity rates due to infectious conditions and enhanced the prominence of non-fatal health conditions, especially at older ages. Meanwhile, a notable decline in fertility that reduced the mean number of babies (from 5.0 to 2.5) per woman between 1950 and 2010, combined with a decline in mortality, have meant continued population growth but different demographic patterns.

Because of these two demographic effects, population ageing is inevitable today. The 21st century is an era of population ageing.

In addition, because of higher female life expectancy, the older population has different proportions of men and women. In 2010, among those aged 60-plus years, women outnumber men by an estimated 69 million. Among those aged 80 years or over, women are 1.7 times as numerous as men, and among centenarians women are 3.5 times more numerous than men [2].

**Table 1.1** Global trends in ageing, 1950–2050

Region	Percent of population aged 60+				
	1950	1975	2000	2025	2050
Asia	6.7	6.6	8.6	14.8	24.4
Europe	12.1	16.5	20.3	27.3	33.6
Latin America/Caribbean	5.6	6.5	8.4	14.9	25.0
Northern America	12.4	14.6	16.3	24.7	27.0
Oceania	11.2	11.0	13.4	19.1	23.5
Sub Saharan Africa	5.2	4.8	4.8	5.5	8.3

Source: UNPD, 2011.

## 1.2 Emerging health and social trends of ageing

Population ageing will have profound consequences for societies, with implications for all facets of human life. In the economic area, population ageing will have an impact on economic growth, savings, investment and consumption, labour markets, pensions, taxation and intergenerational transfers. On the social side, population ageing can affect health, healthcare, family composition, living arrangements, housing and migration. In the political arena, population ageing can influence voting patterns and representation. The profound, pervasive and enduring consequences of population ageing present enormous opportunities as well as enormous challenges for all societies.

The demographic shift in all regions of the world will also drive a health transition with adult health issues becoming more prominent in all countries. This demographic change has several implications for public health. The disability-adjusted life year (DALY) is a summary measure widely used to give an indication of the burden of disease. Within a rapidly ageing society, non-communicable diseases may be responsible for a majority of deaths; in the Western Pacific Region which includes China, 67 percent of deaths occurred after age 59 in 2004. Non-communicable diseases now cause almost half of the burden of disease in low- and middle-income countries, although globally, 60 percent of DALYs are owing to premature mortality [3].

Ageing has often been associated with decline and decay, when in fact many people live healthy into older age. Good health is essential for older people to remain independent and to play a part in family and community life. When health conditions do occur in older people, primary health services must provide accessible, integrated and regular care. Chronic diseases require monitoring in order to minimize the development of associated disabilities and negative effects on the quality of life. The ongoing nature of the care means it is more effectively provided in community-based settings such as primary health care centers.

## 1.3 Ageing situation in China

### 1.3.1 Ageing trends in China

Thanks to fast economic growth and a strict family planning policy, China's fertility rate has been declining in the past three decades and average life expectancy

at birth has substantially increased, from 65 years in 1975 to about 74 years today[2]. Over the past two decades, China's population has been ageing rapidly. By the end of 2006, the proportion of Chinese aged 60 and over had reached 10 percent. According to demographic forecasts, this proportion is expected to rise to 30 percent in 2030. The absolute numbers are estimated to increase from 128 million in 2000 to 431 million in 2050 [4]. The 2000 national census found the percent of population aged 65-plus years to be 7% in 2000, reaching the threshold for an "aged society". By 2005, this quickly ascended to 7.7%[5], firmly placing China in the "aged society" category. The older population of China ranks as the largest in the world, accounting for one-fifth of the world's total older population.

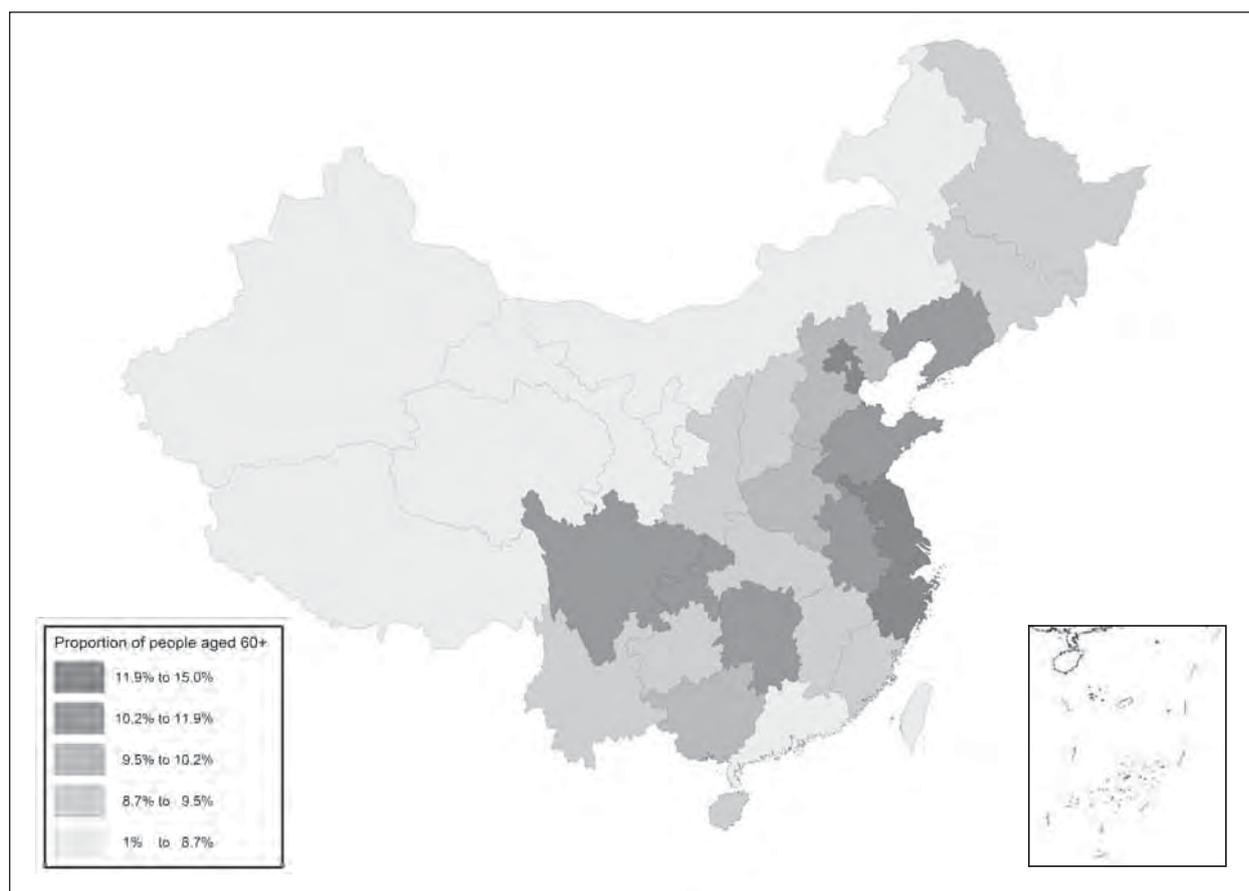
### 1.3.2 Ageing across regions in China

In China, the rate of ageing is distinctly different across regions. In 2006, 21 provinces (including autonomous regions and municipal cities) in China were "aged areas" (more than 10% of the population is over the age of 60 or more than 7% of the population is over the age of 65)[6]. The Shanghai Municipality became "aged" in the year 1979, whereas the last region to be considered "aged", the Ningxia autonomous region, will reach this status in 2012. In contrast to the western economically undeveloped area, the ageing situation and process in the eastern coastal economically developed area are more pressing and rapid (See Figure 1.1). The two eastern provinces, Shanghai and Zhejiang, are currently the oldest [7].

The Shanghai older population proportion ranks at the top in China, and the ageing process is the fastest. In 2009, Shanghai life expectancy was 81.3 years and the percent of the total population aged 60 years old and over was 22%, twice that of the whole country. It is predicted that the percent will rise to 40% by 2030. In Zhejiang, the percent 60 years old or over was 17% in 2009, and is projected to be 33% in 2030. In Shandong, it was 12% in 2009 and about 25% in 2030 [8, 9].

In addition to the provincial differences, there is a marked imbalance in ageing between urban and rural areas in China. In 2000, the older population in rural areas was 85.5 million, accounting for 66% of the total older population in China. The proportion of older population in rural areas was 1.2% higher than that in urban areas[10], and the situation will remain through 2040 [9]. In the second half of the 21st century, however, the proportion of the older population in urban

**Figure 1.1** Proportion of people aged 60 years old and over by province in 2000



areas will exceed that in rural areas, and the difference will gradually increase. This is one of the important characteristics of China's population ageing which is perhaps different from that of other countries.

### 1.3.3 Ageing trends difference between China and other countries

In China, birth and death rates over the past 50 years have declined dramatically due to the implementation

of revolutionary policies for the purpose of improving health and controlling population. The percent of older population increased only modestly in the past half-century. However, China is confronting a more severe ageing situation than other countries in the near future. It took many developed countries more than 45 years for the proportion of population 65+ to increase from 7% to 14%, for example, taking 130 years in France, 85 years in Sweden, and about 79 years in Australia and the US. It will take China only 27 years. Table 1.2 shows the growth in older populations across SAGE countries

**Table 1.2** Population ageing trends in SAGE countries, 1950 to 2050

Country	Percent of population aged 60+				
	1950	1975	2000	2025	2050
China	7.5	7.2	10.2	20.2	33.9
Ghana	4.1	4.5	5.2	7.2	11.9
India	5.4	5.6	6.7	11.0	19.1
Mexico	5.4	5.6	7.5	14.2	25.8
Russia	9.2	13.6	18.4	24.0	31.2
South Africa	6.0	5.2	5.9	10.5	14.8

Source: UNPD, 2011.

from 1950 and projected to 2050. China's older adult population quadruples over this time period, with the most rapid rise coming between 2000 and 2050 [11].

Moreover, population ageing is ahead of modernization in China. Developed countries experienced ageing of their populations after the realization of modernization, which meant ageing after getting rich or ageing hand-in-hand with modernization. However, China is ageing before this realization of modernization. When the developed countries entered into an "aged society", their per capita GDP was between USD 5,000 and USD 10,000. On the contrary, the GDP per capita in China at

present is just over USD 1,000. As a middle income country, China faces an economic challenge when dealing with ageing issues [12].

## 1.4 Health and socio-demographics in China

From 2005 to 2007, there was a small increase in the total population of China, of which the urban population represented nearly 45%. Compared with 2005, the 60+ population increased 2.4% by 2007, with a 0.2%

**Table 1.3 Selected socio-demographic indicators, China, 2009**

Socio-demographic indicators	China, total*	Guangdong	Hubei	Jilin	Shaanxi	Shandong	Shanghai	Yunnan	Zhejiang
Total population (in ten thousands)	133 474	9 638	5 720	2 740	3 772	9 470	1 921	4 571	5 180
Male population (in ten thousands)	68 652	4 874	2 932	1 403	1 910	4 789	955	2 373	2 615
Female population (in ten thousands)	64 822	4 764	2 788	1 337	1 862	4 681	966	2 198	2 565
Sex ratio (female=100)	105.9	102.3	105.2	104.9	102.6	102.3	99.0	108.0	101.9
Annual population growth rate (%)	0.5	–	–	–	–	–	–	–	–
Density of population (per sq. km)	139	522	305	147	183	603	3089	116	51
Percent urban population (%)	46.6	63.4	46.0	53.3	43.5	48.3	88.6	34.0	57.9
Literacy rate age adults older than 15 years old in percentage (%)	92.9	96.4	92.2	96.6	92.8	92.5	96.2	86.3	91.9
Dependency ratio (0-14 and 65+/15-64)	36.2	33.0	32.7	26.7	34.6	34.1	27.6	43.1	33.2
Crude Birth Rate (per 1,000 population)	12.1	11.8	9.5	6.7	10.2	11.7	8.6	12.5	10.2
Total Fertility Rate (15-49)	1.5	–	–	–	–	–	–	–	–
Expectation life (in years)	74	–	–	–	–	–	–	–	–
Household size (persons per household)	3.2	3.3	3.18	3.1	3.2	3.0	2.6	3.6	2.8
Population percent by broad age groups									
(0-14)	16.9	–	–	–	–	–	–	–	–
(15-49)	54.6	–	–	–	–	–	–	–	–
(50+)	28.5	–	–	–	–	–	–	–	–
(60+)	14.5	–	–	–	–	–	–	–	–

\*Note: Data for China, total exclude Hong Kong, Macao, and Taiwan.

Sources: China Statistical Yearbook 2010; Ministry of Health, China, 2010; U.S. Census Bureau.

increase for ages 80+. However, the total fertility rate was around 1.7 over this time period. These results indicate a prolonged lifespan with a relatively lower fertility rate, resulting in a notable decline in the dependency ratio from 0.43 in 2001 to 0.38 in 2007. All data imply an increasing burden of an ageing society in China [6, 10, 13].

Table 1.3 shows important socio-demographic indicators for China as a whole and for the eight provinces covered by SAGE Wave 1, based on the most recent secondary data sources. By the end of 2009, the total population in China was 1.33 billion, the annual population growth rate was about 0.5%, the sex ratio was 106, and the dependency ratio was 36.

## 1.5 Ageing issues and policy goals in China

The ageing of the Chinese population will have a great impact on development, family and individual life. In the economic area, it will influence economic growth, savings, investment, consumption, labour market, pensions and taxation[14]. In the social dimension, population ageing will affect social welfare and the health care system, family structure and life style, as well as housing and immigration. It will also have political and cultural impacts at different levels. Five main issues arise:

1. The burden on the social support system for older persons is increasing;
2. The health care system will have to respond to a disease burden that is shifting toward the older population;
3. The need of social services for older persons is expanding;
4. Ageing issues in rural are getting serious; and,
5. The size of the labour force is decreasing.

In China, the goal of the National Ageing Policy is to assist older persons to feel supported, access needed medical care, contribute to society, engage in life-long learning and live happily. In the broader context of ageing policy goals, a new National Ageing Development 11<sup>th</sup>-Five-Year Plan was formulated in 2006 to cater to the challenges of ageing for the period 2006-2010. Government positively responded to the main ageing issues by increasing the budget for state sector ageing spending, strengthening cooperation between departments including health, civil and labour administration, and drafting various ageing policies. The central gov-

ernment and local governments at all levels will create short-term ageing development plans for every year and a long-term plan covering five years. In 1996, the standing committee of the National People's Congress promulgated the Old Age Law in China emphasizing the roles of family, society and government in protecting elder rights, and helping develop the direction of social responses to ageing. The government specifically established the national and local Committee on Aging to manage ageing affairs and organize ageing research. Meanwhile, China has increased international communication and cooperation on ageing issues [15].

### 1.5.1 Support systems

Support for older adults is a primary issue for the government, which advocates for family support and emotional well-being. Various community-based service models have started in cities as well as rural regions. These models include enhancing the concept of community-based old-age service, increasing input into community-based old-age service, standardizing community-based old-age service, and employing professionals. The central role of the family in caring for older adults is being reinforced as part of 'moral' responsibilities in carrying on Chinese traditions. A strategy to enhance awareness of ageing issues targets both the general public and leading government cadres at all levels. Certain provinces, including Shandong, have developed written agreements between parents and children regarding provision of family care, specifying daughters-in-law in addition to immediate family members as potential future carers.

In urban areas, an endowment insurance system has been in place for many years. When retired at a stated age (the retirement age in China currently is 60 for male civil servants and 55 for male workers, and 55 for female civil servants and 50 for female workers), a standard monthly pension from the government or former employer is available. At the end of 2005, there were 436.7 million superannuation retirees with pension amounts exceeding 404 billion Yuan in urban areas alone. The Chinese government has undertaken multiple financing strategies and is increasing reserves in order to guarantee adequate pensions. Also, the government is developing the corporation complementary endowment insurance and individual savings endowment insurance as part of the overall response to the economics of an ageing population.

In rural areas, where 60% of the older population resides, the endowment insurance system depends largely on

contractual management by land owners who manage the land owned by the old and who support older adults. This is a traditional support system, relying on family support. The government is currently exploring if the urban endowment insurance approach can be replicated in rural areas. “Five basic support aspects” have been made for special categories of the older population, such as the old who have no children, no land, and no labour or are impoverished. The “five basic support aspects” include a stipend to meet living expenses, food, clothing, medical care and funeral costs [15].

## 1.5.2 Health care system

In China, the aging of the population may bring with it an increase in the stress on an already troubled health care system. In addition, the rapid economic growth in China, accompanied by rapid urbanization, may also contribute to an increase in non-communicable diseases. The Chinese health care system is already trying to respond to a disease burden that is shifting, with about 60 percent of burden from non-communicable diseases

among adults aged 45+ [16]. By 2030, older adults will account for two-thirds of the total disease burden in China [17]. It presents special challenges for China’s ongoing reform of healthy ageing and health care, given the large numbers who require curative treatment and the window of opportunity for timely prevention of disease.

In many large cities of China, a primary care system is present as in many western countries. But in less developed urban areas, primary care is mainly carried out at ‘Street Block’ clinics serving the people living within a few blocks. In rural areas, care is delivered at clinics staffed by less intensively trained medical personnel. The rural co-operative medical system (CMS), formerly funded by premiums, a collective welfare fund and government subsidies, changed in 2003 to a system where over 90% is paid out-of-pocket by patients. Currently, medical care in urban areas is undergoing significant and complex reforms. The trend is for government employees to pay a certain percentage of their medical costs before they can enjoy the government subsidy. As a result, people go to the local pharmacy and, based

**Table 1.4 Selected indicators of health expenditure, health infrastructure, mortality and health outcomes, China, 2009**

Health status indicators	
Total expenditure on health (as a percent of GDP)	5.1%
General government expenditure on health (as a percent of total expenditure on health)	27.2%
Private expenditure on health (as a percent of total expenditure on health)	38.2%
General government expenditure on health (as a percent of total government expenditure)	6.2%
Society expenditure on health (as a percent of total expenditure on health)	34.6%
Out of pocket expenditure (as a percent of private expenditure on health)	
Urban	7.0%
Rural	7.2%
Physicians and surgeons (as a percent of total registered medical practitioners)	47.5%
Dentists and dental surgeons (as a percent of total registered medical practitioners)	4.1%
Public health physicians (as a percent of total registered medical practitioners)	1.6%
Percent of births delivered in medical institution	96.3%
Percent of deliveries assisted by health professional(s)	99.3%
Crude death rate (per 1,000 population)	7.1
Under-5 mortality rate (per 1,000 births)	17.2
Infant mortality rate (per 1,000 births)	13.8
Life expectancy (LE) at birth (in years)	74
Health-Adjusted Life Expectancy (HALE) (in years)	66

Source: Ministry of Health, 2010.

on the recommendations of the staff there, purchase medicines for common problems like coughs and colds. If the problem becomes more severe, they will go to the Street Block Clinic or hospital. At present, costs are relatively high—the average monthly income is around RMB 1000, while outpatient treatment for a common cold in Beijing is RMB 150, inpatient room charges are RMB 50 daily, and cataract removal costs RMB 6000. If annual costs are over RMB 2000, only 10% of the excess is paid by the patient with the government picking up the balance [18]. Homes for older people are few in number and costs are extremely variable. Generally, care at home is cheaper (about RMB 400 a month), is readily available, and may be more socially acceptable.

There is an increasing trend towards purchasing private health insurance; for working adults, there is a social health insurance programme to which employers contribute 6% and employees 2% of wages. From this revenue, the Chinese government currently spends an estimated 100 million Yuan annually in retirement benefits. The proportion contributed by employees has increased from 14% in 1978 to 35% in 1993 [19]. A monthly old age allowance is available to government cadres at age 65 and, for employees of organizations like universities, at 75 years, if they have worked for at least 30 years. The allowance amount is based on years of service. In urban areas, about 50% of the population may be receiving the government's old age allowance, while no one in rural areas is receiving this subsidy [18].

Much emphasis has been placed on prevention of chronic diseases. China has an excellent infrastructure for carrying out surveys and surveillance to monitor health and nutritional status, and to disseminate public health messages through its system from central government to provinces and autonomous regions, municipalities, cities, and streets. Each of these units is supervised by a designated person. Thus, the Ministries of Health, Agriculture, Public Security and National Statistics Bureau, aided by the FAO and WHO, together with the Institute of Nutrition and Food Hygiene of the Chinese Academy of Preventive Medicine, have conducted national health and nutrition surveys in 1959, 1982, 1990, and 1992. The Ministry of Health also established a working group for older adult health care in 1995, as well as a national Geriatric Institute to conduct research in the areas of epidemiology, biochemistry, immunology, genetics and cellular biology. Currently there are about 50 organizations for geriatric care and 2000 health care workers nationwide [20].

### 1.5.3 Social services

The government is increasing input into social services for older adults, such as investments in housing, aged care centres, and education. A concrete example is the formation of the Beijing Retired Personnel Development Centre in 1986. It provides education and psychological consultation for older persons. At the same time, it functions as an employment agency, matching the previous occupation and expertise of over 80,000 older people to demands for such expertise by various enterprises. Further examples are Senior Citizen Universities which form venues for promoting healthy ageing, and the Centre for Geriatric Medicine, Health Maintenance and Training of the West China Medical University which trains doctors and nurses in Geriatric Medicine, carries out health promotion, and creates service delivery models. In Shanghai, centenarians receive a certificate, a longevity star, 100 RMB/month for nutritional subsidy from the government, and the municipal or district hospitals pay home visits and carry out periodic physical examinations free of charge. In addition, the Shanghai milk company provides a daily bottle of free milk for the old.

## 1.6 Ageing related studies, data and policy gaps in China

In China, the Census and the vital (sampling) registration system provide reliable data on several socioeconomic and demographic aspects of the population. Yet these data, along with the studies mentioned above, still provide very little information about the older adult population's health and health care needs. In view of the lack of routine health information, organizations such as National Sampling Survey on Ageing Population (NSSAP) and National Risk Factors Surveillance (NRFS) undertook national surveys on the older population and health.

The NSSAP surveys, undertaken in 2000 and 2006, gathered information on demography, social-economy, household size, support networks, living arrangements, self-reported health, available health care, social services needs, satisfaction and happiness, available social security, and the social services system. These surveys highlighted the changes in older persons' living situation and the differences between urban and rural areas [21]. The NRFS focuses on the population aged 15-70, provides data on common behavioral risk factors such as smoking, drinking, activities and nutrition, and is a valuable source of information on ageing and health [22].

More recent are the Kadoorie Biobank Study in China [23], National Health Ageing and Support System Research (NHASSR), China Health and Nutrition Survey (CHNS), Chinese Longitudinal Healthy Longevity Survey [24], and China Health and Retirement Longitudinal Study [25]. The KBSC is a prospective health study investigating the causes of major chronic diseases such as stroke, heart disease, cancer, diabetes and chronic respiratory disease. Over 513,000 people aged 30-79 were recruited from 10 areas across China. The baseline survey has been completed from 2004 to 2008; each participant consented to take part, had a blood sample taken, underwent physical examination, and completed a questionnaire [23]. The NHASSR is sponsored by the National Committee on Aging, with an interest in policy research for healthy ageing and support systems. The CHNS is a longitudinal study on health, nutrition and family planning, started in 1989, and is run by the China CDC. It includes adults and older adults that can be analyzed to assess health and nutritional status. The CLHLS started in 1998 and examines the determinants of healthy ageing specifically in the oldest old. The CHARLS completed a pilot study in 2008, and plans to gather information on the population aged 45 years and over every two years. CHARLS has a number of questions that overlap with SAGE, but with a greater focus on economic aspects of ageing and well-being. Cross-study analyses, including comparisons of these data to SAGE results, would be a valuable exercise in China, with added implications and lessons for ageing and adult health outside China.

A number of longitudinal studies on ageing, health and retirement in developed countries are available, including the U.S. Health and Retirement Study (HRS), the Study on Health, Ageing and Retirement in Europe (SHARE) and the English Longitudinal Survey of Aging (ELSA). In addition, a number of longitudinal surveys on ageing have been conducted in middle-income countries - for instance, the Mexican Health and Ageing Survey (MHAS) and the Russian Longitudinal Monitoring Survey (RLMS) - which have provided much needed information on health and well-being of older persons within the respective countries. Cross-country analyses, with comparisons to SAGE, are crucial to improving our understanding of the impacts of different policies and systems on health and the ageing process.

A comprehensive evidence base is an important input for effective health policy interventions. The lack of data from routine health information systems is a common limitation in many developing countries, including

China. Given this background, the World Health Organization's Study on global AGEing and adult health (SAGE) intends to provide evidence on the health status of the Chinese ageing population, and in comparison to a number of other lower, middle and higher income countries.

## 1.7 SAGE global coverage and SAGE Wave 0 (as part of the World Health Survey)

WHO implemented the World Health Survey (WHS) in 2002-04 in 70 countries, including China. For China, the WHS is considered SAGE Wave 0. It was a population representative household survey that measured health status and well-being within and across countries, health systems coverage and responsiveness, and health care expenditures. Each country collected information on adults aged 18 years and older, including persons aged 50-plus who were members of the selected households.

The number of countries were reduced from 70 to six, moving from SAGE Wave 0 to Wave 1, generating cohorts in low and middle income countries - China, Ghana, India, Mexico, Russian Federation and South Africa. The countries were selected to give a broad representation across different regions, taking into consideration population and health characteristics (median age, life expectancy and sex ratios) and WHO's ongoing working relationship with the country. SAGE Wave 1 focuses on the population aged 50+ years with a smaller cohort of respondents aged 18-49 years included for comparison purposes. China chose to use a new sampling frame and sample for Wave 1. SAGE Wave 1 was implemented between 2008 and 2010 in China, with longitudinal follow-up in Wave 2 planned for 2012 and Wave 3 in 2014.

## 1.8 SAGE goals and objectives

SAGE will improve our empirical understanding of the effects of ageing on the well-being of adults and improve the capacity of researchers to analyze the effects of social and policy changes as they occur in the future. SAGE will provide baseline and longitudinal health and health-related data on older persons in middle and low income countries. Data collected will include self-reported assessments of health linked to anchoring vignettes for improved comparability across individuals,



communities and populations; assessment of perceptions of well-being and quality of life; self-reported assessment of functioning with measured performance tests on a range of different health domains; biomarkers; and the introduction of a longitudinal study design to allow for dynamic examination of changes in health expectations and experiences over the life course and investigation of compression of morbidity in aging populations.

#### *Primary Objectives*

- To obtain reliable, valid and comparable data on levels of health on a range of key domains for adults aged 50 years and older in nationally representative samples;
- To examine patterns and dynamics of age-related changes in health and well-being using longitudinal follow-up of survey respondents as they age, and to investigate socioeconomic consequences of these health changes;
- To supplement and cross-validate self-reported measures of health and the anchoring vignette approach to improving comparability of self-reported measures, through measured performance tests for selected health domains; and,
- To collect data on health examinations and biomarkers to improve the reliability of data on morbidity and risk factors, and to monitor the effect of interventions.

#### *Additional Objectives*

- To generate large enough cohorts of older adult populations and comparison cohorts of younger populations to follow intermediate outcomes, monitor trends, examine transitions and life

events, and address relationships between determinants and health, well-being and health-related outcomes;

- To develop a mechanism to link survey data to surveillance data from demographic surveillance sites;
- To build linkages with other national and cross-national ageing studies;
- To improve methodologies to enhance the reliability and validity of the outcomes and determinants;
- To examine how the mix and distribution of health, health care, socioeconomic and family resources affect key outcomes, including mortality, morbidity and health care utilization; and,
- To provide a public-access information base to engage all stakeholders, including national policy makers and health systems planners, in planning and decision-making processes about the health and well-being of older adults.

### **1.9 Dissemination**

In China, the SAGE National Report will be used to engage all stakeholders, including national policy makers and health systems planners such as government, national and local health administrations, and ageing health research institutions such as the CDC system and universities. The information is also a good source for comparative analyses to other ageing research in China and selected results from surveillance systems (for example, behavioral risk factors for non-communicable diseases). The SAGE team also plans additional analyses and publications to fully utilize and disseminate a broader range of results on the health and well-being of older Chinese.



## 2. Methodology

### 2.1 Sampling design, implementation and size

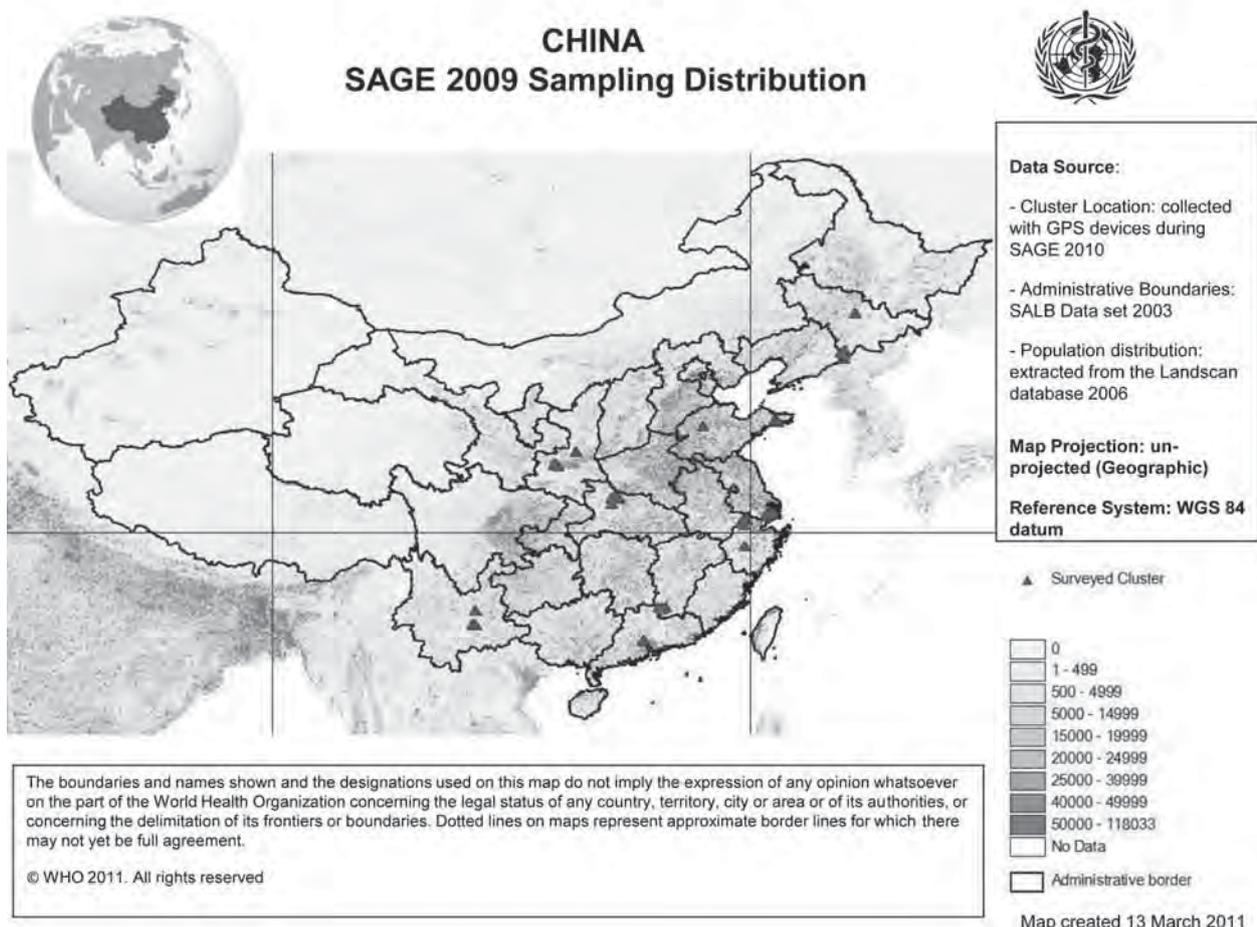
#### 2.1.1 National sampling plan

In SAGE-China, the total target sample was 9,600 households, including 8,000 households with respondents aged 50 years and older (50-plus) and 1,600 households aged 18 to 49 years. The goal was to get a study population that was a nationally representative sample of respondents aged 50-plus, their spouses and other

persons over 50 years in the household, and a smaller sample of persons aged 18 to 49 years as a comparator population.

Selection of the sampling strata consisted of three steps. Firstly, the 31 provinces in China were divided into three areas (eastern, middle and western) according to geographic area and socioeconomic level. Secondly, four provinces were randomly selected from the eastern, two from the central and two from the western areas (Shanghai, Zhejiang, Guangdong and Shandong; Hubei

**Figure 2.1** Distribution of sampling sites in SAGE-China



and Jilin; and, Yunnan and Shaanxi, respectively). Thirdly, one county from rural DSPs (national Death Surveillance Points) and one district from urban DSPs in each province were selected. In total, eight provinces and 16 strata were selected for SAGE-China. Figure 2.1 shows the distribution of sampling strata in China.

Three principles were used for the sampling design:

A probability sampling design was employed, meaning that every individual in the sampling frame has a known and non-zero chance of being selected into the survey sample.

A multi-stage cluster sampling strategy was used.

An adequate number of persons must be drawn from the sampling frame to account for an estimated amount of non-response (refusal to participate, empty houses). The highest estimate of potential non-response and empty households was used to ensure that the desired sample size was reached at the end of the survey period. However, efforts weremade to ensure a response rate of at least 80%. In addition, all households that were drawn into the sample must be approached for the survey even if response rates turn out to be higher than initially anticipated. If at the end of data collection the required sample size of 8,000 respondents aged 50+ years and 1,600 respondents aged 18-49 years has not been reached, additional persons must be selected randomly into the survey sample from the sampling frame. 10% was added to the original sample size to account for non-response.

All steps of sampling, including justification for stratification, cluster sizes, probabilities of selection, and weights at each stage of selection, and the computer program used for randomization, were communicated to WHO.

The procedure of sampling was divided into five stages after demographic information was collected by survey provincial teams:

- Stage 1 (PSU): Four townships in urban or rural communities per county/district using PPS method, for a total of 64 PSUs sampled. Table 2.1 shows the number of sample PSUs in SAGE-China;
- Stage 2 (SSU): Two villages/enumeration areas (EAs) per township/community using PPS method, for a total of 128 SSUs sampled;
- Stage 3 (TSU): Two residential blocks (RB) per village/EA using random cluster sampling method, for a total of 256 TSUs sampled;

- Stage 4: Forty-two households per RB using randomized sampling method (SRS), including:
  - a) 50+ (older) household: sampling 35 households from households that have person(s) for interview aged 50+ in each village using simple randomized sample (SRS) method.
  - b) 18-49 (younger) household: sampling seven households that have person(s) for interview aged 18-49.
 In total, 10,752 households were sampled, which included a 10% oversample to account for anticipated non-response.
- Stage 5: Selection of individuals. All persons aged 50+ in these 35 households were invited to participate and be interviewed. Using KISH grid methodology assigned by WHO Geneva, one respondent aged 18-49 was selected in each younger household.

### 2.1.2 Organization of SAGE in China

The SAGE survey was implemented by the China CDC system in partnership with the Ministry of Health. The core survey team included persons from Shanghai Municipal Centre for Disease Control and Prevention (SCDC) and the National Centre for Chronic and Non-communicable Diseases of the China CDC (NCD). The SCDC survey team took charge of the entire survey procedure, in cooperation with NCD. The field survey team consisted of staff from respective Province and County/District level CDCs.

In order to progress smoothly, the survey was coordinated by the Statistical Information Centre in the Ministry of

**Table 2.1 Sample PSUs: number of villages and urban enumeration blocks selected in SAGE-China**

Province/ municipality	PSUs		
	Urban site	Rural site	Total
Zhejiang	4	4	8
Hubei	4	4	8
Shaanxi	4	4	8
Guangdong	4	4	8
Jilin	4	4	8
Shanghai	4	4	8
Shandong	4	4	8
Yunnan	4	4	8
<b>Total (pooled)</b>	<b>32</b>	<b>32</b>	<b>64</b>

Health, the Province and County/District level health administrative departments, and the local governments of survey sites. In addition, the survey consultation team included experts in epidemiology, statistics, sociology, and ageing research, and this team offered technical support throughout the study.

## 2.2 Questionnaires

The SAGE questionnaires are based on a questionnaire developed for the World Health Survey, which was a population-representative household survey that included multiple modules devised to measure health status and well-being within and across countries, health systems coverage and responsiveness, and health care expenditures. The SAGE survey instrument used the WHS questionnaire as a starting point. The WHS questionnaire was revised following a review of 16 large cross-national and longitudinal ageing surveys, recommendations from experts in the field of ageing and adult health and members of the SAGE Advisory Group, and independent cognitive testing of the revised instrument in two countries (South Africa and Viet Nam) by StatsSweden. Following this, a pre-test of the instrument was conducted in three countries in 2005 (Ghana, India and Tanzania). The results were analysed and used to make final revisions to the SAGE Wave 1 questionnaires. The questionnaires were used to assess health status and health systems from a household and individual perspective - using self-report questions - to which were added questions about perceptions of well-being and more objective measures of health, including measured performance tests and a fingerprick blood sample for those who provided consent.

The same instruments were used across six countries and consist of four main parts: 1) household questionnaire; 2) individual questionnaire; 3) proxy questionnaire; and, 4) verbal autopsy questionnaire. A few changes were made to suit the Chinese context, details of which are available on request.

### Household questionnaire

This section includes questions about the household and household members (full household roster), housing characteristics, assets, income, consumption, and transfers between household members within a household and also to those outside the household. A brief description of each section of the household questionnaire follows:

- Section 0000: a summary of key information for supervisors, interviewers and data entry clerks.
- Section 0100: sampling details necessary for calculating sampling weights.
- Section 0200: household GPS information.
- Section 0300: specific address and location information of the selected household.
- Section 0350: information about attempts to complete the interview, and final result.
- Section 0400: household roster included details about all the household members.
- Section 0450: provided the interviewer with the correct procedure for selecting new respondents for the individual questionnaire and the consent form for the household informant completing the household questionnaire.
- Section 0500: information about physical characteristics of the dwelling/household.
- Section 0600: information about transfers into and out of the household.
- Section 0700: information about household income and assets.
- Section 0800: information about expenditures for the household.

### Individual questionnaire

Individual respondents were asked to sign a consent form, after determining if a proxy interview was warranted. A separate consent form was used for taking and storing a blood spot sample for future analyses.

The individual questionnaire included questions about the respondent's health state, physical functioning, health risk factors and conditions, health care use, health systems responsiveness, and perceptions about their own well-being and happiness. It also includes a section where the respondent consents to body measurements and participates in tests of vision, cognition, mobility, grip strength and lung function.

A rotation schedule for completing the survey questionnaire was used to minimize burden for each individual respondent. Two modules, Sections 2000 and 7000, included sections that are more taxing on the respondent and are time consuming. These sub-sections were used to generate four rotations (Rotations A-D), each of which included one version of the set of health vignettes

and one version of the Day Reconstruction Method. A respondent was asked to reply to only one rotation set of questions for each of the two sections.

A brief description of each section of the individual questionnaire follows:

- This section started with filter questions about memory (IQ Code), to assess if respondents aged 50-plus were cognitively able to provide reliable results and complete the survey. If a proxy was needed, the interviewer shifted to a proxy questionnaire.
- Section 1000 included the individual consent form and characteristics about the individual respondent. An individual consent form was completed by the respondent who was selected from the household roster using the Kish table techniques (for 18-49 households) and for all individuals aged 50+ years in 50+ households.
- Section 1500 included questions about the current or past work situation. It also asked if the person was actively looking for work.
- Section 2000 asked about overall health, abilities in day-to-day activities and eight self-rated health domains (affect, mobility, sleep/energy, cognition, interpersonal activities, vision, self-care and pain), and includes the vignette methodologies. The 12-item version of WHODAS II is also used in this section to assess functioning, which includes questions on activities of daily living (ADLs) and instrumental activities of daily living (IADLs).
- Section 2500 measured respondents' blood pressure, height, weight, waist and hip circumferences and asked respondents to complete performance tests (near and distance vision, lung function via spirometry, cognition, grip strength and timed walk) and blood draw.
- Section 3000 examined selected risk factors and health behaviors consisting of personal decisions and habits that affect health (tobacco and alcohol use, nutritional intake and physical activity). These areas follow the recommendations of WHO STEPS (Stepwise approach to surveillance of risk factors)[26].
- Section 4000 contained questions about 11 health conditions (stroke, angina, arthritis, diabetes mellitus, chronic lung disease, asthma, depression, hypertension, cataracts, injuries and oral health problems) and for five of the conditions, a set of common symptoms to improve prevalence estimations. The questions asked whether respondents had received

a diagnosis, if they were on longer-term treatment, and if they were on current treatment.

- Section 5000 questioned the individual respondent about recent use of health care services and the types of services accessed. This section includes questions about inpatient care over the past 3 years and outpatient and home care over the past 12 months, with specific questions about the type and reason for care over the last 12 months.
- Section 6000 identified a respondent's social connections and participation in the community.
- Section 7000 obtained perceptions about quality of life and well-being. The WHO Quality of Life (WHOQoL) eight-item version is a well-validated instrument used in SAGE[27], along with a new methodology to measure happiness adapted specifically for SAGE. An abbreviated Day Reconstruction Method module[28] is used to assess the momentary experience of well-being whilst WHOQoL estimates the evaluative component of subjective well-being and quality of life.
- Section 8000 was not included in SAGE China.
- Section 9000 documented the interviewer's observations about the respondent and impressions of the interview process.

## Proxy questionnaire

For respondents aged 50-plus, a very short set of questions about memory preceded the main set of questions in the Individual Questionnaire. If the interviewer felt there was a potential problem with a respondent's memory, a proxy questionnaire, consisting of the IQ Code along with a brief set of questions about the respondent's health status, conditions list, and health care use, was administered to a proxy respondent. A proxy completed a proxy respondent consent form.

## 2.3 Health and biomarker measurements

Health and biomarker measurements of the SAGE survey in China were implemented uniformly from standardized protocols and training. All devices used in the SAGE were calibrated to a standard. Measurements and performance tests were completed in a central location at each survey site.

### 2.3.1 Health measurements

The list of anthropometric measurements and measured performance tests included:

- Blood pressure. The blood pressure was measured three times during the interview – all times on the right arm/wrist with the respondent seated – using an electronic blood pressure monitor (OMRON Upper Arm Blood Pressure Monitor, HEM-7012). The respondent had been seated for about 10 minutes, so checking three times, with one minute between checks was sufficient for correct assessment.
- Anthropometry. Weight and height measurements were collected and used to calculate Body Mass Index (BMI), an independent risk factor for various health outcomes. Waist and hip circumferences measurements were collected to calculate waist-to-hip ratio, which is an independent risk factor for cardiovascular disease and other health outcomes.
- Physical tests included four-meter timed walks (at normal and rapid pace) and hand grip strength using each hand (Smedley's Hand Dynamometer, Scandidact, Oldenvej 45, 3490 Kvistgard, Denmark).
- Lung function test with spirometry (MIR SpiroDoc Diagnostic Portable Spirometer, Medical International Research, Via del Maggiolino, 125 - 00155 Rome, Italy).
- Myopic and hyperopic tests with LogMAR chart (Tumbling "E" Chart for 4m testing and Tumbling "E" Near Vision Card for 40 cm testing. Precision Vision Ltd., 944 First Street LaSalle, IL 61301, USA.) The test used standard lighting and corrected vision as per the individual respondent's situation. The acuity test was administered in a "forced-choice" fashion; the participant was instructed to provide a response and to guess if uncertain.
- Battery of cognition tests included: 1) Verbal fluency, the ability to produce as many words (animals) as possible in a one-minute time span; 2) Immediate and delayed verbal recall, wherein 10 words are successively presented after which the respondent is given the opportunity to recall as many of the words as possible. This is repeated thrice to saturate the learning curve. After about 10 minutes of interview time, recall and recognition are again tested; and, 3) Digit span (forward and backward).

These tests will assist in determining levels and trends in health inequalities, planning and monitoring interventions, and evaluating policies by helping to calibrate self-reported health status and vignette response pat-

terns. While these tests are not difficult to administer, additional training and testing for the fieldworkers were provided to make sure that the tests were implemented with a high level of precision and accuracy.

### 2.3.2 Biomarker collections

For respondents who provided consent, a fingerprick using sterile techniques was used to collect a small amount of blood by trained staff. While the fingerprick is less invasive than venipuncture, all issues and ethics involved with obtaining a blood sample were applied. Training was provided to ensure that samples were collected correctly (using sterile, single-use materials), handled appropriately after the collection (dried without contamination of the sample by interviewer or other persons), and transported to local laboratories for storage immediately after field collection work each day. After all surveys were completed in each province, blood samples were transported to the SCDC central laboratory in Shanghai.

Survey supervisors coordinated safe transport of all blood spot samples and biohazardous waste from fieldworkers (supervisors had additional portable biohazardous waste containers, and swapped empty for full containers as needed). Supervisors provided reminders about proper techniques and procedures throughout the data collection period.

Blood samples were stored in heavy-duty sealable plastic bags, containing humidity indicators and desiccant. Fieldworkers stored samples in sturdy portable boxes. Supervisors collected the samples from each interviewer at the end of each day. Supervisors checked labels against the hardcopy questionnaire for IDs and respondent name, made sure identifiers were removed and then properly packaged and stored the samples for transport to the laboratory. These samples were hand-delivered to a central laboratory. The supervisors coordinated and controlled access to the list of IDs and respondent identifiers. Packages containing the blood samples were opened only in the laboratory by trained staff.

The blood samples will be analyzed for markers of anemia (haemoglobin), diabetes (glycosylated haemoglobin and non-fasting random blood glucose), cardiovascular disease (lipids, triglycerides and C-reactive protein), and chronic infection status (EBV). The samples are stored at -20C, with a staged approach to analyzing and running assays to account for the high assay costs and funding levels. Further assays on the DBS samples

will be considered based on the health topic and availability of funding.

## 2.4 Geodata

SAGE collected geographic information, which is useful to analyze and display data related to positions of the survey sample clusters. The location of each surveyed cluster was obtained with the highest precision using a global positioning system (GPS) device. The latitude and longitude of every household surveyed were recorded at the first time that interviewers visited the sampled household.

Once at the cluster area to be surveyed, interviewers found an open space such as in front of a house or at a central nearby location, turned on the GPS device and read when the accuracy became less than 65ft with at least three satellite signals received. The readings were taken in degrees and decimal degrees up to three decimal points. This ensured that every household was distinctly located in the GIS.

These geodata will be used to digitally map the location of PSUs and households and for creating thematic maps and performing spatial analysis. The data should also be related to plan analyses such as distance to health care facilities, non-communicable disease mapping, finding respondents for Wave 2 of data collection in 2012, and finding respondents for validation studies/sub-studies.

## 2.5 Vignettes

The health and responsiveness sections of SAGE used vignettes to improve cross-population comparability. Vignettes are hypothetical stories about a person's health condition or their experience with health care system. Vignettes help to illustrate and adjust for biases and differences in how individuals understand health and the health system, and can be used to enhance comparability across sub-groups within countries and across countries [29]. Respondents are asked to rate the condition and experience of the person in the vignette, keeping their own experiences in mind. This rating will be used to calibrate respondent self-reports about his or her own health.

The self-report and vignette response categories were the same, and on an ordinal scale (Very good-1, Good-2,

Moderate-3, Bad-4, Very bad-5). The vignette adjustments improve the understanding of how the response categories are used, and at the population level, demonstrate cardinal scale properties so that differences (between one and two, and two and three, for example) have the same meaning. This is an essential step to say whether the differences between "Very good" (labelled one) and "Good" (labelled two) are the same as the difference between "Good" and "Moderate" (labelled three).

Secondly, the responses on each domain are rescaled from zero to 100 by setting all the responses equal to and better than the experience described in the best vignette to 100 (that is, best health).

## 2.6 Income quintile

Household income quintiles used in this analysis reflect relative inequalities in income. In this report, income quintiles were derived from the household ownership of durable goods, characteristics of the dwelling (type of floor, wall, and cooking stove), and access to services such as improved water, sanitation and cooking fuel. Durable goods included number of chairs, tables, cars, and if, for example, the household has electricity, a television, fixed and mobile phone, a bucket or washing machine. Quintile is a statistical division of sample households based on income (assets) distribution into five equal parts. The variable takes on the values 1-5 with 1 being the quintile with the poorest households and 5 being the quintile with the richest households. Analyses comparing the bottom quintile to the top quintile reflect considerable differences in relative and absolute wealth. Comparisons will be made to self-reported income and consumption.

## 2.7 Data collection procedures

### 2.7.1 Investigators and training

Each SAGE survey site had one field survey team composed of 10 to 12 investigators. Sixteen survey teams and about 200 investigators contributed to the data collection phase in total. All the investigators came from CDC or Community Health Service Centre (CHSC) and had medicine or public health professional backgrounds, and most had experience in similar large-scale surveys. Equal numbers of male and female investigators were recruited where possible for each team. This sex proportion ensured that each team could offer to

have sensitive questions asked by a same-sex interviewer. There were different roles within each team, including five to six interviewers to complete the questionnaire, two to three interviewers for the health and blood measurements, one supervisor, one field editor, and one field guide.

Training for the interviewers and supervisors was conducted in each participating province by the SCDC survey team and lasted four to five days. The training duration was extended to at least four days to account for the new sections added (as compared to the baseline WHS/SAGE Wave 0 survey instrument), particularly the performance tests and blood spots. Standardized training materials, including audiovisual aids, were developed for SAGE. The SAGE questionnaires were accompanied by a detailed interview and question-by-question guide. Training materials and principal investigators were provided by WHO to ensure standardization across sites.

During the training programme the interviewers were provided with the background, rationale of the study, techniques of interview, and an understanding of each question of the instrument. The roles and responsibilities of the interviewers were explained in detail. The principal investigators, in addition to presentations and discussions by medical experts, conducted the training. The training also contained video presentations and mock interviews. A pilot test of field training was organized for the interviewers, followed by an interactive session to discuss feedback from field training.

## 2.7.2 Data collection and processing

The first phase of SAGE data collection in China used paper-and-pencil face-to-face interviews, followed by computer-assisted face-to-face interviews in the second phase. Attempts to contact households were done in person or by telephone. The data collection procedure included three steps as follows:

- Step one: Investigators visited the dwelling place of a sampled household, filled in information about the household roster, and collected Geodata.
- Step two: Study teams completed the whole questionnaire and health measurements which were arranged in a central location, such as a local school or office of the neighbourhood committee. Alternately, depending on a respondent's time and health state, the interview was arranged in a respon-

dent's home. When a respondent arrived at the central location, his/her identity was checked by the field guide at the entrance. Depending on the waiting time, the respondent might complete the questionnaire first or health measurements first. At the end of the interview, the respondent could be offered a health consultation with feedback by a field editor. Also, the respondent was provided with a small gift for their cooperation.

- Step three: Survey teams checked and delivered data. The questionnaires were checked in the provinces by a field editor and supervisor. After that, all checked questionnaires were sent to the SCDC survey team, where the data entry and primary cleaning work was undertaken.

All sites used a standardized CPro software programme for data entry as provided by the WHO. The WHO assigned weights to the data set and generated the necessary tables using STATA. The SCDC programme undertook the national report writing.

## 2.8 Survey metrics and data quality

This section deals with an assessment of quality of data in terms of response rate, comparison of test and retest estimates and kappa values that plot the item responses.

### 2.8.1 Response rate

The response rate for household and individual questionnaires indicates the extent of response from household and individuals, respectively. The response rate also has a direct relationship with the degree of representativeness of the sample.

In this survey, a total of 10752 households were sampled and 10218 households responded, amounting to a 95 percent response rate for the household questionnaire (see Table 2.2). Rural areas recorded a higher (96 percent) response rate than urban areas (94 percent).

In SAGE China, the final result codes with respect to completion of household and individual questionnaire are: 1) interview completed; 2) interview partially completed; and 3) interview refused, not conducted or other. The response rate is the percent of interviews fully and partially completed out of all households or individuals, that is,  $(1+2)/(1+2+3)$ . The non-response rate is percent of households or individuals who refused to

answer or could not be contacted, that is, (3)/(1+2+3). Compared to other large-scale surveys[30], the overall response rate of 95 percent is very good. However, this may mask variations in response rates by socio-demographic characteristics of the respondents. To study such variations, response rates have been examined by selected characteristics such as place of residence, age, and sex.

From the households, a total of 15,050 adult individuals (respondents) were identified for the individual questionnaires, and 14,813 individual interviews including 210 proxy interviews were completed. The response rate for the individual questionnaire is above 98 percent (see Table 2.3). The response rate is slightly higher in rural compared to urban areas, among females compared to males, and does not vary much among different age groups.

## 2.8.2 Demographic characteristics

Sex ratio and household size calculated in SAGE-China are lower than those from the National Bureau of Statistics, Chinese Statistical Yearbook 2009 (see Table 2.4). The survey design determines the differences.

In SAGE-China, the main survey population is aged 50-plus, and the number of households including person(s) aged 50-plus is larger than the number without a 50-plus individual. Because sex ratios usually decline with age due to differences in longevity, we would expect the sex ratios in this survey to be lower than for the country as a whole.

The more limited definition of “household” in SAGE is a reason behind the smaller household size. In China Statistical Yearbooks, household means the members who live together at the same address, mainly including

**Table 2.2 Household response rate by residence in SAGE-China**

Residence	Household Interviews completed	Household Interviews contacted	Household Interviews Response rate (%)
Urban	5,042	5,376	93.8
Rural	5,176	5,376	96.3
<b>Total</b>	<b>10,218</b>	<b>10,752</b>	<b>95.0</b>

Note: Completed interviews include the interviews completed and partially completed.

Response rate = (interview completed + interview partially completed) / (interview completed + interview partially completed + interview refused, not be conducted and other).

**Table 2.3 Individual response rate by age, sex and residence in SAGE-China**

Characteristics	Individual interviews completed	Individual interviews contacted	Individual interviews Response rate (%)
<b>Residence</b>			
Urban	7,215	7,333	98.4
Rural	7,598	7,673	99.0
<b>Age group in years</b>			
18-49	1,636	1,642	99.6
50-59	5,701	5,807	98.2
60-69	3,926	3,968	98.9
70-79	2,772	2,802	98.9
80+	776	790	98.2
<b>Sex</b>			
Male	6,887	6,993	98.5
Female	7,924	8,016	98.9

Note: Completed interviews include the interviews completed and partially completed.

Response rate = (interview completed + interview partially completed) / (interview completed + interview partially completed + interview refused, not be conducted and other). Individual here includes both individual and proxy interviews.

**Table 2.4 Comparison of sex ratio and household size\* between SAGE-China and China Statistical Yearbook**

Index	Data sources	
	SAGE-China	China Statistical Yearbook 2009
Sex ratio (Female=100)	94.7	105.9
All household members		
Individual respondents	86.9	105.9
Household size	2.6	3.2

**Note:**

In National Bureau of Statistics, China Statistical Yearbooks, "Household" means the members who live together at the same address, mostly family members. One person living singly is also one household. In SAGE, "Household" means the members who live together at the same address, share meals (eat out of the same pot) and usually stay at this address for at least four months a year. One person living singly is also one household.

family members (children, siblings or parents) but also including other relatives, friends and other members. One person living alone is also one household [31]. But in SAGE, in addition to living together, the members in a household should share meals (eat out of the same pot) and usually stay at this address for at least four months a year.

### 2.8.3 Myers blended index

Age is an important study variable in demography and epidemiological studies. Misstatement of age is one

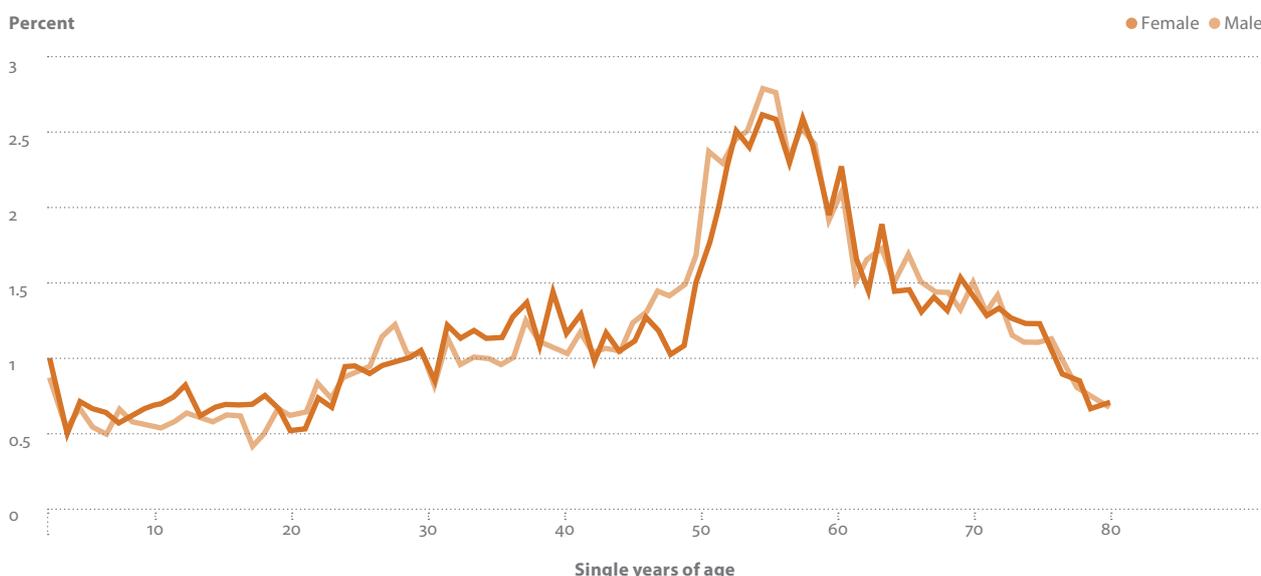
example of content error in census and surveys. Age heaping is a common phenomenon and is considered to be a measure of data quality and consistency [32]. The approximation of age manifests itself in the phenomenon of age heaping in self-reported or proxy age data.

In this report, age heaping and digit preference were calculated using Myers' blended index. Myers' blended index is a measure of age heaping that involves a comparison of expected proportions of population at each age with the "reported" proportions of population at each age. In this report, Myers' blended index is used to evaluate the quality of data[33].

Myers' blended index is calculated for ages 10 and above and shows the excess or deficit of people in ages ending in any of the 10 digits expressed as percentages. It is based on the assumption that the population is equally distributed among the different ages. Myer's blended index is the absolute value sum of percentage differences between the reported and expected age distribution. It ranges from 0 to 99, 0 meaning no age heaping and 99 meaning all ages are reported with the same terminal digit. If Myers' blended index is over 60, age heaping is very severe and the data quality is poor.

Figure 2.2 shows the Myers' blended index for household members in SAGE-China. Myers' blended index is 1.8, which indicates that a minimum of 1.8% of the population reported ages with an incorrect final digit. The index value is very low indicating no evidence of age heaping.

**Figure 2.2 Age heaping using Myers' blended method for household members in SAGE-China**



Source: SAGE 2007-2010

**Table 2.5** Number of retest interviews, proxy retests, and proxy validation interviews completed in SAGE-China

Characteristics of questionnaire respondent	Retest household			Proxy retests	Proxy validations
	Total	Household questionnaire	Individual questionnaire		
<b>Age group</b>					
18-49	98	35	63	–	15
50-59	277	102	175	13	201
60-69	235	106	129	8	152
70-79	190	72	118	10	72
80+	44	19	25	10	33
Missing	31	18	13	–	–
<b>Sex</b>					
Male	364	118	239	18	208
Female	511	234	284	23	265
<b>Residence</b>					
Urban	281	117	164	8	153
Rural	594	235	359	33	320
<b>Income quintiles</b>					
Lowest	206	82	124	13	128
Second	204	91	113	12	109
Third	172	66	106	7	102
Fourth	150	52	98	6	83
Highest	86	36	50	2	35
Missing	57	25	32	1	16
<b>Total (pooled)</b>	<b>875</b>	<b>352</b>	<b>523</b>	<b>41</b>	<b>473</b>

Figure 2.2 Age heaping using Myers' blended method for household members in SAGE-China

## 2.8.4 Reliability

The SAGE survey has a built-in retest mechanism to check the reliability of data. In this survey, a retest interview was conducted among 10 percent of households. Different investigators were used for the retest. The sampled retest households were divided into two parts; two out of five households for the household questionnaire and three out of five households for the individual questionnaire.

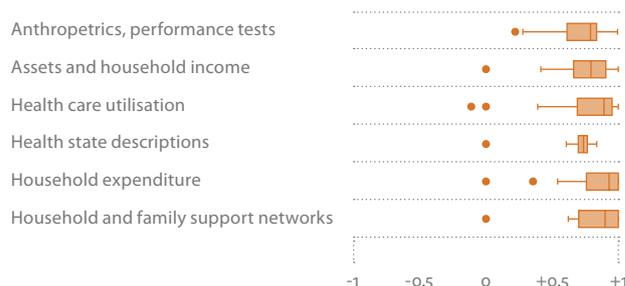
Table 2.5 shows the number of retest interviews and proxy validations in SAGE-China by socio-demographic characteristics of the respondents. A total of 875 retest household interviews, 41 retest proxy interviews, and 473 proxy validation interviews were completed. The retest household respondents were more likely to be in

rural compared to urban areas and, female compared to male. Retesting declined with increasing household income.

The Kappa values for most of the domains lie between 0.8 and 1.0, indicating that most observations on each test and retest are identical (see Figure 2.3)

**Figure 2.3** Kappa/ICC values for selected interview domains in SAGE-China

N=10,218; N retest=875





## 2.9 Weighting

The SAGE-China in eight provinces adopted a multistage stratified cluster sample design. Post-stratification corrections were made to these weights to compensate for under-coverage. The National Bureau of Statistics Chinese Statistical Yearbook 2009 population was used as the reference population. All analyses are carried out using these normalized probability weights, and variance estimations take into account the complex design implemented in STATA.

Design weights were calculated taking the specific sample design into consideration. Both household and individual weights were calculated to perform analysis at the household and individual level.



### 3. Household and individual characteristics

#### Introduction

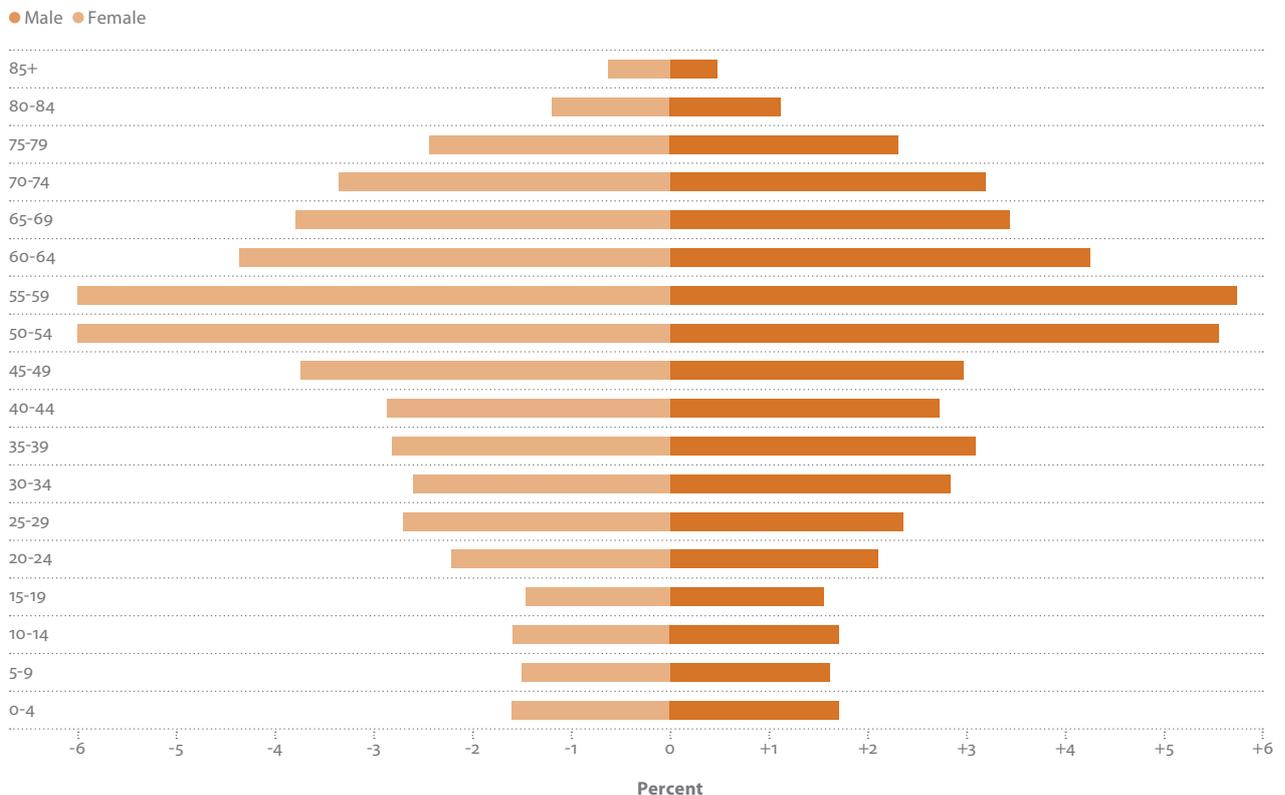
The survey collected information from households and individual respondents. The household informant is a household member who best understands the situation in the selected dwelling, while individual respondents are from one of two broad age groups: either older adults aged 50-plus years or younger adults aged 18-49 years. Older households drawn from a random sample were known to have at least one person aged 50-plus. All older adults from older households were invited to participate. Households targeting younger adults were drawn from a random sample, with the individual for interview selected from the household

roster using the Kish table method. As the goal of the study was to examine ageing and the health of older adults, a larger sample of adults aged 50-plus was selected, with a relatively smaller sample of 18-49 year old respondents included for comparison purposes. The main results of this report focus on the situation of respondents aged 50-plus years.

#### 3.1 Household population profile

This section includes a household roster with basic and personal information about each member in surveyed

**Figure 3.1** Population pyramid based on SAGE-China household population



Source: SAGE-China, 2007-2010

**Table 3.1.1** Percent distribution of the household population by socio-demographic characteristics

Characteristics	Male (%)	Female (%)	Total (%)	Number
<b>Age Group</b>				
0-4	3.8	3.2	3.5	838
5-9	3.3	2.9	3.1	789
10-14	3.7	3.2	3.4	834
15-19	3.3	2.8	3.1	763
20-24	4.3	4.5	4.4	1,080
25-29	4.7	5.3	5.0	1,282
30-34	5.5	4.7	5.1	1,377
35-39	6.1	5.3	5.7	1,495
40-44	5.2	5.3	5.2	1,414
45-49	5.9	7.1	6.5	1,700
50-54	11.4	12.6	12.0	3,021
55-59	12.0	12.1	12.0	3,005
60-64	8.9	8.5	8.7	2,184
65-69	7.2	7.5	7.4	1,831
70-74	6.7	6.8	6.7	1,657
75-79	4.9	4.8	4.9	1,205
80+	3.1	3.4	3.3	866
All	100.0	100.0	100.0	25,341
<b>Residence</b>				
Urban	49.8	50.6	50.2	12,754
Rural	50.2	49.4	49.8	12,662
All	100.0	100.0	100.0	25,416
<b>Marital status</b>				
Never married	22.8	17.4	20.0	5,073
Currently married	71.0	69.5	70.2	17,775
Cohabiting	0.2	0.2	0.2	51
Separated/divorced	1.6	1.4	1.5	371
Widowed	4.1	11.3	7.8	1,975
Don't know	0.3	0.2	0.2	59
All	100.0	100.0	100.0	25,304
<b>Education</b>				
No formal education	12.0	24.6	18.4	4,680
Less than primary school	17.1	16.6	16.8	4,275
Primary school completed	18.9	16.2	17.5	4,444
Secondary school completed	25.5	21.3	23.3	5,923
High school (or equivalent) completed	17.4	14.6	15.9	4,040
College/university completed	8.9	6.7	7.8	1,969
Post-graduate degree completed	0.3	0.1	0.2	50
All	100.0	100.0	100.0	25,386
<b>Total</b>	<b>48.6</b>	<b>51.4</b>	<b>100.0</b>	<b>25,431</b>

households, including age, sex, education level, marital status, health and personal care needs, insurance coverage, main income earner status and household head status. The household in SAGE Wave 1 is defined as “people living in the same place who share meals, living together for at least four months a year. A single person living alone can also be considered a household”. Figure 3.1 plots the male and female population from the sampled households (N=25,341). The shape is larger in the older age groups because of the sampling strategy, stratified by older (with at least one individual respondent aged 50-plus to be interviewed) and younger (with individual respondent aged 18-49 to be interviewed) households. People of all ages could reside in selected dwellings/ households, but the selection was based on the individual who was to be interviewed (either 50-plus or 18-49).

### 3.1.1 Socio-demographic characteristics of the household population

The age group, area of residence, marital status, and level of education of all household members are shown in Table 3.1.1. The proportion of women (51.4%) is higher than men (48.6%) in the study, with small sex differences by age groups and residence. The 50-54 and 55-59 age groups were the highest proportion at 12.0%, amongst all age groups. The proportion married was 70.2%, single was 20.0%, widowed was 7.8%, with 1.5% divorced or separated. Household members who listed cohabiting, and those who were not clear, comprised less than 1% of the total. The proportion of single males was higher than single females, and the proportion of widowed women was higher than widowed men. For highest level of education completed amongst household members, the most common level was junior high school graduate, 23.3%. People who never received formal education accounted for 18.4% of respondents,

while university graduates accounted for 7.8%. The overall level of female education was lower than that of men; nearly one-fourth of women had no formal education, more than double the level for men (12.0%).

Data on household member health insurance coverage and whether any household members needed informal or formal care are shown in Table 3.1.2. In China, mandatory health insurance means basic medical insurance for urban workers and the new rural cooperative medical care, while voluntary insurance means insurance from an employer or other social insurance. Mandatory health insurance accounted for the highest share, 68.9%, followed by the proportion of uninsured at 17.4%. Seven percent of people had voluntary insurance and 6.6% had both mandatory and voluntary health insurance. Only 2.4% of household members were in need of health care because of a health condition or advanced age, and 0.2% lived in long-term social welfare agencies (such as nursing homes).

### 3.1.2 Household size, household head and main income earner

Household characteristics such as number of residents, head of the household, and the main income-earner are provided in Table 3.1.3 and Table 3.1.4. Among all surveyed households, the average household size was 2.6 people. Households with two to five people were the most common (82.4%). Single-person households accounted for 14.9% of all households and households with 6-11 members accounted for 2.7%. The proportion of single-person households was higher in rural areas than in urban areas, while the proportion with 2-5 people in urban areas was higher than that in rural areas. There was little difference between urban and rural areas in households with six or more people. As

**Table 3.1.2** Percent distribution of insurance coverage and health care needs of household members by sex

Characteristics	Male (%)	Female (%)	Total (%)	No. of respondents
<b>Insured</b>				
Mandatory	69.6	68.3	68.9	17,497
Voluntary	6.3	6.9	6.6	1,680
Both	7.2	6.9	7.0	1,784
None	16.9	17.9	17.4	4,422
All	100.0	100.0	100.0	25,383
<b>Needs care</b>				
Needs care	2.2	2.5	2.4	596
Institutionalized	0.2	0.2	0.2	52

**Table 3.1.3** Percent distribution of selected household characteristics by area of residence

Characteristics	Residence			No. of respondents
	Urban (%)	Rural (%)	Total (%)	
<b>Household size</b>				
1	46.1	53.9	100	1,526
2-5	50.9	49.1	100	8,416
6-11	49.2	50.8	100	273
Total	50.1	49.9	100	10,215
Mean household size (persons)	2.7	2.6	2.6	
<b>Household head</b>				
Younger Woman	62.9	37.1	100	433
Older Woman	67.9	32.1	100	2,597
Younger Man	39.2	60.8	100	1,399
Older Man	43.6	56.4	100	5,728
Total	50.0	50.0	100	10,157
Mean age of household head (in years)	60.5	58.1	59.3	
<b>Main income earner</b>				
Younger Woman	79.6	20.4	100	447
Older Woman	77.0	23.0	100	1,498
Younger Man	41.7	58.3	100	2,123
Older Man	49.4	50.6	100	5,050
Total	53.6	46.4	100	9,118
Mean age of main income earner (in years)	57.7	53.9	55.9	

Note: Younger Woman (YW, woman aged 18-49), Older Woman (OW, woman aged 50+); Younger Man (YM, man aged 18-49), Older Man (OM, man aged 50+)

income quintile increased from low to high, the proportion of households with only one person decreased: that of the lowest income group was 34.3%, and that of the highest group was 4.8%.

The head of household was defined as the household's main decision-maker. Heads of household were divided into four types for some tables in this report, namely, younger women aged 18-49 (YW), younger men aged 18-49 (YM), older women aged 50-plus (OW), and older men aged 50-plus (OM). The average age of heads of household was 59.3 years. OM households accounted for the highest share, 56.4%, followed by OW households, 25.6%. The proportion of younger men who were household heads was 13.8%, with the proportion of younger women only 4.3%. Heads of urban households tended to be older than those in rural households. The proportion of YW and OW households was significantly higher in urban than in rural areas, while the proportion

of YM and OM households was significantly higher in rural than in urban areas. As income quintiles increased, the proportion of younger men and women as household heads increased while the proportion of older women and men as household heads declined.

The average age of main household income-earners was 55.9 years. A majority of sample households had an older man as main income earner (55.4%), followed by YM, OW, and YW households (23.3%, 16.4% and 4.9%, respectively). The average age of main income-earners in urban households was greater than that in rural households, and the proportion of households with female main earners (both younger and older) was considerably higher in urban areas.

The age, education and income of household heads surveyed are shown in Table 3.1.5. Household heads aged 50-59 accounted for more than a third (34.6%)

**Table 3.1.4** Percent distribution of selected household characteristics by income quintile

Characteristics	Income quintile					Total (%)	N
	Lowest (%)	Second (%)	Middle (%)	Fourth (%)	Highest (%)		
<b>Household size (persons)</b>							
1	39.6	20.7	18.3	13.9	7.4	100	1,526
2-5	13.5	17.6	20.2	23.7	24.9	100	8,413
6-11	6.4	16.1	15.9	20.6	41	100	273
Total	17.2	18.1	19.8	22.2	22.7	100	10,211
Mean household size (persons)	2.1	2.5	2.6	2.7	3.2	2.6	
<b>Household head</b>							
YW	9.8	18.4	19.4	19.4	33	100	433
OW	23.1	16.3	17.1	18.9	24.6	100	2,597
YM	12.2	18.1	17.3	23.9	28.6	100	1,399
OM	16.4	18.9	21.7	23.4	19.5	100	5,728
Total	17.2	18.1	19.8	22.2	22.7	100	10,156
Mean age of household head (in years)	63.7	59.9	59.6	58.0	56.3	59.3	
<b>Main income earner</b>							
YW	9.3	15.6	14.6	19.8	40.6	100	447
OW	24.9	15.3	19.2	19.6	21.0	100	1,498
YM	11.3	17.6	16.8	22.9	31.5	100	2,123
OM	14.8	17.8	22.1	24.8	20.5	100	5,050
Total	15.4	17.2	20.0	23.3	24.1	100	9,118
Mean age of main earner (in years)	60.5	56.5	57.5	55.4	51.8	55.9	

Note: Younger Woman (YW, woman aged 18-49), Older Woman (OW, woman aged 50+); Younger Man (YM, man aged 18-49), Older Man (OM, man aged 50+)

of all household heads, followed by heads aged 60-69. The proportion of male-headed households in each age group was greater than the proportion of female-headed households, except at ages 70 and over. The latter probably reflects the fact that Chinese women live longer than men on average. In terms of education, secondary school was the most common completed level among all household heads (24.7%), followed by primary school (20.3%). The education level of male heads was higher in general than among women: 11.1% of all male household heads had no formal education, compared with 31.4% of all female heads.

### 3.1.3 Living arrangements

Data on household structure are presented in Table 3.1.6 and Table 3.1.7.

Among households whose head was 50-plus, 13.5 % consisted of a person living alone while 29.5% contained a head and spouse who were both aged 50-plus. These proportions were higher in rural areas than in urban areas. In the entire SAGE sample, one-generation households accounted for 49.9% of the total, continuous two-generation households 29.8%, three-generation households 14.6%, and skip-generation households 3.4%.

The proportions of one-generation and skip-generation households in rural areas were higher than in urban areas, while the proportion of continuous two-generation households was higher in urban areas. Increasing household income was positively associated with residing in two-generation and three-generation households, while the opposite was true for one-generation and skip-generation households.

**Table 3.1.5** Percent distribution of household heads by socio-demographic characteristics

Household head characteristics	Male (%)	Female (%)	Total (%)	No. of respondents
<b>Age group</b>				
18-29	0.7	1.2	0.9	84
30-39	6.4	4.2	5.7	548
40-49	12.5	8.7	11.3	1,086
50-59	36	31.7	34.6	3,316
60-69	24	23.5	23.9	2,287
70-79	16.5	23.6	18.6	1,785
80+	3.9	7.1	4.9	468
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>9,573</b>
<b>Education</b>				
No formal education	11.1	31.4	17.4	1,664
Less than primary	18	15.3	17.2	1,642
Primary school completed	22.8	14.5	20.3	1,939
Secondary school completed	26.8	20.1	24.7	2,365
High school completed	14.8	14.3	14.7	1,401
College completed	6.2	4.2	5.6	533
Post graduate degree completed	0.2	0.1	0.2	18
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>9,562</b>

**Table 3.1.6** Percent distribution of household living arrangements and structure by residence

Characteristics	Residence			N
	Urban (%)	Rural (%)	Total (%)	
<b>Living arrangements</b>				
Single with household head aged 50+	12.7	14.4	13.5	1,384
Dual with household head aged 50+ and spouse <50	1.2	3.9	2.5	258
Dual with household head aged 50+ and spouse 50+	27.6	31.4	29.5	3,014
Other	58.5	50.3	54.4	5,558
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>10,213</b>
<b>Multigenerational household</b>				
One generation	44.4	55.5	49.9	5,103
Continuous two generation	36.4	23.3	29.8	3,046
Skip generation	1.6	5.3	3.4	350
Three generation	14.7	14.5	14.6	1,495
More than three generation	2.9	1.4	2.3	219
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>10,213</b>

Note: Generations are calculated from the SAGE household roster. One generation, for example, is a married couple without children; Continuous two generation, for example, = parent/child; Skip generation, for example, = grandparent/grandchild. Three generation = grandparent/parent/child.

**Table 3.1.7** Percent distribution of household living arrangements and structure by income quintile

Characteristics	Income quintile						N
	Lowest (%)	Second (%)	Middle (%)	Fourth (%)	Highest (%)	Total (%)	
<b>Living arrangements</b>							
Single with household head aged 50+	32.8	15.5	12.5	8.0	3.8	13.5	1,384
Dual with household head aged 50+ and spouse <50	2.0	3.7	3.4	2.6	1.1	2.5	258
Dual with household head aged 50+ and spouse 50+	26.7	30.0	34.1	33.7	23.1	29.5	3,014
Other	38.5	50.8	50.0	55.7	72.0	54.4	5,558
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>10,213</b>
<b>Multigenerational household</b>							
One generation	64.6	53.2	53.9	49.8	33.1	49.9	5,102
Continuous two generation	20.8	28.4	25.9	29.1	42.0	29.8	3,046
Skip generation	4.3	4.7	4.1	3.1	1.6	3.4	350
Three generation	7.7	11.4	14.2	16.2	21.3	14.6	1,495
More generation	2.6	2.3	1.9	1.9	2.0	2.3	218
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>10,211</b>

Note: Generations are calculated from the SAGE household roster. One generation, for example, is a married couple without children; Continuous two generation, for example, = parent/child; Skip generation, for example, = grandparent/grandchild. Three generation = grandparent/parent/child.

## 3.2 Individual respondent characteristics

The previous tables in this chapter present data at the household level. For some analyses, it also is useful to consider the characteristics of individual people in the survey. The basic socio-demographic characteristics of individual respondents are shown in Table 3.2.1.

### 3.2.1 Age and sex distribution

Among all individuals aged 50-plus, respondents aged 50-59 years accounted for 44.9%, respondents aged 60-69 accounted for 31.9%, respondents aged 70-79 years accounted for 18.6%, and those aged 80-plus accounted for 4.6%. Men aged 50-69 outnumbered women, whereas the opposite was true for ages 70-plus. The proportion of all respondents aged 50-plus was higher in rural than in urban areas. The proportion of male respondents in rural areas was higher than that in urban areas, while the proportion of female respondents was slightly higher in urban areas.

### 3.2.2 Marital status

Nearly 85 percent of all respondents aged 50-plus were currently married at the time of the survey. The figure for men (90.2%) was higher than for women (79.5%).

About one in eight respondents were widowed, with a higher proportion seen among women (18.1%) than among men (6.4%).

### 3.2.3 Education

Among all respondents aged 50-plus, 23.1% had not received any formal education. Fewer than 5% of respondents had completed a university degree. In general, the educational level of men was higher than that of women.

### 3.2.4 Religion, ethnicity and language

The religious, mother tongue and ethnic backgrounds of respondents are shown in Table 3.2.2. A very large

majority (93.1%) of respondents reported no religious affiliation, somewhat more so for men than for women. Buddhism was mentioned by 4.8% of respondents, and

Christianity by 1.6%. Virtually all respondents' mother tongue was native Chinese, and 98.9% of the respondents were of Han ethnicity.

**Table 3.2.1 Basic socio-demographic characteristics of individual respondents aged 50 or over by sex**

Characteristics	Male (%)	Female (%)	Total (%)	No. of respondents
<b>Age group</b>				
50-59	46.8	43.1	44.9	5,912
60-69	32.6	31.2	31.9	4,192
70-79	16.7	20.5	18.6	2,447
80+	4.0	5.2	4.6	606
All	100.0	100.0	100.0	13,157
<b>Residence</b>				
Urban	43.9	50.7	47.3	6,229
Rural	56.1	49.3	52.7	6,928
All	100.0	100.0	100.0	13,157
<b>Marital status</b>				
Never married	1.6	0.7	1.1	148
Currently married	90.2	79.5	84.8	11,156
Cohabiting	0.2	0.2	0.2	28
Separated/divorced	1.6	1.5	1.5	204
Widowed	6.4	18.1	12.3	1,616
All	100.0	100.0	100.0	13,152
<b>Education</b>				
No formal education	13.1	32.9	23.1	3,036
Less than primary	18.4	19.4	18.9	2,492
Primary school completed	24.5	17.6	21.0	2,766
Secondary school completed	23.3	16.4	19.9	2,612
High school completed	14.6	10.7	12.6	1,660
College completed	6.0	2.9	4.4	585
Post graduate degree completed	0.1	0.0	0.1	7
All	100.0	100.0	100.0	13,157
<b>Income quintile</b>				
Lowest	15.8	16.7	16.3	2,131
Second	18.4	17.9	18.1	2,374
Middle	20.6	20.4	20.5	2,684
Fourth	23.5	23.2	23.4	3,059
Highest	21.7	21.8	21.8	2,849
All	100.0	100.0	100.0	13,096
<b>Total</b>	<b>47.8</b>	<b>52.2</b>	<b>100.0</b>	<b>13,157</b>

**Table 3.2.2 Religion, ethnicity and language characteristics of individual respondents by sex**

Characteristics	Male (%)	Female (%)	Total (%)	No. of respondents
<b>Religion</b>				
None	96.5	89.7	93.1	12,037
Buddhism	2.5	7.1	4.8	620
Christianity	0.7	2.5	1.6	206
Other	0.2	0.5	0.4	48
Refused	0.1	0.2	0.2	21
Total	100.0	100.0	100.0	12,931
<b>Mother tongue</b>				
Chinese mandarin	99.7	99.6	99.7	12,966
Chinese, other	0.3	0.3	0.3	39
Other	0.0	0.0	0.0	3
Total	100.0	100.0	100.0	13,008
<b>Ethnic background</b>				
Han	98.9	98.8	98.9	12,832
Other	1.1	1.2	1.1	149
Total	100.0	100.0	100.0	12,982
<b>Total</b>	<b>47.8</b>	<b>52.2</b>	<b>100.0</b>	<b>13,157</b>



## 4. Income, consumption, transfers and retirement

### Introduction

Economic status is a very important factor that influences health, and a sound economic basis is a basic guarantee of life for the older adult population. In general, the older population is a relatively vulnerable socio-demographic group with a vulnerable economic situation, facing many difficulties in life. Research on aging issues and concerns about the living conditions of older adults are inseparable from the understanding of the economic situation of families and individuals. Therefore, the economic situation of the older population and the population who are about to become older is an important element of the SAGE survey. The survey included questions on occupational history, family assets, income and expenditure, and also collected information about retirement, social and economic support networks, and major health spending.

### 4.1 Work history

This survey explored a respondent's occupational history by means of an individual questionnaire, to understand whether work is paid or unpaid, and to determine the type, location and duration of work. If the respondent had retired or had stopped working, the survey explored the reason for stopping work and the respondent's age at that time.

#### 4.1.1 Work status

For the purposes of this report, respondents were divided into two groups, respondents who ever worked and respondents who never worked. Those who ever worked were further divided into respondents who were currently working and those who were not currently working. Among respondents aged 50-

plus, Table 4.1.1 shows that 91.1% of respondents were currently working or had worked at some time. Those currently working accounted for 43.6% of the entire sample, those not currently working represented 47.5% and 8.9% of respondents had never worked. The proportion of urban respondents who ever worked but were not currently working was 3.7 times higher than in rural areas, whereas the share of respondents who were currently working was 3.8 times higher in rural than in urban areas.

Men were more likely than women to be currently working, while women were more likely to have stopped working. The percent of women who had never worked was more than twice that of men. As might be expected, the proportion of people who were currently working declined with increasing age; however, a notable 15% of the population aged 80-plus were still working. The proportion that had ever worked but were no longer working at the time of the survey declined with age, while the proportion who had never worked increased with age. Level of education was related to current work status; the percentage of people currently working declined with an increase in education. The exception to this pattern was people with no formal education, 16% of whom had never worked. Data on income quintile showed a general decline in current work status with increasing income, and a corresponding increase in the share of people who were no longer working.

#### 4.1.2 Age and reasons for retirement/work stoppage

The reasons for stopping work among respondents who had ever worked were divided into four categories: homemaker or having no financial need; health or age reasons; being laid off and/or not being able to find work; and other reasons. The "other" category included:

**Table 4.1.1** Percent distribution of past and current work status by selected characteristics

Characteristics	Ever worked		Never worked (%)	N
	Currently working(%)	Currently not working (%)		
<b>Sex</b>				
Male	53.1	41.7	5.2	6,444
Female	34.3	53.1	12.6	6,509
<b>Residence</b>				
Urban	17.5	76.8	5.7	6,159
Rural	67.3	20.9	11.8	6,794
<b>Age group</b>				
50-59	60.1	32.1	7.9	5,850
60-69	38.6	52.2	9.2	4,140
70-79	19.1	70.7	10.2	2,405
80+	14.3	73.3	12.4	558
<b>Education</b>				
No formal education	41.6	42.3	16.2	2,891
Less than primary	53.4	35.7	10.9	2,486
Primary school	46.1	44.8	9.2	2,757
Secondary school	43.6	51.3	5.1	2,589
High school	34.6	63.6	1.8	1,642
College	26.4	72.9	0.7	581
Post graduate	26.7	73.3	0.0	7
<b>Income quintile</b>				
Lowest	46.9	38.6	14.6	2,080
Second	50.5	35.6	13.9	2,338
Middle	47.1	44.4	8.5	2,637
Fourth	44.9	49.1	6.0	3,018
Highest	30.7	65.1	4.2	2,819
<b>Total</b>	<b>43.6</b>	<b>47.5</b>	<b>8.9</b>	<b>12,953</b>

in studies/training, seasonal work, vacation/sick leave/voluntary leave, and temporary time off. Among respondents aged 50-plus, the average retirement age or the age when they stopped working was 54.3 (Table 4.1.2). The average retirement/work stoppage age among the urban population was 6.5 years earlier than among rural dwellers, and that for women was 4.3 years earlier than for men. The average retirement/work stoppage age for respondents aged 50-59 was 48.7 years versus 61.7 years for the oldest respondents (aged 80-plus). Currently married people stopped working 2.7 years earlier than widowed people. As household income quintile increased from a low to high level, the average age of retirement/work stoppage gradually declined.

In terms of the reasons for retirement or stopping work, health or age accounted for 87.9%, being unable to find work or being laid off accounted for 3.7%, homemaking or having no financial need accounted for 3.3%, and all other reasons amounted to 5.1%. Health and/or age reasons were more prominent in urban than in rural areas, while homemaking and having no financial need were more common in rural areas. Differences by gender were small, with homemaking more common for women and being laid off more so for men. As in most countries, the importance of health/age concerns as a reason for work stoppage become greater with increasing age. Health/age concerns were somewhat more common among the widowed, divorced and separated than among married people.

**Table 4.1.2 Mean age of retirement and reasons for work discontinuation by selected characteristics**

Characteristics	Mean age of retirement/ work stoppage (in years)	Reasons for work discontinuation (%)				N
		Homemaker	Health /age	Laid off	Other*	
<b>Sex</b>						
Male	56.7	1.2	86.9	5.8	6.0	2,610
Female	52.4	4.9	88.7	2.0	4.3	3,381
<b>Total</b>	<b>54.3</b>	<b>3.3</b>	<b>87.9</b>	<b>3.7</b>	<b>5.1</b>	<b>5,990</b>
<b>Residence</b>						
Urban	53.1	1.6	93.4	4.4	0.5	4,590
Rural	59.6	8.7	70.0	1.3	20.0	1,400
<b>Total</b>	<b>54.3</b>	<b>3.3</b>	<b>87.9</b>	<b>3.7</b>	<b>5.1</b>	<b>5,990</b>
<b>Age group</b>						
50-59	48.7	5.8	75.3	10.8	8.2	1,787
60-69	55.0	3.2	91.4	1.0	4.5	2,138
70-79	57.4	1.6	94.5	0.5	3.4	1,668
80+	61.7	0.1	98.8	0.2	0.9	397
<b>Total</b>	<b>54.3</b>	<b>3.3</b>	<b>87.9</b>	<b>3.7</b>	<b>5.1</b>	<b>5,990</b>
<b>Marital status</b>						
Never married	54.7	4.8	89.0	2.1	4.1	64
Currently married	53.8	3.4	86.7	4.2	5.7	4,865
Cohabiting	52.2	3.2	63.3	0.0	33.6	10
Separated/divorced	53.4	1.7	91.4	6.9	0.0	108
Widowed	56.5	2.7	94.2	1.0	2.1	942
<b>Total</b>	<b>54.3</b>	<b>3.3</b>	<b>87.9</b>	<b>3.7</b>	<b>5.1</b>	<b>5,989</b>
<b>Income quintile</b>						
Lowest	58.3	3.7	86.4	3.0	6.9	783
Second	55.6	4.0	85.9	3.0	7.1	810
Middle	54.2	3.6	87.0	3.2	6.3	1,158
Fourth	53.5	2.6	88.1	3.0	6.4	1,451
Highest	52.7	3.2	90.0	5.2	1.6	1,770
<b>Total</b>	<b>54.3</b>	<b>3.3</b>	<b>87.9</b>	<b>3.7</b>	<b>5.1</b>	<b>5971</b>

\*Other reasons include: in studies/training, seasonal work, vacation/sick leave/voluntary leave, and temporary time off.

### 4.1.3 Employment types

The survey asked about types of employers and were divided into four groups: public sector (government); private sector (profit or nonprofit); self-employment; and informal employment. Different characteristics of respondent employers are shown in Table 4.1.3. The largest proportion was self-employed, accounting for 49%, followed by public sector (government), 38%. The proportions of private sector (profit or non-profit) and

informal employment were small, respectively 10% and 3%.

In urban areas, the proportions of respondents working for the public sector (government), private sector (profit or non-profit), and in informal employment were higher than in rural areas. Public sector employment dominates in urban areas (72%), while the vast majority of workers in rural areas (86%) are self-employed. The share of respondents in private sector (profit or nonprofit)

**Table 4.1.3** Percent distribution of employment types by selected characteristics

Characteristics	Employment types (%)				N
	Public sector	Private sector	Self-employed	Informal employment	
<b>Sex</b>					
Male	37.4	11.0	49.0	2.7	6,148
Female	38.2	8.8	49.9	3.1	5,719
<b>Total</b>	<b>37.8</b>	<b>9.9</b>	<b>49.4</b>	<b>2.9</b>	<b>11,867</b>
<b>Residence</b>					
Urban	72.0	13.3	11.3	3.5	5,843
Rural	4.6	6.7	86.4	2.2	6,024
<b>Total</b>	<b>37.8</b>	<b>9.9</b>	<b>49.4</b>	<b>2.9</b>	<b>11,867</b>
<b>Age group</b>					
50-59	31.1	13.2	52.8	2.9	5,420
60-69	39.5	7.7	49.8	3.0	3,782
70-79	50.2	6.8	40.4	2.6	2,173
80+	43.5	4.9	48.8	2.8	492
<b>Total</b>	<b>37.8</b>	<b>9.9</b>	<b>49.4</b>	<b>2.9</b>	<b>11,867</b>
<b>Marital status</b>					
Never married	27.9	13.7	51.1	7.2	118
Currently married	38.0	10.3	49.0	2.7	10,160
Cohabiting	23.0	0.0	77.0	0.0	26
Separated/divorced	47.7	12.4	36.1	3.9	192
Widowed	35.8	7.1	53.9	3.2	1,368
<b>Total</b>	<b>37.8</b>	<b>9.9</b>	<b>49.4</b>	<b>2.9</b>	<b>11,864</b>
<b>Income quintile</b>					
Lowest	17.8	6.4	72.0	3.8	1,785
Second	23.2	7.3	66.7	2.8	2,017
Middle	36.0	9.8	51.2	3.0	2,426
Fourth	41.0	10.7	46.1	2.2	2,863
Highest	60.3	13.4	23.4	2.9	2,718
<b>Total</b>	<b>37.8</b>	<b>9.9</b>	<b>49.4</b>	<b>2.9</b>	<b>11,809</b>

employment decreased with age, while the share working in the public sector (government) increased until very old age. The proportion in self-employment declined with age until rising among those aged 80 and over. The proportion of self-employment and informal employment among married people was somewhat lower than among widowed people, and the proportions working in public sector (government) and private sector (profit or non-profit) jobs slightly higher. There was a clear association between greater public and

private sector employment and higher household income, whereas self-employment was inversely related to income quintile.

#### 4.1.4 Occupation types

Using the International Standard Classification of Occupations [34], the occupations of respondents were divided into ten categories. The first category is

legislators, senior officials and managers, the second category is professionals, the third category is technicians and associate professionals, the fourth category is clerks, the fifth category is service workers and shop and market sales workers, the sixth category is skilled agricultural and fishery workers, the seventh category is craft and related trades workers, the eighth category is plant and machine operators and assemblers, the ninth category is elementary occupations, and the tenth category is armed forces.

The main characteristics of respondents aged 50-plus in different occupational categories are shown in Table 4.1.4. Skilled agricultural and fishery workers accounted for a majority of all workers, 56.4%, and an even larger proportion (78.2%) in rural areas. The only other category to employ more than 10% of all workers was craft and related trades (12.0%). Gender and age differences within occupation types tended to be minor. Perhaps the most notable income pattern in Table 4.1.4 is the inverse association of income and the proportion of

**Table 4.1.4 Percent distribution of occupation groups by selected characteristics**

Characteristics	Occupation groups										N
	1	2	3	4	5	6	7	8	9	10	
<b>Sex</b>											
Male	4.1	5.3	7.0	4.3	5.8	54.4	11.8	2.4	4.7	0.3	5,190
Female	2.3	5.9	5.3	4.3	5.5	58.5	12.3	1.4	4.5	0.1	4,958
<b>Total</b>	<b>3.2</b>	<b>5.6</b>	<b>6.2</b>	<b>4.3</b>	<b>5.7</b>	<b>56.4</b>	<b>12.0</b>	<b>1.9</b>	<b>4.6</b>	<b>0.2</b>	<b>10,148</b>
<b>Residence</b>											
Urban	5.4	9.2	10.1	6.9	4.9	38.0	16.6	1.8	6.7	0.3	5,505
Rural	0.6	1.2	1.5	1.1	6.5	78.2	6.6	2.1	2.1	0.0	4,643
<b>Total</b>	<b>3.2</b>	<b>5.6</b>	<b>6.2</b>	<b>4.3</b>	<b>5.7</b>	<b>56.4</b>	<b>12.0</b>	<b>1.9</b>	<b>4.6</b>	<b>0.2</b>	<b>10,148</b>
<b>Age group</b>											
50-59	2.1	4.0	6.2	4.5	6.6	56.7	12.9	2.4	4.4	0.2	4,612
60-69	3.9	6.8	5.5	4.1	5.4	57.2	10.7	1.4	4.7	0.4	3,193
70-79	4.3	7.4	7.6	4.1	4.4	53.7	12.1	1.4	4.9	0.0	1,918
80+	5.8	4.7	4.0	3.7	2.8	58.8	12.5	2.4	5.3	0.2	424
<b>Total</b>	<b>3.2</b>	<b>5.6</b>	<b>6.2</b>	<b>4.3</b>	<b>5.7</b>	<b>56.4</b>	<b>12.0</b>	<b>1.9</b>	<b>4.6</b>	<b>0.2</b>	<b>10,148</b>
<b>Marital status</b>											
Never married	0.0	5.9	13.2	9.1	8.1	37.6	16.8	3.2	6.1	0.0	81
Currently married	3.3	5.6	6.4	4.5	5.6	56.1	11.9	1.9	4.6	0.2	8,697
Cohabiting	0.0	3.9	0.0	0.0	7.8	82.9	1.3	4.0	0.0	0.0	25
Separated/divorced	2.1	7.5	6.5	3.2	4.2	46.8	20.7	1.6	7.5	0.0	174
Widowed	2.6	5.2	4.0	2.6	6.4	60.4	12.0	2.2	4.6	0.0	1,169
<b>Total</b>	<b>3.2</b>	<b>5.6</b>	<b>6.2</b>	<b>4.3</b>	<b>5.7</b>	<b>56.4</b>	<b>12.0</b>	<b>1.9</b>	<b>4.6</b>	<b>0.2</b>	<b>10,145</b>
<b>Income quintile</b>											
Lowest	1.0	2.5	2.2	1.4	6.1	75.6	5.5	1.6	4.2	0.0	1,310
Second	0.8	3.3	3.2	2.1	4.4	71.3	8.1	1.4	5.3	0.0	1,555
Middle	2.3	5.1	5.4	4.1	5.1	59.6	10.0	2.0	6.2	0.1	2,124
Fourth	3.0	6.4	7.5	4.8	5.4	53.8	13.6	1.8	3.6	0.2	2,581
Highest	6.9	8.2	9.7	6.6	7.0	36.9	18.0	2.4	3.9	0.5	2,521
<b>Total</b>	<b>3.2</b>	<b>5.6</b>	<b>6.2</b>	<b>4.3</b>	<b>5.7</b>	<b>56.3</b>	<b>12.0</b>	<b>1.9</b>	<b>4.6</b>	<b>0.2</b>	<b>10,091</b>

ISCO-88 major occupation groups: 1=Legislators, senior officials and managers; 2=Professionals; 3=Technicians and associate professionals; 4=Clerks; 5=Service workers and shop and market sales workers; 6=Skilled agricultural and fishery workers; 7=Craft and related trades workers; 8=Plant and machine operators and assemblers; 9=Elementary occupations; and 10=Armed forces.

respondents in the skilled agricultural and fishery workers category (group 6).

## 4.2 Income and transfers (household level)

Given the important relationship between health and wealth, and how notoriously difficult it is to obtain accurate and reliable data regarding income in household health surveys, SAGE Wave 1 added questions on household income, consumption, cash and resource transfers to the permanent income/long-term fixed assets approach used in SAGE Wave 0 as a means to improve the accuracy of the wealth estimates. This report section also includes information on self-reported satisfaction with economic status.

### 4.2.1 Household income sources

The main sources of household income were divided into five types: wage and salary; trading and business; pension income and benefits (including state old-age and veteran's/civil service pension, contributory pension fund, provident fund or social security benefit); rent, interest and dividends (such as savings and fixed deposits); and all others. Households may have multiple sources of income.

Among all surveyed households, 62% had wage or salary as a source of income, 40% had pension and benefits, 16% had business and trading income, 9% had rental benefits and dividends, and 19% had other sources (Table 4.2.1). Income sources of urban and rural households are quite different. The proportion of urban households which had pension and benefits was six

**Table 4.2.1 Household income sources by selected characteristics**

Characteristics	Income sources									
	Wage, salary		Trading, business		Rental, interest, and dividends		Pension, benefits		Other	
	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N
<b>Residence</b>										
Urban	55.7	4,823	5.3	4,566	15.3	4,534	69.3	4,837	13.6	4,816
Rural	67.4	5,008	26.8	4,900	3.6	4,886	11.4	4,890	23.1	4,659
<b>Total</b>	<b>61.7</b>	<b>9,831</b>	<b>16.4</b>	<b>9,466</b>	<b>9.2</b>	<b>9,420</b>	<b>40.2</b>	<b>9,727</b>	<b>18.5</b>	<b>9,475</b>
<b>Income</b>										
Lowest	48.2	1,685	17.4	1,619	2.3	1,607	28.0	1,652	29.7	1,632
Second	61.0	1,769	20.3	1,700	2.9	1,682	27.2	1,741	20.7	1,715
Middle	62.5	1,926	16.0	1,864	5.2	1,855	38.6	1,928	16.0	1,866
Fourth	65.1	2,201	14.5	2,125	9.5	2,120	43.7	2,186	13.3	2,087
Highest	68.2	2,250	14.8	2,159	22.5	2,156	57.5	2,220	15.8	2,175
<b>Total</b>	<b>61.7</b>	<b>9,831</b>	<b>16.4</b>	<b>9,466</b>	<b>9.2</b>	<b>9,420</b>	<b>40.2</b>	<b>9,727</b>	<b>18.5</b>	<b>9,475</b>
<b>Sex (HH head)</b>										
Male	66.3	6,922	18.2	6,664	8.1	6,628	34.5	6,814	17.4	6,611
Female	50.5	2,905	12.0	2,799	11.9	2,789	53.7	2,910	21.2	2,863
<b>Total</b>	<b>61.7</b>	<b>9,827</b>	<b>16.4</b>	<b>9,463</b>	<b>9.2</b>	<b>9,417</b>	<b>40.2</b>	<b>9,724</b>	<b>18.5</b>	<b>9,474</b>
<b>Marital status (HH head)</b>										
Never married	55.4	172	14.5	165	5.0	165	43.9	168	22.5	158
Currently married	65.6	7,909	17.7	7,606	9.7	7,567	38.0	7,800	17.1	7,607
Cohabiting	78.0	12	8.2	12	13.9	12	18.7	14	29.9	14
Separated/divorced	53.6	244	9.8	237	6.4	234	48.7	241	13.4	237
Widowed	42.2	1,479	10.8	1,435	7.6	1,431	49.8	1,493	26.3	1,452
<b>Total</b>	<b>61.7</b>	<b>9,817</b>	<b>16.4</b>	<b>9,455</b>	<b>9.2</b>	<b>9,410</b>	<b>40.2</b>	<b>9,716</b>	<b>18.5</b>	<b>9,467</b>

times greater than in rural areas, while the proportion of households which had rental income/interest/dividends in urban areas was more than four times as large as in rural areas. The proportion of rural households with wage and business income was higher than that of urban households.

As household income quintile increased from low to high, the proportion of households that had wage/salary income, rental income/interest, and pension and benefits steadily increased. The proportion of households with wage/salary income in the highest income quintile was 41% higher than in the lowest income quintile. The proportion with rental income/interest/dividends among the highest income group was as 8.8 times that of the lowest income group. Pension and benefit receipt among the highest income group was more than twice as common as among the lowest

two income groups. Male-headed households were more likely to have wage/salary and business income compared with female-headed households, while the opposite was true for rental income/interest/dividends, pension and benefits, and other sources. Households with married heads were more likely to have wage/salary income than were widow-headed households, while the latter were more likely to receive pension and benefits.

## 4.2.2 Household monthly income and income sufficiency

The survey used the estimated total value of all family income in the past 12 months to calculate the mean monthly family income, and asked respondents about their satisfaction with household income, that is,

**Table 4.2.2 Mean monthly household income and income sufficiency by selected characteristics**

Characteristics	Mean monthly income		Sufficient to cover daily living needs	
	(RMB: yuan)	N	Percent (%)	N
<b>Residence</b>				
Urban	3,822	5,089	77.7	4,816
Rural	1,302	5,064	66.4	4,659
<b>Total</b>	<b>2,571</b>	<b>10,154</b>	<b>72.1</b>	<b>9,475</b>
<b>Income</b>				
Lowest	1,220	1,743	47.0	1,632
Second	1,281	1,818	61.7	1,715
Middle	1,965	1,997	73.1	1,866
Fourth	2,754	2,229	82.5	2,087
Highest	4,965	2,301	88.4	2,175
<b>Total</b>	<b>2,571</b>	<b>10,089</b>	<b>72.1</b>	<b>9,475</b>
<b>Sex (HH Head)</b>				
Male	2,430	7,070	71.8	6,611
Female	2,903	3,016	72.8	2,863
<b>Total</b>	<b>2,571</b>	<b>10,086</b>	<b>72.1</b>	<b>9,474</b>
<b>Marital status (HH Head)</b>				
Never married	1,712	171	68.4	158
Currently married	2,711	8,097	73.7	7,607
Cohabiting	895	15	62.5	14
Separated/divorced	1,375	254	64.5	237
Widowed	2,150	1,541	65.9	1,452
<b>Total</b>	<b>2,571</b>	<b>10,079</b>	<b>72.1</b>	<b>9,467</b>

whether the income can cover the family's daily living expenses and debt. Table 4.2.2 shows that the mean monthly household income was 2571 yuan, 3822 yuan in urban areas and 1302 yuan in rural areas. Mean monthly household income by income quintile ranged from 1220 yuan in the lowest group to 4965 yuan in the highest group. The mean monthly income for male-headed households was 2430 yuan, lower than for female-headed households (2903 yuan). Mean monthly income in married-head households was higher than for other marital statuses.

In terms of self-satisfaction with household income, 72.1% of the surveyed households believed that they could pay off the family's daily living expenses and debt at the time of survey, and were satisfied with

their income. Satisfaction with income among urban households was higher than among rural households. Satisfaction increased with income, such that satisfaction in the highest group was 88% higher than in the lowest group. Households with married heads were most likely to feel that their income was sufficient.

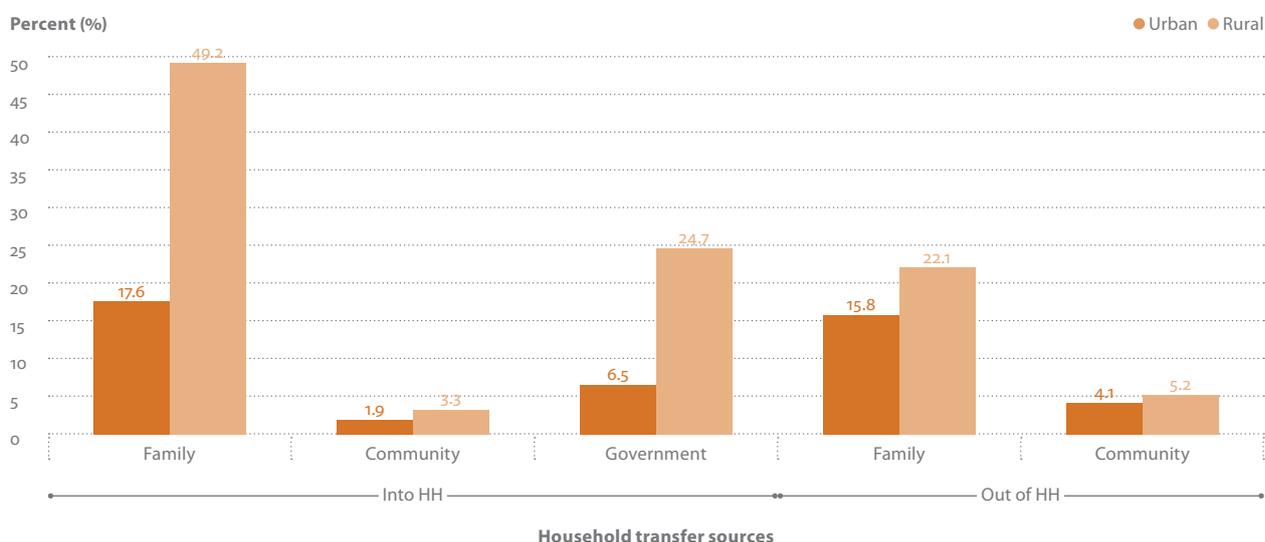
### 4.2.3 Household transfers

Household transfers may be important components of family support networks and financial well-being. SAGE households were asked whether they received or provided any help over the past 12 months, and the type of help. Help received from external sources is divided into three types: help from family and relatives;

**Table 4.2.3 Household transfers by selected characteristics**

Characteristics	Into household (%)			Out of household (%)		No. of Respondents
	Family	Community	Government	Family	Community	
<b>Residence</b>						
Urban	17.6	1.9	6.5	15.8	4.1	5,121
Rural	49.2	3.3	24.7	22.1	5.2	5,097
<b>Total</b>	<b>33.4</b>	<b>2.6</b>	<b>15.5</b>	<b>18.9</b>	<b>4.6</b>	<b>10,218</b>
<b>Income quintiles</b>						
Lowest	49.2	4.1	26.2	9.9	2.0	1,760
Second	42.0	3.3	21.3	12.3	2.5	1,845
Middle	33.8	2.1	15.5	20.7	4.8	2,023
Fourth	29.5	2.4	13.1	24.3	5.9	2,266
Highest	17.9	1.4	5.3	24.1	6.9	2,319
<b>Total</b>	<b>33.4</b>	<b>2.6</b>	<b>15.5</b>	<b>18.9</b>	<b>4.6</b>	<b>10,213</b>

**Figure 4.1 Household transfer sources by residence**



**Table 4.2.4 Transfers into and out of households by sources**

Sources		Transfers (%)			
		Monetary	Non-monetary*	Care	N
Into HH	Family	81.9	53.8	11.6	3,407
	Community	76.2	39.0	0.3	261
	Government	96.4	14.5	–	1,588
Out of HH	Family	83.1	45.5	13.5	1,930
	Community	74.1	41.7	10.2	474

\* Non-monetary includes food and other goods as well as assistance not related to care (for example, help with transportation).

**Table 4.2.5 Mean monetary value and mean time of household transfers by sources in the last 12 months**

Sources		Transfers (mean monetary value and mean time)			
		Monetary (yuan)	Non-monetary (yuan)	Time (hours/week)	No. of respondents
Into HH	Family	3250.8	522.5	10.9	3,407
	Community	3025.7	111.7	0.3	261
	Government	540.2	112.7	–	1,588
Out of HH	Family	2470.1	421.7	14.7	1,930
	Community	978.7	180.1	7.9	474

\* Non-monetary includes food and other goods as well as assistance not related to care (for example, help with transportation).

social and community assistance; and the government (government pensions are excluded in this section). Help provided by the household is divided into two types: assistance to relatives who do not live in the household; and community help. All of these types of help are then divided into monetary, food and other goods (non-monetary), and care.

One-third of all SAGE households received help from family or relatives in the year prior to the survey (Table 4.2.3). Approximately 16% received government assistance, and 2.6% accepted community help. In the other direction, 18.9% of households provided help to family and/or relatives, and 4.6% provided help to the community. The likelihood of providing and receiving help was higher for rural than for urban households, for all transfer categories (Figure 4.1). The proportion of households receiving external assistance declined as household income level increased, and the proportion of households providing help increased.

Table 4.2.4 indicates that monetary help was the most common form of transfer, both to and from households. If households received external help or helped others in the year before the survey, they were asked to estimate an approximate value of both monetary and

non-monetary help (in RMB, yuan). Care was recorded in terms of mean time (hours) per week. Table 4.2.5 shows that the sum of monetary and non-monetary transfers into households was considerably greater than transfers out of households. In terms of providing care, however, households provided more hours of care, on average, than they received.

### 4.3 Consumption (household expenditure)

The SAGE Wave 1 built on the WHS/SAGE Wave 0 by expanding the number of expenditure items that constitute household consumption, including expenditures on food, household goods, health services and other costs. Costs can be cash or forms of non-monetary expenses; non-monetary expenses were converted into cash equivalents and were included in the calculation of household spending. In order to collect as comprehensive information as possible and also to minimize recall bias, the household expenditure module covered costs in the last seven days, last 30 days, or last 12 months, depending on the items. Data on health care expenditures and other health-related

expenses were collected for two time periods—the past 30 days and the past 12 months—in order to capture large expenditures. In the statistical analysis, the various parts and types of household spending were adjusted to a unified “month” as the time unit.

The relevant definitions of household consumption expenditure and health expenditure are as follows[35]:

1. Household consumption expenditures (EXP) include cash and other kinds of expenses to purchase all goods and services, as well as the monetary value of home-made goods for internal consumption.
2. Food expenditure is the total value of money to purchase food or home-grown food to meet home consumption, but not including alcoholic beverages, tobacco and food consumption outside the home, such as in hotels and restaurants.
3. The poverty line is set at the level of household food expenditure. After adjusting for household size, this is the value of subsistence spending.
4. Subsistence spending is the minimum requirement by a household to maintain basic living. A household’s non-subsistence spending (NSS) is expenditure above subsistence spending and reflects capacity to pay (CTP).
5. Expenditure quintile (EQ) is another measure of the level of household wealth. Expenditure is divided into five equal portions (quintiles) after adjusting for family size. The first quintile contains the lowest level of household wealth, and the fifth quintile the highest level of household wealth.
6. Poor households are defined as households whose total expenditure is less than subsistence spending.

**Table 4.3.1** Mean monthly consumption expenditure and percent of poor households across different population groups

Characteristics	Mean monthly consumption expenditure (RMB: yuan)	Poor household (%)
<b>Residence</b>		
Rural	948	50.6
Urban	1,841	10.1
<b>Expenditure quintiles</b>		
Q1 (Lowest)	244	100.0
Q2	596	47.4
Q3	994	0.0
Q4	1,531	0.0
Q5 (Highest)	3,700	0.0
<b>Having 50+ member(s)</b>		
No	1,661	19.1
Yes	1,377	31.0
<b>Health insurance</b>		
No	1,184	37.9
Yes	1,433	28.7
<b>Catastrophic health expenditure</b>		
No	1,432	28.6
Yes	1,339	32.8
<b>Poor</b>		
No	1,867	—
Yes	327	—
<b>Total</b>	<b>1,413</b>	<b>29.5</b>

7. Impoverished households are those that became poor after paying for health care services. That is, non-poor households become impoverished as a result of health care payments.
8. Out-of-pocket payments (OOP) refer to household health expenditures made at the point of receiving health services. OOP typically include doctor's consulting fees, purchases of medication, hospital bills and spending on alternative and/or traditional medicine. OOP excludes expenditures on health-related transportation, special nutritional and insurance reimbursement.
9. Catastrophic health expenditure is the total actual expenditure when a family's out-of-pocket payments (OOP) on health care are greater than or equal to the 40% of the household's capacity to pay.

### 4.3.1 Household monthly expenditure and poor households

The mean monthly household expenditure was 1413 yuan, and was about twice as high in urban areas (1841) as in rural areas (948 yuan). The mean monthly household expenditure in the lowest quintile group was 244 yuan, and that in the highest expenditure quintile group was 3700 yuan. The expenditure of households with family members aged 50 and older was less than that of households that do not have members aged 50 and over. The expenditure of households that have health insurance coverage was higher than those without health insurance. The monthly household expenditure of non-poor households was about six times that of poor households. The total health care expenditure of households that had catastrophic

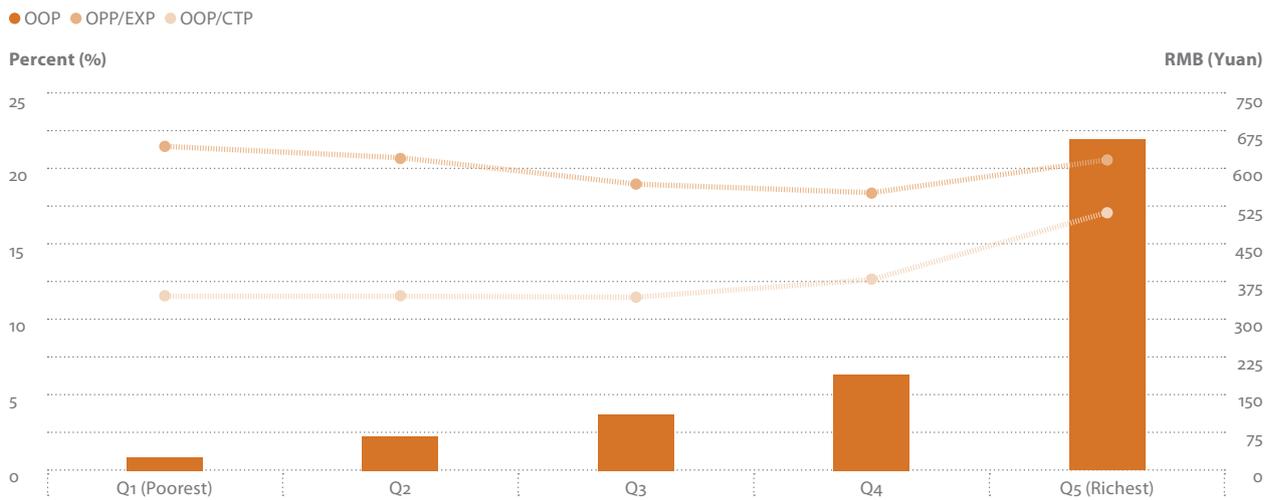
**Table 4.3.2 Mean monthly out-of-pocket (OOP) payments and health expenditure characteristics across different population groups**

Characteristics	Mean monthly OOP (RMB: yuan)	OOP/EXP (%)*	OOP/NSS (%)**	Impoverished household (%)	Having catastrophic health expenditure (%)
<b>Residence</b>					
Rural	148	13.8	21.2	8.0	22.1
Urban	270	12.2	19.0	4.4	19.0
<b>Expenditure quintiles</b>					
Q1 (Lowest)	27	11.6	21.5	0.0	23.6
Q2	68	11.6	20.7	16.8	21.0
Q3	112	11.5	19.0	8.6	19.6
Q4	191	12.7	18.4	3.1	17.6
Q5 (Highest)	659	17.1	20.6	2.3	20.6
<b>Having 50+ member(s)</b>					
No	135	7.3	10.3	3.7	8.8
Yes	222	13.7	21.4	6.5	22.2
<b>Having 50+ member(s)</b>					
No	243	12.8	22.1	6.7	23.9
Yes	209	12.9	19.8	6.1	20.2
<b>Catastrophic health expenditure</b>					
No	80	5.1	8.4	1.8	–
Yes	723	43.2	65.1	23.2	–
<b>Poor</b>					
No	284	13.4	19.5	8.7	19.5
Yes	38	11.8	21.4	0.0	22.8
<b>Total</b>	<b>211</b>	<b>12.9</b>	<b>20.0</b>	<b>6.1</b>	<b>20.5</b>

\* Out-of-pocket expenditures on health care as a percentage of total household expenditures.

\*\* Out-of-pocket expenditures on health care as a percentage of non-subsistence spending.

**Figure 4.2 Out-of-pocket health payments by expenditure quintiles**



health care expenditures was higher than that of households without catastrophic health care expenditures.

The proportion of poor households in SAGE was 29.5%, and the proportion of poor households in rural areas was five times as high as in urban areas. Households were more likely to be poor if they had at least one member aged 50 and older. Poor households were less likely than others to have health insurance and slightly less likely to have had a catastrophic health expenditure.

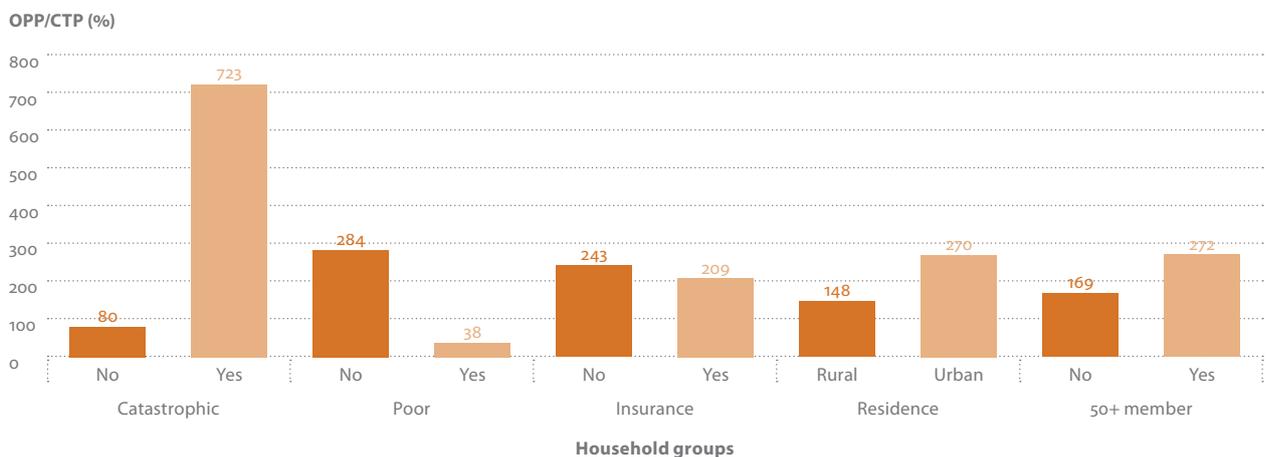
### 4.3.2 Household health expenditure

Out-of-pocket payments (OOP) are shown in Table 4.3.2. The mean monthly OOP of 211 yuan represented 12.9% of total household expenditure and 20.0% of capacity to pay. The proportion of households with catastrophic health care expenditures was 20.5%. Just over 6% of all households became poor because of health care expenditure.

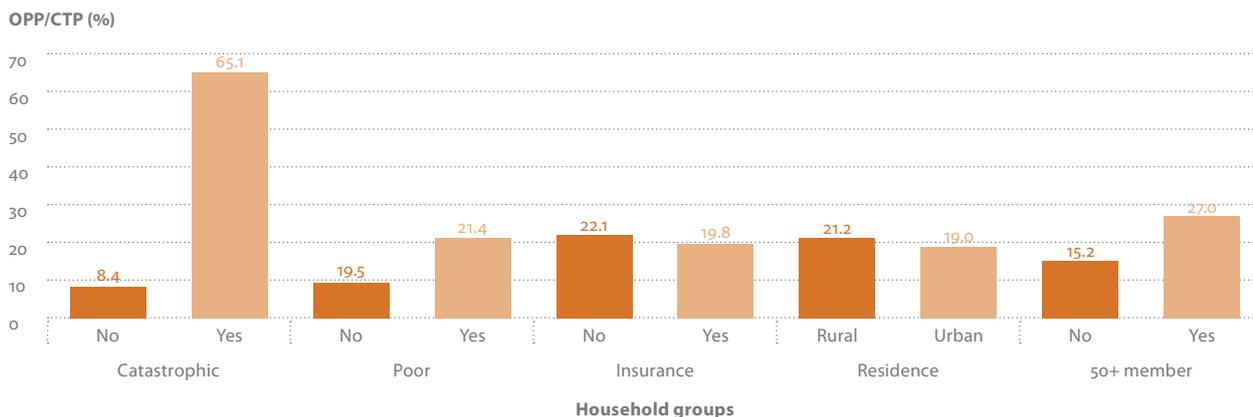
Figure 4.2 displays data on OOP payments by household income quintile. OOP as a percent of overall household expenditure varied little in the lower income quintiles, but increased between quintiles 4 and 5. The ratio of OOP payments to capacity to pay was highest in the lowest expenditure group, but differences among quintiles were small. The difference between the ratio of monthly OOP payments to total household expenditure and that of monthly OOP payments to capacity to pay diminished with increased income.

Out-of-pocket health payments for different household types are shown in Figure 4.3. The amount of OOP for rural households was lower than that for urban households, and was 9 times higher for households with catastrophic health expenditure than for households without such expenditure. Out-of-pocket payments by poor households were about one-eighth that of non-poor households. Households with health insurance had lower payments than did households without health insurance, and households with one or more

**Figure 4.3 Out-of-pocket health payments across different household groups**



**Figure 4.4** Out-of-pocket health payments as a share of capacity to pay (OPP/CTP)



members aged 50 or above had higher OOP costs than did households without a 50+ member.

Figure 4.4 shows ratios of out-of-pocket payments (OOP) to capacity to pay (CTP) according to various household characteristics. The OOP/CTP ratio was slightly higher for urban than for rural households, and for poor versus non-poor households, and for households with health insurance versus those without. The ratio for households with catastrophic health care expenditure was eight times that of households without catastrophic expenditure. The ratio for households with one or more members aged 50 and over was significantly higher than for younger households. Insurance coverage showed some beneficial effects.

The proportion of households having catastrophic health care expenditure decreased as expenditure quintiles increased from lowest to second highest, with a slight increase seen for the highest expenditure

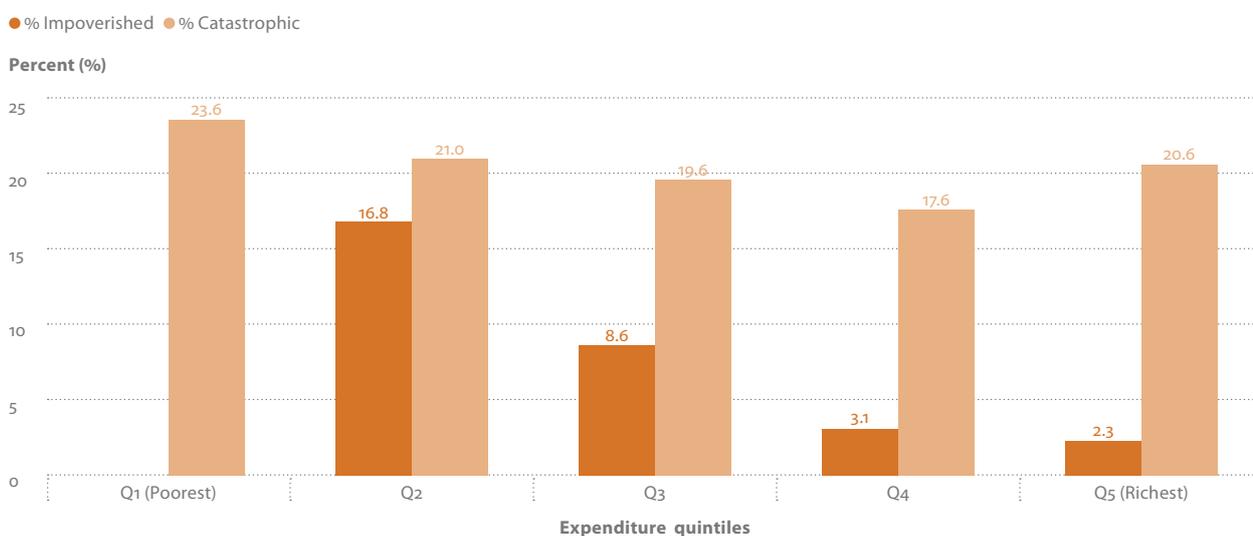
quintile (Figure 4.5). The impoverishment rate also declined with greater income. Moving from quintile 2 through 5, there was a decreasing chance that a catastrophic health expenditure would lead to household impoverishment.

Additional information on catastrophic expenditures and impoverishment is presented in Figure 4.6. Both events were more common among rural than among urban households, and among households with an older adult member. Differences in rates of impoverishment between households with and without health insurance were relatively small, with insurance having more impact on catastrophic expenditures.

### 4.3.3 Health payment types

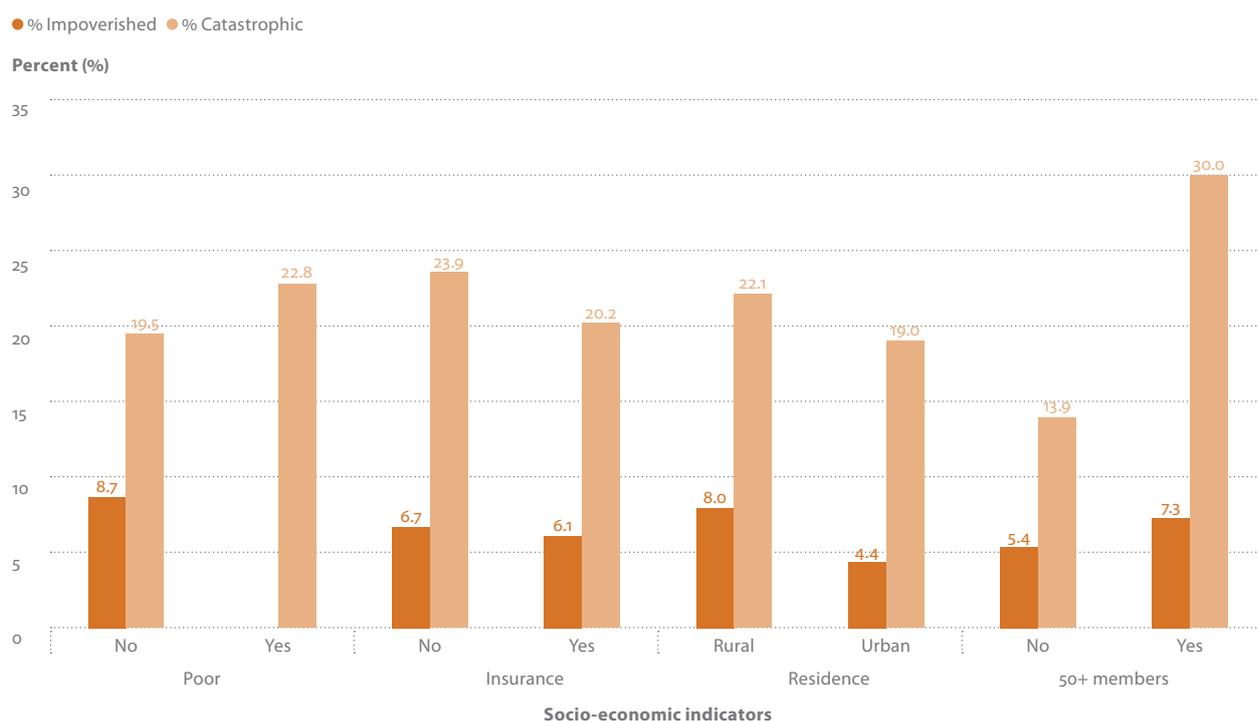
Out-of-pocket payments for health care in this survey can be divided into eight types: inpatient charges;

**Figure 4.5** Percentage of households with catastrophic expenditure and impoverishment by expenditure quintiles



Note: impoverished households don't apply to Q1, 100% poor households in Q1.

**Figure 4.6** Percentage of households with catastrophic expenditure and impoverishment by socio-economic indicators



Note: impoverished households don't apply to poor households.

**Table 4.3.3** Distribution of out-of-pocket health payments by selected characteristics

Characteristics	Distribution of out-of-pocket health payments (%)							
	Inpatient	Outpatient	Traditional	Drugs	Other*	Health aids	Ambulance	Long term care
<b>Catastrophic</b>								
No	5.1	13.0	2.8	63.7	12.1	1.9	0.2	1.1
Yes	13.2	12.9	3.5	52.2	14.1	1.5	1.1	1.5
<b>Poor</b>								
No	11.1	13.2	3.3	54.4	13.9	1.7	0.9	1.5
Yes	5.3	6.7	2.3	79.1	6.2	0.3	0.0	0.0
<b>Insurance</b>								
No	1.2	30.6	5.2	49.4	8.3	4.9	0.1	0.3
Yes	11.8	11.1	3.1	56.3	14.0	1.2	0.9	1.5
<b>Residence</b>								
Rural	14.1	6.6	3.6	63.6	9.2	0.8	1.3	0.9
Urban	9.1	16.1	3.1	51.7	15.7	2.0	0.6	1.6
<b>Expenditure quintiles</b>								
Q1 (Lowest)	4.1	4.4	2.0	84.8	4.5	0.1	0.0	0.0
Q2	6.3	8.2	2.7	74.3	7.7	0.7	0.0	0.2
Q3	10.2	11.2	2.2	69.0	6.2	1.0	0.0	0.1
Q4	8.3	15.1	1.2	65.8	6.3	2.0	0.7	0.6
Q5 (Highest)	12.4	13.4	4.2	47.4	17.8	1.7	1.1	2.0
<b>50+ member in household</b>								
No	12.9	14.3	3.1	51.0	14.7	1.3	0.8	1.9
Yes	10.6	12.8	3.3	56.1	13.4	1.6	0.8	1.3
<b>Total</b>	<b>10.8</b>	<b>12.9</b>	<b>3.3</b>	<b>55.7</b>	<b>13.5</b>	<b>1.6</b>	<b>0.8</b>	<b>1.4</b>

\* "Other" payments include expenditures on diagnostic and laboratory tests such as X-rays or blood tests, dentists, any other health care products or services that did not fit into main categories.

outpatient charges; traditional medicine fees (TCM); drug costs; health aid costs; ambulance fees; long-term care costs; and other costs. The distribution of out-of-pocket health payments for these goods and services by selected background characteristics is shown in Table 4.3.3. Drug costs accounted for the largest share of total costs, 55.7%, with outpatient costs and inpatient costs both above 10% and traditional medicine fees 3.3%.

Figures 4.7 and 4.8 display the distribution of health payments by different categories of households. Figure 4.7 shows that drug costs decline as a proportion of all health payments as household income increases. The share of expenses for outpatient and inpatient treatment tended to increase with income.

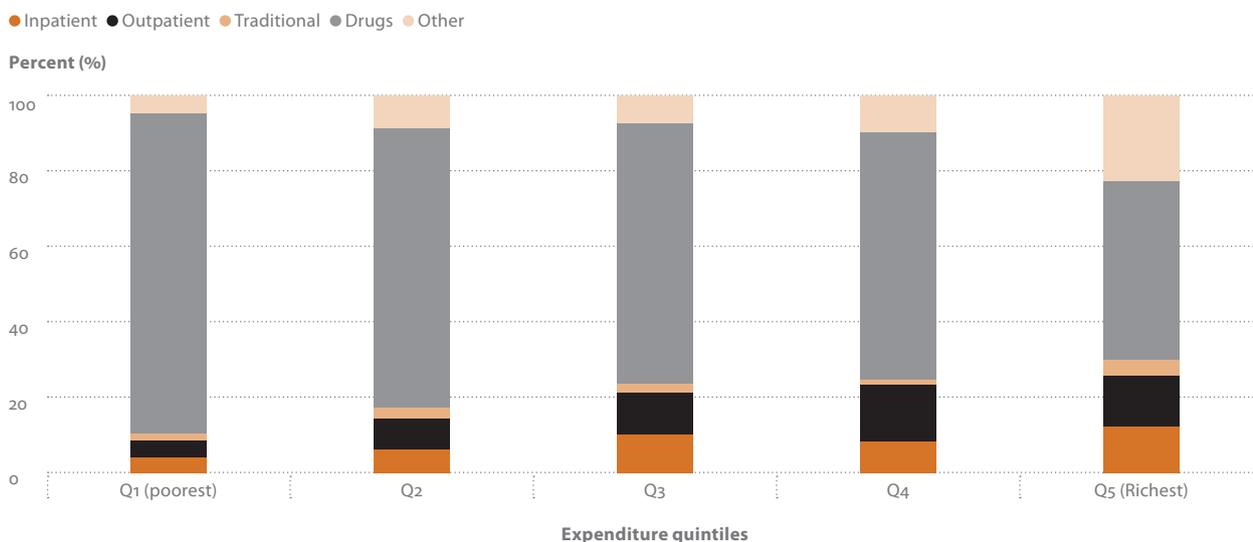
Payments made by rural households were mainly for drugs and inpatient care, while drugs and outpatient

care predominated among urban households. Inpatient costs for households with catastrophic health care expenditure were 2.6 times higher than for households without such expenditure. The bulk of health payments by poor households, 79%, were for drugs. Also notable in Figure 4.8 is the difference in outpatient and inpatient care expenses between households with and without health insurance coverage.

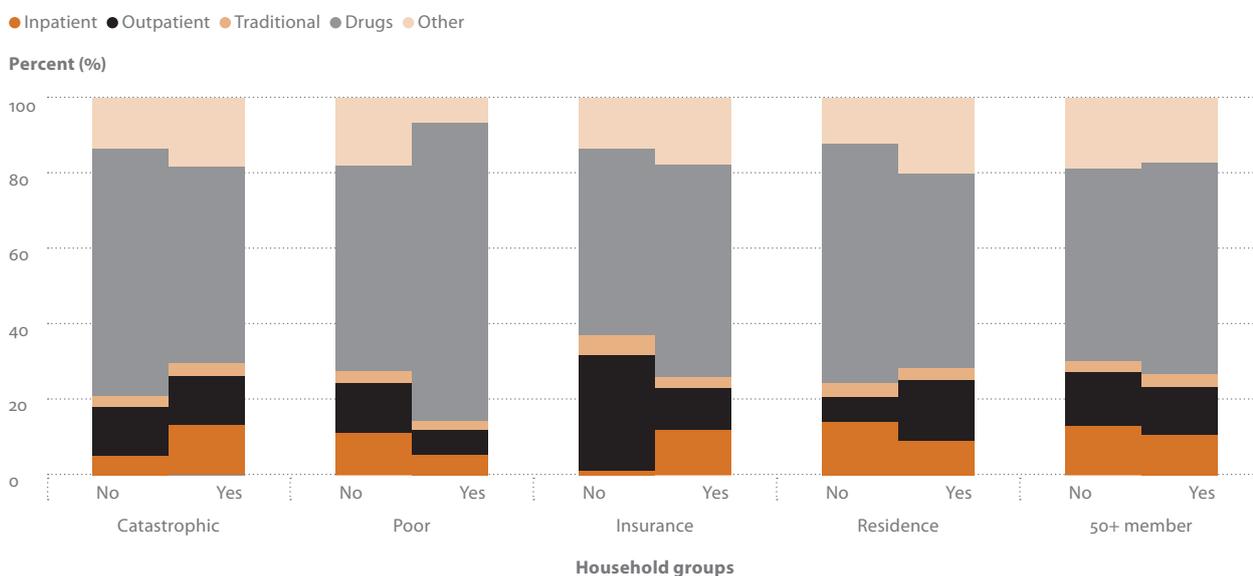
### 4.3.4 Health payment sources

In addition to examining the types and distribution of household health costs, respondents were asked about the financial sources used to pay for health care in the 12 months prior to the survey. The main response categories included savings, sold items (including, land, furniture, stocks, jewelry), funding from outside family

**Figure 4.7** Distribution of health payments by expenditure quintiles



**Figure 4.8** Distribution of health payments by household groups



**Table 4.3.4 Household financial sources of health services payment by selected characteristics**

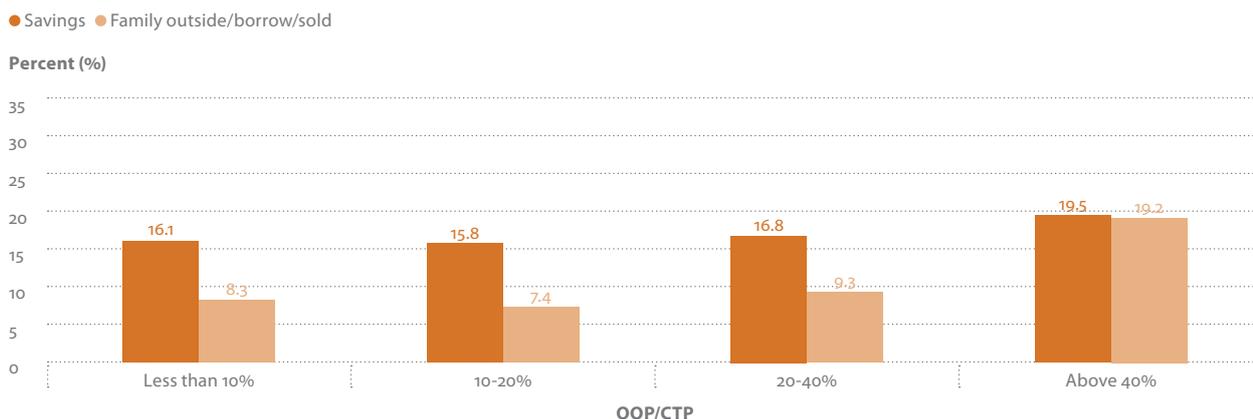
Characteristics	Financial sources (%)						
	Savings	Sold items	Family outside HH	Borrowed	Health insurance*	Current income	Other
<b>OOP%NSS</b>							
Less than 10%	16.1	0.3	6.8	1.2	44.7	93.3	1.5
10-20%	15.8	0.2	6.5	0.7	47.0	94.0	1.9
20-40%	16.8	0.0	8.2	1.1	47.1	92.7	2.5
Above 40%	19.5	0.1	18.1	1.0	45.9	90.6	3.5
<b>Hospitalization</b>							
No	16.3	0.2	9.1	1.0	44.5	92.6	2.3
Yes	26.8	0.1	22.1	2.3	63.4	92.4	2.2
<b>Insurance</b>							
No	15.0	0.1	13.0	1.0	8.1	86.2	4.2
Yes	17.2	0.2	9.7	1.1	48.7	93.1	2.1
<b>Residence</b>							
Rural	12.7	0.3	15.2	1.8	42.4	91.4	3.1
Urban	21.4	0.1	4.7	0.3	49.2	93.8	1.5
<b>Expenditure quintiles</b>							
Q1 (Lowest/Poorest)	8.5	0.2	20.5	0.8	35.1	88.4	4.7
Q2	13.8	0.5	11.2	1.2	38.9	91.2	3.5
Q3	16.7	0.0	7.4	1.2	48.1	93.2	1.4
Q4	19.7	0.0	4.9	0.5	53.4	94.2	1.1
Q5 (Highest/Richest)	25.8	0.2	6.3	1.5	52.3	95.6	1.0
<b>Having 50+ member in household</b>							
No	16.3	0.2	7.0	1.4	45.1	93.3	1.7
Yes	18.1	0.2	14.0	0.6	46.8	91.5	3.0
Total (mean)	17.1	0.2	10.0	1.1	45.8	92.6	2.3

\* Health insurance, as one financial source, includes not only insurance but also community health schemes.

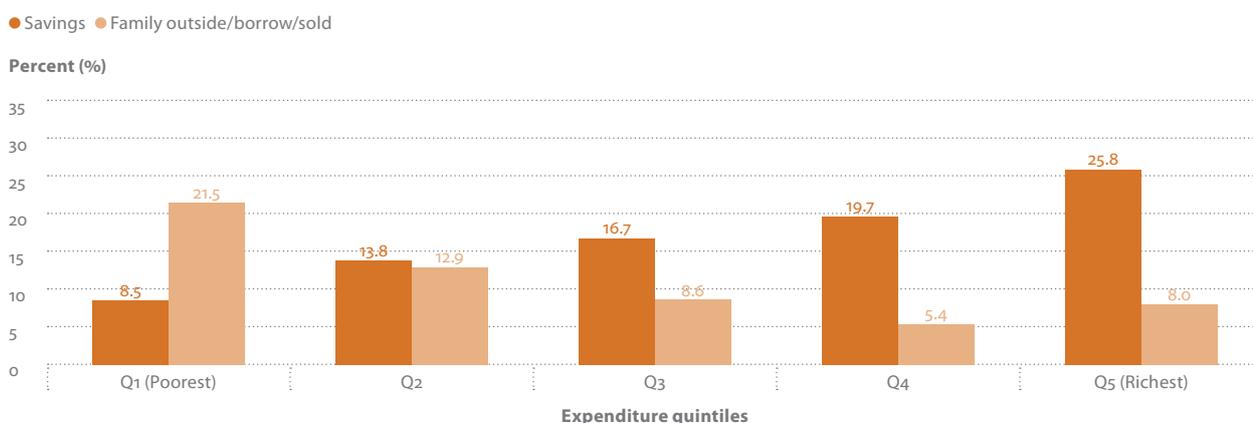
or friends, loans from financial institutions, health insurance (including community health projects), and current income (for instance, wages, pensions, welfare work). Table 4.3.4 indicates that nearly 93% of all households used current income to pay for some or all of their health care. Other major sources included health insurance (45.8%), savings (17.1%), and funding from friends and relatives (10%). Savings played a larger role in urban than in rural settings, while rural households were three times as likely to have funding from friends and relatives. The role of health insurance appears especially important for households requiring hospital services/inpatient care.

Figure 4.9 shows financial sources used for health payments by health spending levels, exclusive of current income and health insurance. Two source categories are considered: (1) savings; and (2) a combination of funding from friends and relatives, sold items and borrowing. As the ratio of out-of-pocket payment to capacity to pay increased, the proportion of each category tended to increase, and savings were consistently higher. When the ratio of OOP to CTP was more than 40%, indicating catastrophic health care cost, the proportion of households using savings to pay was 19.5%, and the proportion using funding from relatives, friends, borrowing and selling was 19.2%. This is

**Figure 4.9** Financial sources of health payment by health spending level



**Figure 4.10** Financial sources of health payment by expenditure quintiles



likely to result in spending down of assets and debt accumulation.

Financial sources of health payment by expenditure quintile are shown in Figure 4.10. As household expenditure quintiles increase, the proportion of households using savings to pay increased, and the proportion using funding from friends and relatives, sold items and borrowing decreased. Except for the lowest expenditure group, the proportion using savings was higher than that of funding from friends and relatives, sold items and borrowing.

Overall, these income and expenditure results provide a rich set of data to inform economic policy for older adults and additional data to evaluate the ongoing health system reforms.



## 5. Risk factors

### Introduction

Risk factors are behaviors, characteristics, properties or exposure that can increase the likelihood of disease. Almost all persons are exposed to a variety of risk factors, leading to the occurrence of chronic diseases or communicable diseases. This section describes various risk factors and their distributions in the older adult population. By identifying modifiable risk factors, targeted efforts can be implemented to improve population health.

SAGE focuses on environmental risk factors and behavioral risk factors such as smoking, alcohol consumption, intake of fruits and vegetables and physical activity. Environmental risk factors include access to improved water, sanitation conditions, and fuel conditions, each of which are related to human health. Smoking and drinking are widely recognized as important health risk factors, while the level of intake of fruits and vegetables and physical activity levels also have a direct relationship to health.

Other risk factors, such as social networks and happiness, will be addressed in other publications.

### 5.1 Tobacco and alcohol consumption

#### Tobacco consumption

Tobacco is divided into manufactured cigarettes, hand-rolled cigarettes, pipe, cigar, and smokeless tobacco, among which cigarettes are the most widely used tobacco products in the world. A large number of findings and epidemiological evidence proves that tobacco has a negative impact on health regardless of its form [36-38]. "Smokers" is used as a generic term for tobacco consumption in the following text, but refers to tobacco consumed in any form.

Different characteristics of tobacco consumption among respondents aged 50-plus are shown in Table 5.1.1. More than one-fourth (26.7%) were daily smokers, and another 2.5 % were smokers on a non-daily basis. About 7% of respondents were former smokers who were not smoking at the time of interview. There was a decline in the prevalence of daily smoking by age, but also clear persistence of tobacco use into older ages, with 15% of the 80-plus age group still smoking.

Men were much more likely than women to be smokers or former smokers. When all three smoking categories are combined, 67.5% of men versus only 4.7% of women were current or former smokers. The percentage of smokers in rural areas (42.3%) was higher than in urban areas (28.7%), and urban respondents were more likely to say that they had stopped smoking.

The likelihood of ever having smoked was lowest among respondents without any formal education (24.2%), and also lower among the most highly educated. There was very little difference in smoking propensity among persons with less than primary, primary, and secondary education (40%-42%). In terms of marital status and smoking, the ever-smoking rate among singles was the highest, 53.3%, and among widowed respondents the lowest, 23.9%.

Data on smoking and income show that the smoking rate among the two lowest income quintiles was highest, about 40%. As income increases, smoking rates tend to decline, to a low of 31.2% among the highest income group.

Average daily tobacco consumption is shown in Table 5.1.2. Among daily smokers aged 50-plus, the average daily cigarette consumption was 18. Average daily cigarette consumption declined with age, to a low of 15 among respondents aged 80-plus. On average, male smokers smoked more cigarettes per day than female

**Table 5.1.1 Tobacco consumption by selected demographic characteristics**

Characteristics	Tobacco use (%)				Never smoker (%)	N
	Current daily smoker	Smoker, not daily	Not current smoker	Total		
<b>Age group</b>						
50-59	31.0	2.5	4.7	38.2	61.8	5,845
60-69	26.7	2.4	7.1	36.2	63.8	4,132
70-79	19.0	2.5	9.1	30.6	69.4	2,402
80+	15.2	3.6	11.7	30.6	69.4	554
<b>Total</b>	<b>26.7</b>	<b>2.5</b>	<b>6.6</b>	<b>35.8</b>	<b>64.2</b>	<b>12,934</b>
<b>Sex</b>						
Male	50.9	4.4	12.2	67.5	32.5	6,411
Female	3.0	0.7	1.1	4.7	95.3	6,523
<b>Total</b>	<b>26.7</b>	<b>2.5</b>	<b>6.6</b>	<b>35.8</b>	<b>64.2</b>	<b>12,934</b>
<b>Residence</b>						
Urban	19.4	2.0	7.2	28.7	71.3	6,164
Rural	33.4	2.9	6.0	42.3	57.7	6,770
<b>Total</b>	<b>26.7</b>	<b>2.5</b>	<b>6.6</b>	<b>35.8</b>	<b>64.2</b>	<b>12,934</b>
<b>Education</b>						
No formal education	18.0	2.0	4.2	24.2	75.8	2,885
Less than primary	30.4	2.4	7.4	40.3	59.7	2,470
Primary school completed	31.6	2.5	8.1	42.2	57.8	2,746
Secondary school completed	31.2	2.9	6.9	41.0	59.0	2,589
High school completed	25.0	3.0	5.6	33.6	66.4	1,653
College or post-graduate degree completed	17.6	1.8	8.7	28.1	71.9	591
<b>Total</b>	<b>26.7</b>	<b>2.5</b>	<b>6.6</b>	<b>35.8</b>	<b>64.2</b>	<b>12,934</b>
<b>Marital status</b>						
Never married	43.0	3.1	6.2	52.3	47.7	131
Currently married	27.9	2.5	6.8	37.3	62.7	11,007
Cohabiting	28.8	2.2	4.9	35.9	64.1	28
Separated/divorced	32.1	1.6	5.5	39.2	60.8	201
Widowed	16.3	2.4	5.2	23.9	76.1	1,563
<b>Total</b>	<b>26.7</b>	<b>2.5</b>	<b>6.6</b>	<b>35.8</b>	<b>64.2</b>	<b>12,929</b>
<b>Income quintile</b>						
Lowest	29.1	3.4	6.2	38.7	61.3	2,079
Second	30.9	2.6	6.8	40.2	59.8	2,329
Middle	26.2	2.8	5.8	34.8	65.2	2,618
Fourth	26.8	2.2	6.6	35.6	64.4	3,024
Highest	21.9	1.9	7.4	31.2	68.8	2,823
<b>Total</b>	<b>26.7</b>	<b>2.5</b>	<b>6.6</b>	<b>35.8</b>	<b>64.2</b>	<b>12,873</b>

**Table 5.1.2 Average daily cigarette consumption by selected demographic characteristics**

Characteristics	Mean daily cigarette consumption*	No. of respondents
<b>Age group</b>		
50-59	19.0	1,814
60-69	17.7	1,105
70-79	15.2	456
80+	14.7	84
<b>Total</b>	<b>18.0</b>	<b>3,460</b>
<b>Sex</b>		
Male	18.3	3,264
Female	13.1	195
<b>Total</b>	<b>18.0</b>	<b>3,460</b>
<b>Residence</b>		
Urban	16.9	1,197
Rural	18.6	2,262
<b>Total</b>	<b>18.0</b>	<b>3,460</b>
<b>Education</b>		
No formal education	16.2	518
Less than primary	18.8	751
Primary school completed	18.8	867
Secondary school completed	18.5	808
High school completed	16.9	413
College or post-graduate degree completed	15.1	103
<b>Total</b>	<b>18.0</b>	<b>3,460</b>
<b>Marital status</b>		
Never married	20.2	56
Currently married	18.2	3,076
Cohabiting	22.0	8
Separated/divorced	15.4	64
Widowed	16.2	254
<b>Total</b>	<b>18.0</b>	<b>3,459</b>
<b>Income quintile</b>		
Lowest	15.3	604
Second	18.2	720
Middle	18.5	687
Fourth	19.0	809
Highest	18.3	618
<b>Total</b>	<b>18.0</b>	<b>3,439</b>

\* Current daily smokers only.

**Table 5.1.3 Alcohol consumption by selected demographic characteristics**

Characteristics	Life time abstainer (%)	Alcohol consumption (%)				N
		Non heavy drinkers	Infrequent heavy drinkers	Frequent heavy drinkers	Total	
<b>Age group</b>						
50-59	69.9	20.4	1.8	7.8	30.1	5,313
60-69	74.4	18.5	0.9	6.2	25.6	3,635
70-79	81.2	14.4	0.6	3.9	18.8	2,105
80+	89.4	8.3	0.0	2.3	10.6	484
<b>Total</b>	<b>74.2</b>	<b>18.2</b>	<b>1.2</b>	<b>6.4</b>	<b>25.8</b>	<b>11,537</b>
<b>Sex</b>						
Male	51.8	33.0	2.3	12.9	48.2	5,391
Female	93.9	5.3	0.2	0.6	6.1	6,146
<b>Total</b>	<b>74.2</b>	<b>18.2</b>	<b>1.2</b>	<b>6.4</b>	<b>25.8</b>	<b>11,537</b>
<b>Residence</b>						
Urban	81.6	15.4	1.2	1.8	18.4	5,409
Rural	67.7	20.7	1.2	10.4	32.3	6,128
<b>Total</b>	<b>74.2</b>	<b>18.2</b>	<b>1.2</b>	<b>6.4</b>	<b>25.8</b>	<b>11,537</b>
<b>Education</b>						
No formal education	82.4	12.4	0.4	4.8	17.6	2,643
Less than primary	70.9	19.7	0.9	8.4	29.1	2,176
Primary school completed	70.3	19.9	1.5	8.3	29.7	2,431
Secondary school completed	70.5	21.0	1.7	6.9	29.5	2,311
High school completed	75.0	18.6	2.3	4.1	25.0	1,468
College or post-graduate degree completed	79.2	19.9	0.4	0.4	20.8	507
<b>Total</b>	<b>74.2</b>	<b>18.2</b>	<b>1.2</b>	<b>6.4</b>	<b>25.8</b>	<b>11,537</b>
<b>Marital status</b>						
Never married	68.8	10.1	2.1	19.0	31.2	109
Currently married	72.9	19.2	1.3	6.6	27.1	9,799
Cohabiting	85.6	14.4	0.0	0.0	14.4	28
Separated/divorced	69.3	22.3	0.8	7.6	30.7	182
Widowed	84.5	11.6	0.4	3.5	15.5	1,416
<b>Total</b>	<b>74.2</b>	<b>18.2</b>	<b>1.2</b>	<b>6.4</b>	<b>25.8</b>	<b>11,534</b>
<b>Income quintile</b>						
Lowest	73.5	18.6	0.9	7.0	26.5	1,829
Second	74.7	17.6	0.8	6.9	25.3	2,078
Middle	74.2	17.0	1.2	7.6	25.8	2,345
Fourth	72.9	18.9	1.6	6.6	27.1	2,730
Highest	75.9	18.7	1.4	4.0	24.1	2,496
<b>Total</b>	<b>74.2</b>	<b>18.2</b>	<b>1.2</b>	<b>6.3</b>	<b>25.8</b>	<b>11,478</b>

\* Alcohol use was defined as: life-time abstainers, never consumed alcoholic beverage; non-heavy drinkers (social drinkers), <2 days per week with 5 or more standard drinks (in last 7 days); infrequent heavy drinker (binge drinkers): 2-3 days per week with 5+ standard drinks in last 7 days; and, frequent heavy drinkers, 4 or more days per week with 5+ standard drinks (in last 7 days).

smokers (18.3 versus 13.1), and consumption among daily smokers in rural areas was moderately higher than in urban areas. Consistent with the prevalence data in Table 5.1.1, daily cigarette consumption was lowest among respondents without formal education and those with college degrees. Daily cigarette consumption increased as household incomes increased, but declined slightly in the highest income quintile.

## Alcohol consumption

Drinking alcohol is prevalent among people in many parts of the world, and often functions as a common social activity. Low level consumption has been shown to have health benefits; however, alcohol consumption may also result in drunkenness, intoxication, dependence, and other outcomes related to adverse health risks and social consequences. Many studies have shown that long-term or excessive alcohol intake has serious consequences for human mental and physical status, and excessive alcohol intake is also an important risk factor for traffic accidents and violence. At the same time, alcohol use can affect a number of chronic diseases, and occasional excessive drinking also increases the risk of injury and stroke. Alcohol use is linked to the occurrence of ischemic heart disease, and is also an important risk factor for many diseases including cirrhosis and certain types of cancer. An estimated 2,500,000 people die each year because of harmful alcohol consumption and alcoholism[39].

The accurate measurement of alcohol consumption in surveys may be complicated by cultural and social differences, as well as alcohol content and serving size of beverages consumed. SAGE recorded daily alcohol consumption among respondents during the seven days prior to interview. Respondents were divided into lifetime abstainers, non-heavy drinkers, infrequent heavy drinkers, and frequent heavy drinkers according to the extent of their alcohol consumption.

Among respondents aged 50-plus, the overall drinking rate was 25.8% (Table 5.1.3). Non-heavy drinkers, infrequent heavy drinkers and frequent heavy drinkers were 18.2%, 1.2 % and 6.4% of the entire sample, respectively. Drinking at any level declined with increasing age, and the drinking rate was the lowest (10.6%) among respondents aged 80-plus. Women were significantly less likely than men to consume alcohol; while nearly half of all men drank to some extent, the level among women was 6.1%. Drinking was significantly lower in urban (18.4%) than in rural areas (32.3%). In terms of educa-

tional level, alcohol use was lowest among respondents without formal education, and highest among those with less than primary, primary, and secondary education. People who had never married, and who were separated or divorced, had higher rates of drinking than those of other marital status. There were only minor differences in drinking by income group.

## 5.2 Nutrition and physical activity

Fruits and vegetables are an important part of a healthy diet, and adequate daily intake can help prevent cardiovascular disease and certain cancers. The World Health Report 2002 presented evidence that inadequate fruit and vegetable intake is one of the ten risk factors that lead to death [40]. In addition, the International Agency for Research on Cancer (IARC) coordinated a high-level international review of the relationship between fruit and vegetable consumption and cancer risk, and concluded that consumption of fruits and vegetables can reduce the risk of cancer, especially gastrointestinal cancer. According to the IARC, too little fruit and vegetable intake accounts for 5-12% of the occurrence of preventable cancer in the world, and accounts for 20-30% of upper gastrointestinal cancer [41]. Convincing evidence also exists about fruits and vegetables reducing the risk of obesity, and may also reduce the risk of diabetes [42].

In SAGE, one serving of fruit and vegetable intake is equivalent to approximately 80 grams of fruit or vegetable, and the adequacy of intake was determined according to the number of servings. Five or more servings are considered adequate, and fewer than five servings are inadequate. As seen in Table 5.2.1, the rate of inadequate or insufficient vegetable and fruit intake among respondents aged 50-plus was 35.7%. The level of insufficiency rose with age, to a high of 58.0% among the oldest (80-plus) respondents. There were very minor differences in intake among men and women and in urban versus rural areas. There were, however, clear gradients by education and income. More education and higher incomes were related to a more sufficient intake of fruit and vegetables.

Physical activity refers to physical action caused by the skeletal muscles that consumes energy. Lack of physical activity is considered to be the world's fourth largest risk factor for death (accounting for 6% of global deaths). In addition, it is estimated that physical inactivity is responsible for approximately 21-25% of the occurrence

**Table 5.2.1** Sufficiency of fruit/vegetable intake by selected demographic characteristics

Characteristics	Intake of fruit and vegetables (%)		N
	Insufficient*	Sufficient	
<b>Age group</b>			
50-59	30.8	69.2	5,912
60-69	35.8	64.2	4,192
70-79	41.8	58.2	2,447
80+	58.0	42.0	606
<b>Total</b>	<b>35.7</b>	<b>64.3</b>	<b>13,157</b>
<b>Sex</b>			
Male	35.6	64.4	6,546
Female	35.8	64.2	6,611
<b>Total</b>	<b>35.7</b>	<b>64.3</b>	<b>13,157</b>
<b>Residence</b>			
Urban	34.7	65.3	6,230
Rural	36.6	63.4	6,928
<b>Total</b>	<b>35.7</b>	<b>64.3</b>	<b>13,158</b>
<b>Education</b>			
No formal education	47.3	52.7	3,037
Less than primary	35.4	64.6	2,492
Primary school completed	35.7	64.3	2,766
Secondary school completed	31.4	68.6	2,612
High school completed	26.2	73.8	1,660
College completed	23.0	77.0	585
Post graduate degree completed	10.2	89.8	7
<b>Total</b>	<b>35.7</b>	<b>64.3</b>	<b>13,158</b>
<b>Marital status</b>			
Never married	43.9	56.1	148
Currently married	33.7	66.3	11,156
Cohabiting	15.0	85.0	28
Separated/divorced	46.8	53.2	204
Widowed	47.4	52.6	1,616
<b>Total</b>	<b>35.7</b>	<b>64.3</b>	<b>13,152</b>
<b>Income quintile</b>			
Lowest	46.6	53.4	2,131
Second	42.0	58.0	2,374
Middle	36.7	63.3	2,684
Fourth	30.2	69.8	3,059
Highest	26.8	73.2	2,849
<b>Total</b>	<b>35.6</b>	<b>64.4</b>	<b>13,097</b>

\* Insufficient intake of fruit/vegetables: fewer than 5 servings per day (80g, per serving) on average in the last 7 days.

**Table 5.2.2** Percent distribution of physical activity by selected demographic characteristics

Characteristics	Physical activity (%)			N
	Low level	Moderate level	High level	
<b>Sex</b>				
Male	26.3	24.9	48.8	6,286
Female	30.0	29.9	40.0	6,365
<b>Total</b>	<b>28.2</b>	<b>27.4</b>	<b>44.4</b>	<b>12,651</b>
<b>Age group</b>				
50-59	22.3	25.3	52.4	5,692
60-69	27.2	28.2	44.6	4,059
70-79	37.1	32.1	30.8	2,354
80+	58.5	23.5	18.0	546
<b>Total</b>	<b>28.2</b>	<b>27.4</b>	<b>44.4</b>	<b>12,651</b>
<b>Residence</b>				
Urban	28.7	36.9	34.4	6,047
Rural	27.7	18.7	53.5	6,604
<b>Total</b>	<b>28.2</b>	<b>27.4</b>	<b>44.4</b>	<b>12,651</b>
<b>Marital status</b>				
Never married	36.3	21.1	42.6	127
Currently married	26.9	27.3	45.8	10,765
Cohabiting	26.9	25.4	47.7	27
Separated/divorced	21.2	31.9	46.9	199
Widowed	37.4	28.5	34.1	1,527
<b>Total</b>	<b>28.2</b>	<b>27.4</b>	<b>44.4</b>	<b>12,647</b>
<b>Education</b>				
No formal education	33.3	25.7	41.1	2,813
Less than primary	25.4	22.6	52.0	2,419
Primary school completed	25.0	24.7	50.3	2,678
Secondary school completed	26.2	27.5	46.3	2,550
High school completed	28.7	37.1	34.2	1,612
College completed	36.9	41.4	21.6	572
Post-graduate degree completed	33.6	56.1	10.2	7
<b>Total</b>	<b>28.2</b>	<b>27.4</b>	<b>44.4</b>	<b>12,651</b>
<b>Income quintile</b>				
Lowest	28.9	23.5	47.5	2,029
Second	25.4	22.7	51.9	2,275
Middle	26.5	27.2	46.4	2,550
Fourth	29.5	25.8	44.7	2,971
Highest	29.8	36.0	34.1	2,765
<b>Total</b>	<b>28.1</b>	<b>27.4</b>	<b>44.5</b>	<b>12,590</b>

**High-level:** A person meeting either of the following criteria is classified in this category: (1) Vigorous-intensity activity on at least 3 days achieving a minimum of at least 1,500 MET-minutes per week, or (2) 7 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 3,000 MET-minutes per week.

**Moderate-level:** A person not meeting the criteria for the “high” category, but meeting any of the following criteria is classified in this category: (1) 3 or more days of vigorous-intensity activity of at least 20 minutes per day, or (2) 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day, or (3) 5 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes per week.

**Low-level:** A person not meeting any of the above-mentioned criteria falls in this category.

of breast and colon cancer, 27% for diabetes and 30% for ischemic heart disease [43]. Regular and appropriate levels of physical activity for adults can not only reduce the risk of high blood pressure, coronary heart disease, stroke, diabetes, breast and colon cancer, depression and the risk of falling, but can also improve bone and functional health. Physical activity also is a key determinant of energy consumption and therefore has a fundamental role in energy balance and weight control [44].

In this survey, physical activity was measured using the Global Physical Activity Questionnaire (GPAQ) and is divided into low level, moderate level and high level [45]. Table 5.2.2 shows the level of physical activity of respondents by age, sex, residence, education level, marital status and income. Among respondents aged 50-plus, the proportion of low, moderate, and high levels of physical activity were 28.2%, 27.4% and 44.4%, respectively. Men (48.8%) were more likely than women (40.0%) to report a high level of physical activity. With increasing age, the proportion of low-level physical activity increased and high-level physical activity decreased. The proportion of high-level physical activity in rural areas (53.5%) was considerably higher than in urban areas (34.4%), while the proportion of moderate physical activity (36.9%) in urban areas was higher than in rural areas (18.7%). Among respondents of different marital status, the proportion of high-level physical activity varied little other than the relatively low level

among the widowed. And except for respondents without formal education, the proportion of high-level physical activity decreased with educational level, though the reverse trend was seen for the moderate-level. A high-level of physical activity tended to decline as income levels increased.

### 5.3 Access to improved water sources and sanitation

Access to clean drinking water and sanitation are basic human needs and basic human rights, and also important for the dignity and health of each person. There is epidemiological evidence that improved sanitation and clean drinking water can prevent the occurrence of disease. About 50 percent of the population in developing countries, some 2.5 billion people, lack improved sanitation facilities, and 884 million people are still using unsafe sources of water [46].

Among households in SAGE, 96.6% had improved drinking water source and only 3.4% had unimproved drinking water (Table 5.3.1). In urban areas, 99 percent of the surveyed households used improved drinking water, compared with 93.3% in rural areas. The proportion of households using improved drinking water increases as household income rises. The proportion of households using improved drinking water in the highest income group was 100%.

**Table 5.3.1 Household drinking water source by selected characteristics**

Characteristics	Drinking water source (%)		Number of households
	Improved	Unimproved	
<b>Residence</b>			
Urban	99.9	0.1	5,091
Rural	93.3	6.7	5,085
<b>Income quintile</b>			
Lowest	87.7	12.3	1,755
Second	95.5	4.5	1,840
Middle	98.6	1.4	2,021
Fourth	99.2	0.8	2,256
Highest	100.0	0.0	2,305
<b>Total</b>	<b>96.6</b>	<b>3.4</b>	<b>10,176</b>

**Improved water source:** Piped water into dwelling, piped water to yard/plot, public tap/standpipe, tube well/borehole, protected dug well, protected spring, rainwater collection, bottled water.

**Unimproved water source:** Unprotected dug well, unprotected spring, small scale vendor, tanker truck, surface water (river, dam, lake, pond, stream, canal, irrigation channels), other.

**Table 5.3.2** Percentage distribution of time to collect drinking water by selected characteristics

Characteristics	Time to collect drinking water (round trip)			N
	Water on premises	Less than 30 minutes	More than 30 minutes	
<b>Residence</b>				
Urban	77.7	20.7	1.6	94
Rural	72.1	26.8	1.1	1,976
<b>Income quintile</b>				
Lowest	53.3	43.9	2.8	646
Second	74.1	24.9	1.0	554
Middle	82.4	17.6	0.0	402
Fourth	86.5	13.5	0.0	305
Highest	90.7	9.3	0.0	163
<b>Total</b>	<b>72.4</b>	<b>26.5</b>	<b>1.1</b>	<b>2,070</b>

Note: Data refer to those households that do not have water piped into the dwelling/yard plot.

The time needed to collect drinking water among households by region and income is shown in Table 5.3.2. Among households in this survey, 72.4% can access drinking water at home, 26.5% spend less than 30 minutes to collect drinking water, and 1.1% spend more than 30 minutes. In urban areas, 77.7% of surveyed households had direct access to drinking water at home, higher than in rural areas (72.1%). The likelihood of direct access to drinking water at home increased with household income, with the proportion reaching 90.7% in the highest household income group.

In households where water needs to be collected for daily use, Table 5.3.3 indicates that men are more likely than women to usually perform this task.

Household sanitation type is shown in Table 5.3.4. More than three-fourths (77.4%) of the surveyed households have improved sanitation facilities, while 22.6% of surveyed households used unimproved sanitation facilities. The proportion of households using improved sanitation facilities increased with household income, with the highest proportion (89.4%) seen in the highest household income group.

**Table 5.3.3** Percentage distribution of household members that usually collect drinking water by selected characteristics

Characteristics	Person that usually collects drinking water			Number of households
	Adult man	Adult woman	Other	
<b>Residence</b>				
Urban	49.2	38.6	12.2	21
Rural	55.1	43.2	1.7	542
<b>Income quintile</b>				
Lowest	58.0	38.2	3.8	301
Second	51.7	48.3	0.0	141
Middle	51.2	48.1	0.7	71
Fourth	45.6	54.4	0.0	36
Highest	62.8	37.2	0.0	15
<b>Total</b>	<b>54.9</b>	<b>43.0</b>	<b>2.1</b>	<b>564</b>

Note: Data refer to those households that do not have water piped into the dwelling/yard plot and have no water on the premises.

**Table 5.3.4 Household sanitation type by selected characteristics**

Characteristics	Sanitation (%)		Number of households
	Improved	Unimproved	
<b>Residence</b>			
Urban	87.2	12.8	5,112
Rural	67.6	32.4	5,092
<b>Total</b>	<b>77.4</b>	<b>22.6</b>	<b>10,204</b>
<b>Income quintile</b>			
Lowest	50.2	49.8	1,759
Second	71.9	28.1	1,843
Middle	81.1	18.9	2,023
Fourth	87.3	12.7	2,262
Highest	89.4	10.6	2,317
<b>Total</b>	<b>77.4</b>	<b>22.6</b>	<b>10,204</b>

**Improved:** Flush/pour flush to piped sewer system, flush/pour flush to septic tank, flush/pour flush to pit latrine, flush/pour flush to unknown place/not sure, ventilated improved pit latrine (VIP), pit latrine with slab, composting toilet.

**Unimproved:** Flush/pour flush to other location, pit latrine without slab/open pit, bucket latrine, hanging toilet/hanging latrine, no facilities or bush or field, other.

## 5.4 Indoor air pollution (solid fuel use for cooking)

Using wood, coal, straw or other solid fuels for cooking may lead to a range of respiratory diseases. And traditional inefficient stoves produce a large amount of dust, carbon monoxide and carcinogenic compounds in smoke. Since women cook at home most of the time, they are exposed to the risk of chronic respiratory disease and eye disease [47].

More than half of all surveyed households used clean fuels, gas or electricity, while 46.5 % relied on solid fuels (Table 5.4.1). The use of paraffin and kerosene as fuel was almost nonexistent. In urban areas, most households used clean fuel (92.8%), while in rural areas most households used solid fuel (86.1%). As household income levels increased, the proportion using clean fuel increased progressively, and that using solid fuel declined. In the highest income quartile, 88.3% of households used clean fuel.

**Table 5.4.1 Percent distribution of household cooking fuel by residence and income quintile**

Characteristics	Cooking fuel used (%)			Number of households
	Clean fuel	Kerosene/paraffin	Solid fuel	
<b>Residence</b>				
Urban	92.8	0.2	7.0	5,113
Rural	13.8	0.1	86.1	5,094
<b>Income quintile</b>				
Lowest	21.0	0.3	78.6	1,760
Second	30.7	0.2	69.1	1,845
Middle	53.4	0.0	46.5	2,022
Fourth	61.4	0.1	38.5	2,265
Highest	88.3	0.0	11.7	2,316
<b>Total</b>	<b>53.4</b>	<b>0.1</b>	<b>46.5</b>	<b>10,208</b>

Clean fuel: Gas and electricity

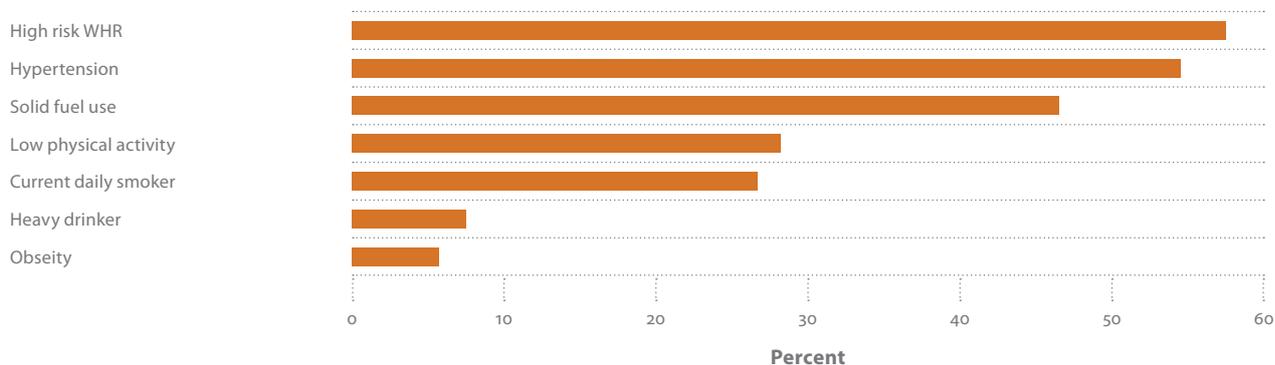
Solid fuel: Coal/charcoal, wood, agricultural residue, animal dung, shrubs/grass, other.

**Table 5.4.2** Percent distribution of fire/stove covered by selected characteristics

Where cooking usually done	Fire/stove covered or not (%)		Number of households
	Chimney/hood	Neither	
In room used for living or sleeping	80.4	19.6	76
In separate room used as kitchen	95.0	5.0	3,210
In separate building used as kitchen	94.8	5.2	202
Outdoor	35.1	64.9	78
Other	26.2	73.8	6
<b>Total</b>	<b>93.2</b>	<b>6.8</b>	<b>3,572</b>

**Figure 5.1** Prevalence of main health risk factors measured in SAGE

China: prevalence of risk factors



Source: SAGE 2007-2010

Data on fire/stove covers for different cooking devices and locations are given in Table 5.4.2. Most indoor fires and stoves used a chimney and/or hood (mask), while 64.9% did not use a hood when cooking outdoor.

A summary of the main risk factors to health using WHO standards, as measured in SAGE, is compiled in Figure 5.1. This figure is intended to provide an insight into the overall risk factor burden; however, some of these variables (waist hip ratio, hypertension and obesity) are described in more detail in Chapter 8 later in this report. Waist hip ratio (WHR) is a considerable risk in older Chinese, with almost 60% at levels considered high risk for cardiovascular disease. Hypertension and solid fuel use also impact around 50% of the population, with the challenge for public health in China to address multiple risk factors. Almost 30% reported low physical activity levels, with equally high levels of smoking daily. Heavy drinking and obesity levels are also a concern to be addressed through health promotion measures.



## 6. Health state

The World Health Organization issued its “Alma-Ata Declaration” in 1978 at the International Conference on Primary Health Care, reaffirming that “health is a state of complete physical, mental and social well-being, not just the absence of disease or infirmity.” This re-definition of health marks a change in the medical model, so that health is no longer limited to biology but also linked with social, psychological, spiritual, environmental and other factors. However, this definition does not interpret the objective indicators of health in an adequate manner. In the World Health Survey (WHS), the World Health Organization’s health survey team proposed a number of operational indicators to measure health, emphasizing a standardized measurement of health [48]. There is no uniform scale to measure health, and it often differs according to sex, occupation, families, communities, and socioeconomic groups. But in general, health refers to mental and physical functions.

Individual health status in SAGE is assessed through a single overall general self-reported health question as well as through self-evaluation of eight health domains: mobility, self-care, pain and discomfort, cognition, interpersonal activity, sleep and energy, affect, and vision. The survey also includes assessment of functioning using 12 questions from the WHO Disability Assessment Schedule-II (WHODAS II) [49]. The WHODAS II focuses on six areas of activity and produces an overall disability score that can be used to identify health needs, determine needed interventions, identify changes in physical function over time, and evaluate the clinical effects of treatment [50]. A fuller set of activities of daily living (ADLs) and instrumental activities of daily life (IADLs) are also included because they are widely used in surveys and studies of older populations.

To begin to better understand subjective self-reported health status, SAGE used anchoring vignettes as a method of improving comparability of self-reported measures. A vignette is a description of a hypothetical

person doing a particular activity, and respondents were asked to rate the condition and experience of the person in the vignette story as if the condition and experience were the respondent’s own. Five vignettes were available for each of the eight health domains.

SAGE also used performance test results for cross-validation of the anchoring vignette strategy, and as independent tests for improving understanding of self-reported health. Analyses of vignette and performance test results will be published in subsequent thematic reports. A description of each health measure, along with results, follows. A summary comparison of scores is provided in the last figure in Section 6.

### 6.1 Self reported general health state

#### 6.1.1 Self-reported overall general health

Self-reported general health status in epidemiological surveys has been well studied and applied, and has been shown to be an important indicator for many health and health-related issues. SAGE asked respondents for their overall assessment of general health using a single question, as well as a set of questions about health states in specific domains. Five response categories were used: very good, good, moderate, bad, and very bad.

The distribution of overall general self-reported health (as a single question) by selected characteristics is shown in Table 6.1.1 for people aged 50-plus. Somewhat less than half (45.2%) of all respondents reported a moderate level of health, 30.4% said good, and 19.0% said bad. Very small proportions reported either of the extreme categories. Men were more apt than women to rate health status as good or very good, and the rural population was more likely than their urban counterparts to report bad or very bad health. Increasing age was associated with poorer self-reported health.

**Table 6.1.1** Distribution of respondent ratings of overall general health by selected characteristics

Characteristics	(%)					No. of respondents
	Very good	Good	Moderate	Bad	Very bad	
<b>Sex</b>						
Male	4.0	33.5	44.0	16.9	1.7	6,458
Female	2.6	27.4	46.3	21.2	2.6	6,526
<b>Total</b>	<b>3.3</b>	<b>30.4</b>	<b>45.2</b>	<b>19.0</b>	<b>2.2</b>	<b>12,984</b>
<b>Residence</b>						
Urban	3.4	30.7	50.8	13.7	1.3	6,172
Rural	3.1	30.1	40.1	23.9	2.9	6,812
<b>Total</b>	<b>3.3</b>	<b>30.4</b>	<b>45.2</b>	<b>19.0</b>	<b>2.2</b>	<b>12,984</b>
<b>Age group</b>						
50-59	4.9	35.6	42.7	15.7	1.2	5,867
60-69	2.2	29.6	46.2	19.7	2.4	4,147
70-79	1.4	21.0	49.8	24.5	3.3	2,409
80+	1.7	22.6	44.1	25.7	5.8	560
<b>Total</b>	<b>3.3</b>	<b>30.4</b>	<b>45.2</b>	<b>19.0</b>	<b>2.2</b>	<b>12,984</b>
<b>Marital status</b>						
Never married	2.1	23.6	43.2	27.6	3.4	127
Currently married	3.5	31.6	45.2	17.8	2.0	11,057
Cohabiting	0.0	21.1	47.6	31.4	0.0	28
Separated/divorced	4.8	29.3	43.8	17.5	4.6	203
Widowed	1.6	22.8	45.7	26.7	3.2	1,565
<b>Total</b>	<b>3.3</b>	<b>30.4</b>	<b>45.2</b>	<b>19.0</b>	<b>2.2</b>	<b>12,979</b>
<b>Income quintile</b>						
Lowest	1.2	21.1	44.4	29.2	4.2	2,085
Second	1.9	28.6	42.6	24.2	2.7	2,330
Middle	3.4	29.0	45.6	19.9	2.2	2,638
Fourth	3.6	32.5	46.0	16.4	1.5	3,037
Highest	5.4	38.1	46.5	9.1	1.0	2,832
<b>Total</b>	<b>3.3</b>	<b>30.5</b>	<b>45.1</b>	<b>19.0</b>	<b>2.2</b>	<b>12,923</b>

Married people in many societies report better health than do non-married people, and this is seen in the SAGE China data as well. The proportion of widowed people considering their health to be good or very good was relatively low. Household income quintile is positively related to health; respondents in the highest income group were twice as likely to report good or very good health compared with people in the lowest quintile. Conversely, respondents in the lowest income group were more than three times as likely as those in the highest group to indicate bad or very bad health.

## 6.1.2 Self-reported difficulty with work or household activities

Respondents were asked about the degree of difficulty with work and household activities in the last 30 days. A description of difficulty was provided to respondents, where “difficulty” is compared to what the respondent perceives as normal conditions. The degree of difficulty is divided into five grades: none; mild; moderate; severe; and extreme. Six in 10 people reported that they had no difficulty with work or household activities, and

**Table 6.1.2** Distribution of difficulty with work or household activities by selected characteristics

Characteristics	(%)					No. of respondents
	None	Mild	Moderate	Severe	Extreme	
<b>Sex</b>						
Male	64.6	22.9	9.3	2.6	0.6	6,443
Female	57.6	28.3	10.9	2.7	0.5	6,510
<b>Total</b>	<b>61.0</b>	<b>25.6</b>	<b>10.1</b>	<b>2.7</b>	<b>0.5</b>	<b>12,953</b>
<b>Residence</b>						
Urban	72.1	20.2	5.8	1.6	0.3	6,157
Rural	51.0	30.5	14.1	3.6	0.8	6,796
<b>Total</b>	<b>61.0</b>	<b>25.6</b>	<b>10.1</b>	<b>2.7</b>	<b>0.5</b>	<b>12,953</b>
<b>Age group</b>						
50-59	70.7	20.9	6.8	1.3	0.3	5,849
60-69	60.4	26.5	10.3	2.4	0.4	4,143
70-79	45.7	33.6	15.0	4.9	0.9	2,404
80+	30.2	34.1	23.4	9.4	2.9	557
<b>Total</b>	<b>61.0</b>	<b>25.6</b>	<b>10.1</b>	<b>2.7</b>	<b>0.5</b>	<b>12,953</b>
<b>Marital status</b>						
Never married	46.3	28.6	21.6	3.6	0.0	127
Currently married	63.4	24.7	9.1	2.4	0.5	11,030
Cohabiting	49.8	40.7	0.0	0.0	9.6	28
Separated/divorced	64.2	25.0	8.1	1.9	0.8	203
Widowed	45.2	31.8	17.2	4.9	0.9	1,561
<b>Total</b>	<b>61.0</b>	<b>25.6</b>	<b>10.1</b>	<b>2.7</b>	<b>0.5</b>	<b>12,949</b>
<b>Income quintile</b>						
Lowest	41.1	35.0	17.6	5.2	1.2	2,082
Second	53.3	29.4	12.9	3.8	0.6	2,325
Middle	59.4	27.9	9.5	2.7	0.5	2,629
Fourth	65.6	23.8	8.3	1.8	0.5	3,028
Highest	79.6	15.5	4.0	0.9	0.1	2,828
<b>Total</b>	<b>61.2</b>	<b>25.6</b>	<b>10.0</b>	<b>2.7</b>	<b>0.5</b>	<b>12,892</b>

one-quarter reported mild difficulty. Another 10% indicated moderate difficulty, while only about 3% of respondents said they had severe or extreme difficulty (Table 6.1.2). Men were less likely than women to report difficulty, and there was a steep decline with age in the proportion of persons experiencing no difficulty.

There was a large difference in difficulty by area of residence. The proportion of rural population without any difficulties was considerably lower than in urban areas, and as difficulty reached a deeper level, the rela-

tive difference between the rural and urban population increased. The ratio of mild difficulties in rural areas was 1.5 times as great as that in urban areas, 2.4 times for moderate difficulty, 2.3 times for severe difficulty, and 2.7 times for extreme difficulty. Among respondents of different marital status, married people and those who were separated or divorced were significantly more likely than others to be without difficulty. The share of respondents without difficulty rose steadily with increasing income, while the proportion fell with increasing income for each of the grades of difficulty.

**Table 6.2** Mean health scores by selected characteristics

Characteristics	Health score	
	Mean	No. of respondents
<b>Sex</b>		
Male	70.0	6,467
Female	65.7	6,528
<b>Total</b>	<b>67.9</b>	<b>12,995</b>
<b>Residence</b>		
Urban	70.7	6,179
Rural	65.3	6,816
<b>Total</b>	<b>67.9</b>	<b>12,995</b>
<b>Age group</b>		
50-59	72.4	5,873
60-69	66.8	4,152
70-79	61.5	2,410
80+	55.4	560
<b>Total</b>	<b>67.9</b>	<b>12,995</b>
<b>Education</b>		
No formal education	61.3	2,892
Less than primary	65.5	2,487
Primary school completed	68.1	2,763
Secondary school completed	71.3	2,603
High school completed	74.1	1,659
College completed	76.1	584
Post-graduate degree completed	78.7	7
<b>Total</b>	<b>67.9</b>	<b>12,995</b>
<b>Marital status</b>		
Never married	63.1	131
Currently married	68.9	11,064
Cohabiting	64.2	28
Separated/divorced	67.8	203
Widowed	61.1	1,565
<b>Total</b>	<b>67.9</b>	<b>12,991</b>
<b>Income quintile</b>		
Lowest	61.4	2,088
Second	64.8	2,336
Middle	66.5	2,639
Fourth	69.0	3,036
Highest	75.5	2,834
<b>Total</b>	<b>67.9</b>	<b>12,934</b>

## 6.2 Composite health score

SAGE used WHO's approach to measuring health, based on a multi-dimensional construct, and can be viewed as a point of comparison with the single question on overall self-reported general health. Respondents were asked their situation in the past 30 days with regard to 16 survey items in eight areas of health, including mobility, self-care, pain and discomfort, cognition, interpersonal activities, sleep and energy, affect, and vision. An individual's health score was then calculated based on responses to the 16 questions and a composite score generated using item response theory [51]. The health score ranged from 0 (indicating worst health) to 100 (best health).

The health score for all respondents as a whole was 67.9. Men scored 4.3 points higher than women, and the urban population scored 5.4 points higher than the rural population (Table 6.2). The health score decreased as the age of respondents increased, and the score increased steadily with increasing levels of education. A similar upward trend was observed from lowest to highest income quintile. Married people scored higher than widowed people.

## 6.3 Functioning and health

Functional assessment is an important aspect of health evaluation. To assess functioning, SAGE used the 12-item WHO Disability Assessment Schedule (WHODAS) version 2, which covers a number of the typical ADLs and IADLs). Activities of daily living is a term used to refer to daily self-care activities within an individual's place of residence or in outdoor environments. ADLs are considered more basic activities, such as eating, bathing and toileting. IADLs identify the ability to complete more complex activities, such as heavy housework, laundry, cooking, buying daily necessities, travelling, financial management and phone calls.

### 6.3.1 WHODAS score

WHODAS II provides a well validated assessment of overall functioning or disability [49]. A respondent is asked about the level of difficulty experienced with daily activities. A single score is generated through summing the responses to the 12 questions and then standardizing the raw score to a 0-100 scale with a higher WHODAS score reflecting worse overall functioning or higher disability.

The survey results of the WHODAS score are shown in Table 6.3.1. The average score of respondents aged 50-plus was 8.9, indicating high functioning or low levels of disability. Overall, WHODAS scores were lower in China than in the other five SAGE countries. Among respondents of different characteristics, WHODAS score results followed the same patterns as seen in the composite health state score in general. WHODAS scores were lower among men than that among women, indicating lower levels of disability. Urban populations had less disability than rural populations, with disability increasing with increasing age. The WHODAS score was lower in higher levels of education suggesting higher disability for those with lower education levels. Disability was lower in married respondents and in higher income quintiles.

### 6.3.2 ADL deficiency

A deficiency in one ADL indicates some difficulty, some level of disability in daily life. Deficiencies in two ADLs suggest higher levels of disability and the need for assistance. The overall proportion of respondents without any major limitations in ADLs was 87.1%. Another 6.8% had some difficulty (1 ADL), and 6.2% had serious difficulties (2+ ADLs) that required assistance from other people (Table 6.3.2). Women were more likely than men to have some or serious ADL difficulty, as were people living in rural versus urban areas. The proportion of respondents with some or serious ADL problems increased with age; nearly one-quarter of people aged 80-plus years reported serious ADL difficulties.

Level of education was associated with ADL limitation. While 77% of respondents without formal education reported no ADL limitation, this figure increased steadily with educational level, to 98% among the college educated. A similar pattern was observed for income quintiles, wherein people in the lowest income group were most likely to have ADL problems and those in successively higher group were less likely.

### 6.3.3 IADL deficiency

The percentage of persons with IADL deficiencies by selected characteristics is shown in Table 6.3.3. The overwhelming majority of surveyed people, 96.4%, said that they had no IADL difficulties. About 2% of respondents said they had difficulty with one IADL, and an equal percentage reported having difficulty

**Table 6.3.1 Mean WHODAS scores by selected characteristics**

Characteristics	WHODAS score	
	Mean	No. of respondents
<b>Sex</b>		
Male	7.7	6,546
Female	10.1	6,611
<b>Total</b>	<b>8.9</b>	<b>13,157</b>
<b>Residence</b>		
Urban	6.9	6,230
Rural	10.7	6,928
<b>Total</b>	<b>8.9</b>	<b>13,158</b>
<b>Age group</b>		
50-59	5.6	5,912
60-69	8.6	4,192
70-79	14.2	2,447
80+	22.0	606
<b>Total</b>	<b>8.9</b>	<b>13,157</b>
<b>Education</b>		
No formal education	14.3	3,037
Less than primary	9.6	2,492
Primary school completed	8.1	2,766
Secondary school completed	6.3	2,612
High school completed	5.1	1,660
College completed	3.7	585
Post-graduate degree completed	1.5	7
<b>Total</b>	<b>8.9</b>	<b>13,158</b>
<b>Marital status</b>		
Never married	10.3	148
Currently married	8.0	11,156
Cohabiting	14.7	28
Separated/divorced	8.3	204
Widowed	14.7	1,616
<b>Total</b>	<b>8.9</b>	<b>13,152</b>
<b>Income quintile</b>		
Lowest	14.2	2,131
Second	10.8	2,374
Middle	9.1	2,684
Fourth	7.5	3,059
Highest	4.3	2,849
<b>Total</b>	<b>8.9</b>	<b>13,097</b>

**Table 6.3.2** Distribution of ADL deficiencies by selected characteristics

Characteristics	% with ADL deficiency			No. of respondents
	0	1	2+	
<b>Sex</b>				
Male	89.6	5.3	5.1	6,455
Female	84.6	8.2	7.2	6,512
All	87.1	6.8	6.2	12,968
<b>Residence</b>				
Urban	92.9	3.6	3.5	6,159
Rural	81.8	9.6	8.5	6,809
All	87.1	6.8	6.2	12,968
<b>Age group</b>				
50-59	92.7	4.6	2.7	5,861
60-69	87.2	7.1	5.7	4,145
70-79	79.2	9.4	11.4	2,402
80+	60.9	15.5	23.6	560
All	87.1	6.8	6.2	12,968
<b>Education</b>				
No formal education	77.2	10.4	12.4	2,891
Less than primary	85.5	8.2	6.3	2,481
Primary school completed	87.9	6.4	5.7	2,759
Secondary school completed	91.6	4.8	3.6	2,593
High school completed	94.4	3.9	1.7	1,655
College completed	97.7	1.4	0.9	582
Post-graduate degree completed	100.0	0.0	0.0	7
All	87.1	6.8	6.2	12,968
<b>Marital status</b>				
Never married	87.1	4.5	8.4	127
Currently married	88.4	6.3	5.3	11,050
Cohabiting	77.3	6.3	16.4	28
Separated/divorced	88.7	6.2	5.0	202
Widowed	77.9	10.1	12.0	1,557
All	87.1	6.8	6.2	12,963
<b>Income quintile</b>				
Lowest	79.8	9.6	10.5	2,086
Second	83.5	7.7	8.8	2,326
Middle	86.0	7.5	6.5	2,635
Fourth	88.9	6.4	4.7	3,028
Highest	95.6	2.9	1.5	2,831
All	87.3	6.6	6.1	12,907
<b>Total</b>	<b>87.1</b>	<b>6.8</b>	<b>6.2</b>	<b>12,968</b>

Note: 0 means no disability; 1 means having some disability; 2+ means having considerable disability and dependency.

**Table 6.3.3** Distribution of IADL deficiencies by selected characteristics

Characteristics	% with IADL deficiency			No. of respondents
	0	1	2+	
<b>Sex</b>				
Male	97.1	1.3	1.6	6,448
Female	95.8	2.3	1.9	6,510
All	96.4	1.8	1.8	12,957
<b>Residence</b>				
Urban	97.2	1.4	1.4	6,152
Rural	95.7	2.2	2.1	6,805
All	96.4	1.8	1.8	12,957
<b>Age group</b>				
50-59	98.7	0.9	0.5	5,859
60-69	97.0	1.6	1.4	4,140
70-79	93.4	3.2	3.5	2,399
80+	81.5	7.8	10.7	559
All	96.4	1.8	1.8	12,957
<b>Education</b>				
No formal education	92.2	3.9	3.9	2,888
Less than primary	97.3	1.4	1.3	2,481
Primary school completed	97.4	1.3	1.4	2,757
Secondary school completed	97.7	1.1	1.2	2,588
High school completed	97.9	1.3	0.7	1,654
College completed	98.9	0.4	0.7	582
Post-graduate degree completed	100.0	0.0	0.0	7
All	96.4	1.8	1.8	12,957
<b>Marital status</b>				
Never married	90.0	3.8	6.2	127
Currently married	97.2	1.5	1.3	11,039
Cohabiting	90.4	0.0	9.6	28
Separated/divorced	96.7	1.9	1.4	202
Widowed	91.3	4.2	4.5	1,557
All	96.4	1.8	1.8	12,953
<b>Income quintile</b>				
Lowest	93.1	3.5	3.3	2,082
Second	95.0	2.6	2.5	2,321
Middle	96.6	1.6	1.7	2,635
Fourth	97.4	1.2	1.4	3,028
Highest	98.8	0.8	0.4	2,829
All	96.4	1.8	1.8	12,896
<b>Total</b>	<b>96.4</b>	<b>1.8</b>	<b>1.8</b>	<b>12,957</b>

Note: 0 means no problem; 1 means having some problem; 2+ means having problem and needing help.

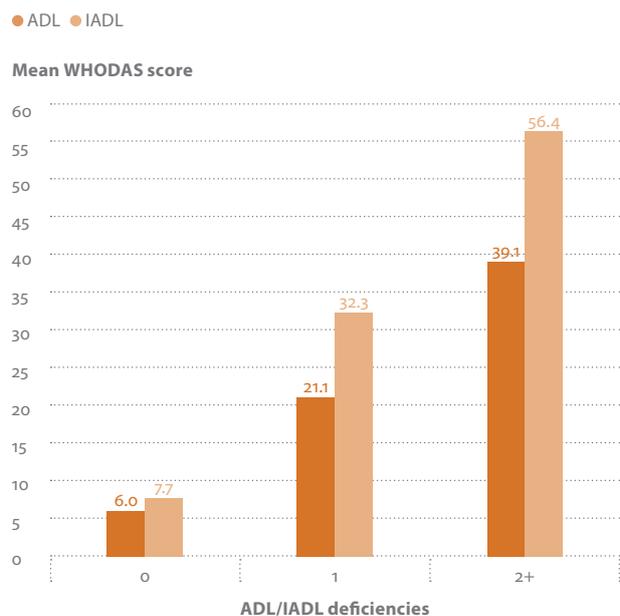


with two or more IADLs. Differences by sex and by urban/rural residence were very small. As was the case with ADLs, the proportion of people with IADL difficulty increased with age, although to a lesser extent than for ADL difficulty. There were consistent but slight gradients in IADL limitations both by educational and income levels, and married people scored better than other marital status categories.

### 6.3.4 WHODAS score and ADL/IADL level

The association between WHODAS score and ADL/IADL deficiencies is shown in Figure 6.1. As expected, these measures move in the same direction. When the ADL level was 0, denoting the absence of ADL difficulties, the WHODAS score was 6.0. When the ADL level was 2+, indicating serious difficulty and the need for help, the WHODAS score rose to 39.1. Similarly, when the IADL level was 2+, the WHODAS score was 56.4, more than 6 times as high as when the IADL level was 0.

**Figure 6.1** WHODAS score by ADL/IADL deficiencies





## 7. Chronic conditions

### Introduction

Social and economic developments, accompanied by population aging, have produced major changes in global disease patterns. Chronic, non-communicable conditions such as cardiovascular disease, stroke, cancer, diabetes and other diseases have become an increasingly serious global public health problem. Chronic diseases have replaced infectious diseases as the leading cause of death in both developed and developing countries. Contrary to popular belief, available data demonstrate that nearly 80% of NCD deaths occur in low- and middle- income countries. In 2008, of the 57 million deaths that occurred globally, 36 million – almost two thirds – were due to NCDs, comprising mainly cardiovascular diseases, cancers, diabetes and chronic lung diseases [52]. In most countries, a rising incidence of chronic disease is increasing national disease burdens, and the treatment of chronic diseases is consuming a growing share of health resources. Acknowledging the pressing health issue, the United Nations held the high-level meeting on the prevention and control of non-communicable diseases in September 2011, to create a sustained global move-

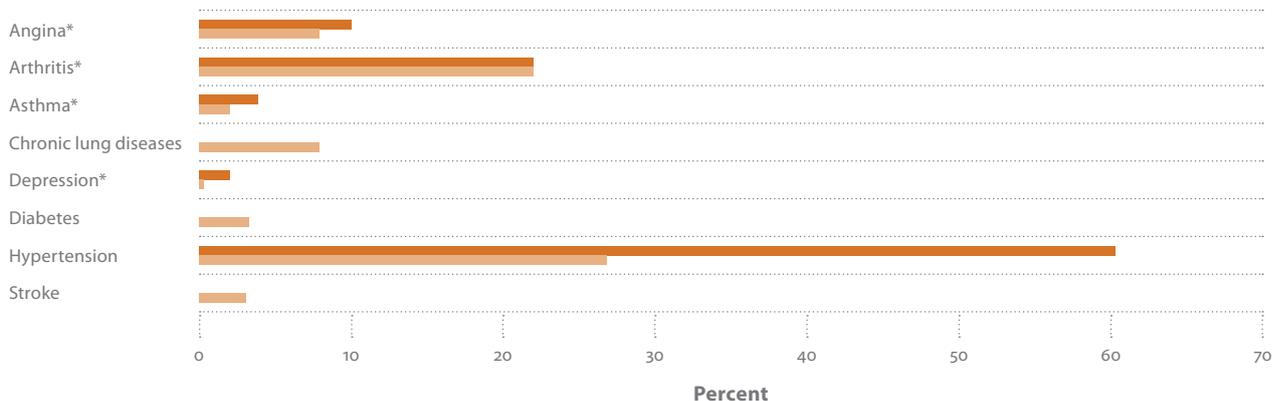
ment to address NCDs [53]. In this light, better knowledge of the prevalence and distribution of common chronic diseases is essential for improved population health and the solvency of health care systems.

SAGE gathered evidence on a range of chronic diseases that contribute to a large portion of the disease burden from NCDs prevalent among older adults. The specific conditions included arthritis, stroke, angina, diabetes, asthma, depression, chronic lung disease, hypertension and edentulism. Questions about injuries and any lasting impacts were included, as well as issues of health coverage and preventive services using indicator conditions such as surgical treatment for cataracts and screening for cervical and breast cancer.

The information gathered also helps to determine how many people are potentially in need of certain health interventions. Respondents who reported a condition were asked about receipt of treatment: on current therapy was considered those on treatment in the two weeks prior to interview; and, respondents on chronic ongoing therapy would have been receiving therapy over the 12 months prior to interview.

**Figure 7.1** Prevalence of chronic conditions by symptom reporting and self-report

● Prevalence by symptom reporting ● Prevalence by self-report



\* These four conditions have validated symptom-reporting + algorithm to generate prevalence.

In an effort to improve prevalence estimates based on self-report, SAGE also used validated symptom-reporting methods to estimate prevalence rates for angina, arthritis, asthma and depression. The set of validated symptom-based questions and related algorithms to estimate prevalence were tested in the 2003 WHO Diagnostic Item Probability Study and subsequently implemented in SAGE [54].

## 7.1 Chronic conditions

Figure 7.1 shows the self-reported prevalence rate and the symptom-based prevalence rate of several chronic diseases investigated in the survey. In addition to self-report, objective measures were used for certain conditions: blood pressure was measured to assess accuracy of hypertension reporting; blood samples were analyzed for gly-

**Table 7.1.1** Prevalence of arthritis and therapy by selected characteristics

Characteristics	Self-reported		Symptom-based		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N	Percent	N
<b>Sex</b>								
Male	17.6	6460	16.1	6379	41.1	1019	67.2	1020
Female	26.3	6525	24.7	6448	43.62	1579	66.2	1576
<b>Total</b>	<b>22.0</b>	<b>12985</b>	<b>20.4</b>	<b>12828</b>	<b>42.64</b>	<b>2598</b>	<b>66.6</b>	<b>2596</b>
<b>Age group</b>								
50-59	17.8	5874	17.3	5799	38.4	986	63.3	987
60-69	24.8	4145	22.5	4096	43.8	917	69.8	917
70-79	26.7	2406	24.0	2379	45.5	568	66.7	565
80+	25.5	560	22.8	553	53.8	126	68.3	126
<b>Total</b>	<b>22.0</b>	<b>12985</b>	<b>20.4</b>	<b>12828</b>	<b>42.6</b>	<b>2598</b>	<b>66.6</b>	<b>2596</b>
<b>Residence</b>								
Urban	24.6	6170	21.3	6093	46.2	1289	70.8	1288
Rural	19.6	6816	19.7	6735	39.2	1309	62.4	1308
<b>Total</b>	<b>22.0</b>	<b>12985</b>	<b>20.4</b>	<b>12828</b>	<b>42.6</b>	<b>2598</b>	<b>66.6</b>	<b>2596</b>
<b>Marital status</b>								
Never married	22.1	131	19.1	129	55.3	25	76.9	25
Currently married	21.4	11055	19.7	10922	42.3	2137	66.6	2135
Cohabiting	17.8	28	16.5	26	33.2	4	56.5	4
Separated/divorced	21.8	203	19.0	201	31.3	37	63.6	37
Widowed	26.1	1564	25.7	1546	45.2	393	66.3	393
<b>Total</b>	<b>22.0</b>	<b>12981</b>	<b>20.4</b>	<b>12823</b>	<b>42.6</b>	<b>2596</b>	<b>66.6</b>	<b>2594</b>
<b>Income quintile</b>								
Lowest	21.7	2086	22.2	2057	41.7	453	64.5	453
Second	22.9	2338	22.0	2317	44.3	507	66.3	507
Middle	21.9	2638	21.1	2609	41.3	541	65.4	539
Fourth	21.9	3033	20.7	2990	45.3	611	68.9	611
Highest	21.8	2828	16.6	2797	42.0	459	70.5	459
<b>Total</b>	<b>22.0</b>	<b>12924</b>	<b>20.4</b>	<b>12771</b>	<b>42.6</b>	<b>2571</b>	<b>66.6</b>	<b>2569</b>

cosylated hemoglobin, a test used to diagnose diabetes; and, spirometry was used to assess chronic lung disease.

Hypertension was the most prevalent condition, by both self-report (26.8%) and measurement (60.3%), followed by arthritis, angina and chronic lung disease. Depression was the least prevalent of the conditions, by self-report (0.3%) and symptom-based report (2%).

## 7.1.1 Arthritis

Table 7.1.1 shows the self-reported and symptom-reported prevalence rates of arthritis, and current as well as chronic ongoing therapy rates by various respondent characteristics. Among respondents aged 50-plus, the self-reported and the symptom-based prevalence rates were identical?, 22.0% and 20.4%. The current therapy

**Table 7.1.2** Prevalence of stroke and therapy by selected characteristics

Characteristics	Self-reported		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N
<b>Sex</b>						
Male	3.5	6454	57.9	209	69.3	207
Female	2.6	6519	62.9	163	72.8	162
<b>Total</b>	<b>3.1</b>	<b>12974</b>	<b>60.1</b>	<b>372</b>	<b>70.8</b>	<b>369</b>
<b>Age group</b>						
50-59	1.5	5865	58.2	75	71.9	75
60-69	3.4	4144	59.0	137	68.3	137
70-79	5.3	2405	62.7	124	72.2	121
80+	7.1	559	58.9	36	73.2	36
<b>Total</b>	<b>3.1</b>	<b>12974</b>	<b>60.1</b>	<b>372</b>	<b>70.8</b>	<b>369</b>
<b>Residence</b>						
Urban	3.7	6165	64.6	226	72.5	223
Rural	2.4	6808	53.0	146	68.2	146
<b>Total</b>	<b>3.1</b>	<b>12974</b>	<b>60.1</b>	<b>372</b>	<b>70.8</b>	<b>369</b>
<b>Marital status</b>						
Never married	3.2	131	56.0	4	56.0	4
Currently married	2.9	11046	61.0	300	72.7	298
Cohabiting	1.8	28	100.0	0	100.0	0
Separated/divorced	2.3	203	57.2	5	57.2	5
Widowed	4.0	1562	56.0	63	63.9	61
<b>Total</b>	<b>3.1</b>	<b>12974</b>	<b>60.1</b>	<b>372</b>	<b>70.8</b>	<b>369</b>
<b>Income quintile</b>						
Lowest	3.2	2083	56.3	66	64.1	66
Second	3.1	2338	69.9	68	84.7	68
Middle	3.2	2636	62.5	83	78.3	82
Fourth	3.5	3031	57.5	93	60.8	91
Highest	2.3	2825	53.3	60	66.8	60
<b>Total</b>	<b>3.1</b>	<b>12913</b>	<b>60.1</b>	<b>371</b>	<b>70.8</b>	<b>368</b>

rate was 42.6% and the chronic ongoing therapy rate 66.6%. Both the self-reported and symptom-based prevalence rates were higher for women than for men, and higher in urban than in rural areas. Both rates rose with respondent age, but decreased slightly among respondents aged 80-plus.

The current therapy rate increased with age, but there were only minor age differences in chronic ongoing therapy. The chronic ongoing treatment rate among rural respondents (62%) was lower than among urban respondents (70.8%). The self-reported (26.1%) and

symptom-based prevalence (25.7%) rates among widowed respondents were higher than for other marital statuses. The self-reported rate differed little by income quintile, but the symptom-based rate decreased as income levels increased, possibly influenced by the financial means to address symptoms.

## 7.1.2 Stroke

Among respondents aged 50-plus, the self-reported prevalence rate of stroke was 3.1% (Table 7.1.2). The cur-

**Table 7.1.3** Prevalence of angina and therapy by selected characteristics

Characteristics	Self-reported		Symptom-based		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N	Percent	N
<b>Sex</b>								
Male	5.9	6445	6.9	5299	61.2	357	78.1	357
Female	9.9	6508	13.1	5068	60.9	660	78.6	660
<b>Total</b>	<b>7.9</b>	<b>12953</b>	<b>10.0</b>	<b>10367</b>	<b>61.0</b>	<b>1017</b>	<b>78.4</b>	<b>1018</b>
<b>Age group</b>								
50-59	4.4	5856	5.6	4913	51.7	269	72.1	272
60-69	9.0	4136	10.9	3321	59.2	358	77.0	358
70-79	13.1	2401	17.5	1761	68.3	307	83.1	305
80+	14.5	559	23.1	372	72.6	83	87.7	83
<b>Total</b>	<b>7.9</b>	<b>12953</b>	<b>10.0</b>	<b>10367</b>	<b>61.0</b>	<b>1017</b>	<b>78.4</b>	<b>1018</b>
<b>Residence</b>								
Urban	10.0	6159	12.3	4764	70.5	579	85.5	577
Rural	6.1	6794	8.0	5602	48.5	438	69.2	440
<b>Total</b>	<b>7.9</b>	<b>12953</b>	<b>10.0</b>	<b>10367</b>	<b>61.0</b>	<b>1017</b>	<b>78.4</b>	<b>1018</b>
<b>Marital status</b>								
Never married	2.8	130	1.4	91	0.0	1	28.2	1
Currently married	7.6	11030	9.5	8943	60.1	833	78.2	833
Cohabiting	1.9	28	3.3	16	100.0	1	100.0	1
Separated/divorced	8.0	203	7.0	161	70.2	11	100.0	11
Widowed	10.9	1559	14.8	1153	65.3	171	78.4	171
<b>Total</b>	<b>7.9</b>	<b>12949</b>	<b>10.0</b>	<b>10365</b>	<b>61.0</b>	<b>1017</b>	<b>78.4</b>	<b>1018</b>
<b>Income quintile</b>								
Lowest	7.1	2080	11.3	1551	50.2	175	65.6	175
Second	8.5	2333	11.3	1823	54.0	202	78.1	203
Middle	9.1	2636	11.1	2102	58.7	231	78.9	233
Fourth	7.5	3022	8.7	2467	66.1	213	83.1	212
Highest	7.5	2823	8.2	2366	76.8	188	86.4	188
<b>Total</b>	<b>7.9</b>	<b>12894</b>	<b>10.0</b>	<b>10309</b>	<b>61.0</b>	<b>1009</b>	<b>78.4</b>	<b>1010</b>

rent therapy rate was 60.0%, and the chronic ongoing therapy rate was 70.8%. Male self-reported prevalence (3.5%) was higher than for women (2.6%), whereas the current and ongoing therapy rates were both lower among men. The self-reported rate rose with age, and was somewhat higher among urban (3.7%) than among rural respondents (2.4%). Both the current and chronic ongoing therapy rates among rural respondents were lower than in urban areas. The self-reported rate among widowed respondents was higher (4.0%) than for other marital statuses, while the self-reported rate (2.3%) was lowest among respondents in the highest income quintile.

### 7.1.3 Angina

The self-reported prevalence rate of angina was 7.9% and the symptom-based prevalence rate 10.0%. The current therapy rate was 61.0% and the chronic ongoing therapy rate 78.4% (Table 7.1.3). Female self-reported and symptom-based prevalence rates were both higher than for men, and these rates also were higher in urban compared with rural areas. Increasing age was associated with a rise in both the self-reported and symptom rates, as well as a rise in current and chronic ongoing therapy. The current and ongoing

**Table 7.1.4** Prevalence of diabetes and therapy by selected characteristics

Characteristics	Self-reported		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N
<b>Sex</b>						
Male	5.7	6446	80.6	361	81.7	356
Female	7.5	6512	83.2	480	86.4	476
<b>Total</b>	<b>6.6</b>	<b>12958</b>	<b>82.1</b>	<b>841</b>	<b>84.4</b>	<b>832</b>
<b>Age group</b>						
50-59	4.2	5860	77.7	247	79.6	246
60-69	8.0	4140	83.5	324	86.4	322
70-79	9.7	2401	83.7	228	85.3	222
80+	7.7	558	88.0	43	91.8	42
<b>Total</b>	<b>6.6</b>	<b>12958</b>	<b>82.1</b>	<b>841</b>	<b>84.4</b>	<b>832</b>
<b>Residence</b>						
Urban	10.3	6156	84.1	629	86.0	620
Rural	3.2	6802	76.1	212	79.7	213
<b>Total</b>	<b>6.6</b>	<b>12958</b>	<b>82.1</b>	<b>841</b>	<b>84.4</b>	<b>832</b>
<b>Marital status</b>						
Never married	4.2	130	58.6	5	58.6	5
Currently married	6.5	11037	81.6	708	84.2	703
Cohabiting	8.4	28	100.0	2	100.0	2
Separated/divorced	3.1	202	72.5	6	72.5	6
Widowed	7.7	1558	86.0	119	86.7	115
<b>Total</b>	<b>6.6</b>	<b>12954</b>	<b>82.1</b>	<b>841</b>	<b>84.4</b>	<b>832</b>
<b>Income quintile</b>						
Lowest	2.9	2080	80.3	59	82.2	59
Second	5.2	2335	83.3	119	87.7	118
Middle	7.1	2629	79.6	184	82.0	183
Fourth	7.3	3030	80.6	218	82.9	217
Highest	9.3	2823	84.6	255	85.9	250
<b>Total</b>	<b>6.6</b>	<b>12897</b>	<b>82.1</b>	<b>835</b>	<b>84.4</b>	<b>827</b>

chronic therapy rates among rural respondents were both lower than among urban respondents. Widowed respondents had the highest self-reported (10.9%) and symptom-based prevalence (14.8%) rates. Among respondents with different income levels, the symptom rate decreased as income level increased. The current therapy rate was highest among respondents in the highest income quintile.

## 7.1.4 Diabetes

The self-reported prevalence rate of diabetes was 6.6%, with a current therapy rate of 82.1% and a chronic ongoing therapy rate of 84.4% (Table 7.1.4). Men reported a lower rate (5.7%) than did women (7.5%), and also had lower current and ongoing therapy rates. Self-reported prevalence rose with age until the oldest age category, and the current and chronic ongoing therapy rates

**Table 7.1.5** Prevalence of asthma and therapy by selected characteristics

Characteristics	Self-reported		Symptom-based		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N	Percent	N
<b>Sex</b>								
Male	2.1	6437	4.1	6374	24.3	258	34.0	259
Female	1.9	6505	3.8	6449	21.5	235	34.7	235
<b>Total</b>	<b>2.0</b>	<b>12942</b>	<b>3.9</b>	<b>12823</b>	<b>23.0</b>	<b>493</b>	<b>34.3</b>	<b>494</b>
<b>Age group</b>								
50-59	1.1	5850	2.3	5806	18.6	132	28.5	134
60-69	2.2	4132	4.2	4092	23.3	165	34.5	165
70-79	3.5	2402	6.4	2377	26.9	148	42.0	148
80+	3.0	558	8.7	547	21.7	47	26.1	47
<b>Total</b>	<b>2.0</b>	<b>12942</b>	<b>3.9</b>	<b>12823</b>	<b>23.0</b>	<b>493</b>	<b>34.3</b>	<b>494</b>
<b>Residence</b>								
Urban	2.5	6148	4.3	6075	25.0	256	40.2	258
Rural	1.5	6794	3.6	6748	20.8	236	27.9	236
<b>Total</b>	<b>2.0</b>	<b>12942</b>	<b>3.9</b>	<b>12823</b>	<b>23.0</b>	<b>493</b>	<b>34.3</b>	<b>494</b>
<b>Marital status</b>								
Never married	0.0	130	2.3	127	0	3	0	3
Currently married	1.8	11019	3.6	10923	23.9	382	34.0	384
Cohabiting	0.0	28	1.9	28	0	1	0	1
Separated/divorced	2.0	201	3.7	197	20.1	7	50.8	7
Widowed	3.1	1560	6.6	1543	20.4	98	35.7	98
<b>Total</b>	<b>2.0</b>	<b>12938</b>	<b>3.9</b>	<b>12819</b>	<b>23.0</b>	<b>491</b>	<b>34.3</b>	<b>493</b>
<b>Income quintile</b>								
Lowest	2.8	2079	6.3	2066	22.9	129	33.0	129
Second	1.9	2333	4.4	2305	27.3	98	32.6	98
Middle	2.6	2630	4.5	2604	27.4	115	38.5	115
Fourth	1.3	3022	3.0	2993	20.8	89	29.4	89
Highest	1.5	2817	2.1	2797	11.5	58	38.5	59
<b>Total</b>	<b>2.0</b>	<b>12881</b>	<b>3.9</b>	<b>12764</b>	<b>23.0</b>	<b>489</b>	<b>34.3</b>	<b>491</b>

also tended to rise with age. The self-reported prevalence rate for urban respondents (10.3%) was three times as high as that for rural respondents (3.2%), and current and ongoing therapy rates also were higher in urban areas. The self-reported rate rose as income quintile increased.

## 7.1.5 Asthma

Table 7.1.5 shows self-reported and symptom-based prevalence rates of asthma as well as current and chronic ongoing therapy rates. For respondents as a whole, the self-reported prevalence rate of asthma was 2.0%, the symptom-reporting rate 3.9%, the current therapy rate 23.0%, and the chronic ongoing therapy rate 34.3%. Asthma prevalence estimates from both methods were

**Table 7.1.6** Prevalence of depression and therapy by selected characteristics

Characteristics	Self-reported		Symptom-based		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N	Percent	N
<b>Sex</b>								
Male	0.3	6449	1.6	6409	3.2	102	11.4	102
Female	0.4	6519	2.5	6466	6.4	159	7.9	159
<b>Total</b>	<b>0.3</b>	<b>12968</b>	<b>2.0</b>	<b>12875</b>	<b>5.2</b>	<b>261</b>	<b>9.3</b>	<b>261</b>
<b>Age group</b>								
50-59	0.3	5868	1.8	5827	6.7	105	12.2	105
60-69	0.3	4145	2.2	4101	5.9	90	7.6	90
70-79	0.4	2399	2.2	2391	0.8	53	7.0	53
80+	0.1	555	2.3	555	6.2	13	6.2	13
<b>Total</b>	<b>0.3</b>	<b>12968</b>	<b>2.0</b>	<b>12875</b>	<b>5.2</b>	<b>261</b>	<b>9.3</b>	<b>261</b>
<b>Residence</b>								
Urban	0.5	6160	2.2	6118	6.9	132	12.8	132
Rural	0.2	6808	1.9	6757	3.4	129	5.7	129
<b>Total</b>	<b>0.3</b>	<b>12968</b>	<b>2.0</b>	<b>12875</b>	<b>5.2</b>	<b>261</b>	<b>9.3</b>	<b>261</b>
<b>Marital status</b>								
Never married	0.3	129	0.9	127	0.0	1	0.0	1
Currently married	0.3	11041	1.9	10962	5.6	208	10.8	208
Cohabiting	0.0	28	2.9	28	0.0	1	0.0	1
Separated/divorced	0.0	203	1.3	199	0.0	3	0.0	3
Widowed	0.3	1563	3.1	1555	3.7	48	3.7	48
<b>Total</b>	<b>0.3</b>	<b>12964</b>	<b>2.0</b>	<b>12871</b>	<b>5.2</b>	<b>261</b>	<b>9.3</b>	<b>261</b>
<b>Income quintile</b>								
Lowest	0.4	2080	2.9	2065	3.7	61	3.7	18
Second	0.2	2335	3.4	2309	3.3	78	5.1	78
Middle	0.3	2633	2.2	2619	1.4	56	5.3	56
Fourth	0.4	3031	1.2	3010	13.0	37	22.1	37
Highest	0.2	2826	1.0	2811	4.0	27	18.0	27
<b>Total</b>	<b>0.3</b>	<b>12907</b>	<b>2.0</b>	<b>12814</b>	<b>5.2</b>	<b>259</b>	<b>9.3</b>	<b>259</b>

higher among men than among women, and generally rose with age. The current therapy rate also increased with age through the 70-79 group. Self-reported and symptom-based rates were higher in urban compared with rural areas, with higher treatment rates in urban areas also. . Among respondents with different marital status, the self-reported (3.1%) and symptom prevalence (6.6%) rates among widowed respondents were the highest. The self-reported and symptom-based rates were highest in the lowest income quintile, 2.8% and 6.3% respectively, and tended to decrease as income levels increased.

## 7.1.6 Depression

Self-reported and symptom-based prevalence rates of depression were low in all older adults regardless of location of residence and socioeconomic characteristics. For respondents as a whole, the self-reported prevalence rate was 0.3% and the symptom-based prevalence rate was 2.0%, and both were higher among women than among men. For people reporting depression, the current therapy rate was 5.2% and the chronic ongoing therapy rate was 9.3%, with an indication of some difference by sex, age and residence. The symptom-based rate generally decreased as income levels increased.

**Table 7.1.7 Prevalence of hypertension and therapy by selected characteristics**

Characteristics	Self-reported		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N
<b>Sex</b>						
Male	23.9	6400	75.4	1504	82.6	1489
Female	29.7	6460	80.0	1899	86.3	1884
<b>Total</b>	<b>26.8</b>	<b>12859</b>	<b>78.0</b>	<b>3403</b>	<b>84.7</b>	<b>3373</b>
<b>Age group</b>						
50-59	19.0	5819	71.8	1097	79.7	1091
60-69	29.9	4100	78.3	1204	85.4	1195
70-79	38.1	2392	83.1	899	88.1	886
80+	37.4	549	86.6	203	92.1	201
<b>Total</b>	<b>26.8</b>	<b>12859</b>	<b>78.0</b>	<b>3403</b>	<b>84.7</b>	<b>3373</b>
<b>Residence</b>						
Urban	33.8	6119	85.0	2152	88.5	2020
Rural	20.5	6741	67.4	1351	79.1	1353
<b>Total</b>	<b>26.8</b>	<b>12859</b>	<b>78.0</b>	<b>3403</b>	<b>84.7</b>	<b>3373</b>
<b>Marital status</b>						
Never married	23.4	128	64.1	30	85.8	30
Currently married	26.0	10954	77.9	2809	84.5	2786
Cohabiting	48.5	28	72.1	13	72.1	13
Separated/divorced	21.3	203	77.7	41	83.4	41
Widowed	33.2	1543	79.4	509	85.9	501
<b>Total</b>	<b>26.8</b>	<b>12855</b>	<b>78.0</b>	<b>3402</b>	<b>84.7</b>	<b>3372</b>
<b>Income quintile</b>						
Lowest	22.8	2071	70.3	466	80.6	464
Second	23.3	2315	77.3	529	85.1	532
Middle	26.4	2607	77.6	681	85.9	677
Fourth	28.6	3001	80.7	846	87.7	843
Highest	30.9	2805	80.9	858	83.6	834
<b>Total</b>	<b>26.8</b>	<b>12798</b>	<b>78.0</b>	<b>3380</b>	<b>84.7</b>	<b>3350</b>

## 7.1.7 Hypertension

The self-reported prevalence rate of hypertension among respondents aged 50-plus was 26.8%, with a current therapy rate of 78.0% and a chronic ongoing therapy rate of 84.7% (Table 7.1.7). The prevalence rate was higher among women than among men, and higher in urban (33.8%) versus rural (20.5%) areas. The rate rose with age, as did the current and chronic ongoing therapy rates. In terms of marital status, the prevalence rate among widowed (33.2%) and cohabiting (48.5%) respondents was the highest. The prevalence increased as income levels increased.

## 7.1.8 Chronic lung disease

The self-reported prevalence rate of chronic lung disease was 7.9%, and the current and chronic ongoing therapy rates were approximately 39% each. Prevalence was higher among men than among women, but the current and chronic ongoing therapy rates were both lower among men. With the increase of age, the prevalence, the current and chronic ongoing therapy rates all increased. Similarly, self-reported prevalence was slightly higher in urban (8.9%) than in rural (7.0%) areas, but the current and chronic ongoing therapy rates were higher among the rural population.

**Table 7.1.8** Prevalence of chronic lung disease and therapy by selected characteristics

Characteristics	Self-reported		Current therapy		Chronic ongoing therapy	
	Percent	N	Percent	N	Percent	N
<b>Sex</b>						
Male	9.3	6441	37.5	575	62.4	573
Female	6.6	6516	40.5	410	65.1	411
<b>Total</b>	<b>7.9</b>	<b>12957</b>	<b>38.7</b>	<b>985</b>	<b>63.6</b>	<b>984</b>
<b>Age group</b>						
50-59	4.7	5864	30.5	262	60.1	257
60-69	8.9	4132	34.7	353	61.3	354
70-79	13.0	2403	47.5	297	67.5	299
80+	13.2	559	52.0	72	70.4	73
<b>Total</b>	<b>7.9</b>	<b>12957</b>	<b>38.7</b>	<b>985</b>	<b>63.6</b>	<b>984</b>
<b>Residence</b>						
Urban	8.9	6159	35.3	537	58.5	532
Rural	7.0	6798	42.9	448	69.4	451
<b>Total</b>	<b>7.9</b>	<b>12957</b>	<b>38.7</b>	<b>985</b>	<b>63.6</b>	<b>984</b>
<b>Marital status</b>						
Never married	9.9	131	13.4	11	62.9	11
Currently married	7.6	11030	36.9	800	61.5	799
Cohabiting	2.9	28	0.0	1	0.0	1
Separated/divorced	10.7	203	29.5	22	66.3	22
Widowed	9.8	1561	51.9	151	74.3	151
<b>Total</b>	<b>7.9</b>	<b>12953</b>	<b>38.7</b>	<b>984</b>	<b>63.6</b>	<b>983</b>
<b>Income quintile</b>						
Lowest	10.5	2083	44.6	213	73.2	217
Second	8.7	2327	44.3	194	63.5	194
Middle	7.8	2636	44.9	190	73.1	190
Fourth	6.6	3027	31.9	193	58.6	193
Highest	6.9	2824	26.7	188	48.1	183
<b>Total</b>	<b>7.9</b>	<b>12896</b>	<b>38.7</b>	<b>978</b>	<b>63.6</b>	<b>977</b>

All three rates rose with age, and tended to decline as income level increased.

## 7.2 Injuries (road traffic and all other)

Each year, over 50 million people worldwide die from traffic accidents, drowning, poisoning, falls or injuries, and burns [55]. WHO estimates injuries and violence to be the fourth leading cause of death in China (after cardiovascular disease, malignant neoplasm and respiratory disease). Official government figures show that

every year road traffic collisions, suicides and other injuries together kill approximately 750,000 people on the mainland and hospitalize more than 3.5 million others [56]. Every year, injuries due to violence, traffic crashes, burns, falls or drownings are responsible for 9% of all deaths and 16% of all disabilities [55].

Table 7.2 shows self-reported prevalence of injuries and any resulting physical disability among respondents aged 50-plus. Road injury prevalence was 1.8%, and one-quarter (24.5%) of road injuries led to disability. Road injuries were somewhat more common among men than among women.

**Table 7.2** Self-reported prevalence of injuries and any resulting physical disability by selected characteristics

Characteristics	Road injury		Disability		Other injury causes		Disability	
	Percent	N	Percent	N	Percent	N	Percent	N
<b>Sex</b>								
Male	2.2	6439	24.9	137	4.8	6438	12.9	307
Female	1.5	6506	23.9	93	5.7	6497	13.5	366
<b>Total</b>	<b>1.8</b>	<b>12944</b>	<b>24.5</b>	<b>230</b>	<b>5.2</b>	<b>12935</b>	<b>13.2</b>	<b>673</b>
<b>Age group</b>								
50-59	2.1	5853	21.4	121	4.5	5846	9.4	261
60-69	1.8	4135	28.8	71	5.9	4130	14.2	240
70-79	1.2	2398	23.2	28	6.0	2402	17.3	144
80+	1.9	558	34.2	10	5.1	557	19.5	28
<b>Total</b>	<b>1.8</b>	<b>12944</b>	<b>24.5</b>	<b>230</b>	<b>5.2</b>	<b>12935</b>	<b>13.2</b>	<b>673</b>
<b>Residence</b>								
Urban	1.0	6146	21.2	60	3.6	6143	13.4	223
Rural	2.6	6798	25.7	170	6.7	6792	13.1	450
<b>Total</b>	<b>1.8</b>	<b>12944</b>	<b>24.5</b>	<b>230</b>	<b>5.2</b>	<b>12935</b>	<b>13.2</b>	<b>673</b>
<b>Marital status</b>								
Never married	0.0	131	0.0	0	4.3	130	0.0	4
Currently married	1.8	11020	23.0	189	5.1	11013	13.0	562
Cohabiting	0.0	28	0.0	0	0.0	28	0.0	0
Separated/divorced	3.1	202	38.4	6	3.7	202	4.6	7
Widowed	2.2	1559	30.4	35	6.4	1557	15.4	99
<b>Total</b>	<b>1.8</b>	<b>12940</b>	<b>24.5</b>	<b>230</b>	<b>5.2</b>	<b>12930</b>	<b>13.2</b>	<b>673</b>
<b>Income quintile</b>								
Lowest	1.5	2078	36.5	31	7.0	2078	23.1	146
Second	1.3	2330	25.9	31	5.5	2373	12.5	127
Middle	2.3	2630	14.1	55	5.9	2629	6.9	154
Fourth	2.4	3020	33.2	72	4.8	3018	10.2	145
Highest	1.5	2825	13.7	41	3.5	2821	14.8	95
<b>Total</b>	<b>1.8</b>	<b>12883</b>	<b>24.5</b>	<b>229</b>	<b>5.2</b>	<b>12874</b>	<b>13.2</b>	<b>667</b>

The prevalence of injuries from other causes was 5.2%, 13.2% of which led to disability. Non-road related injuries were more common among women than among men. There were small differences in injury rates by age, but the proportion of injured people with related disability was highest among the oldest old (80+). Both the road injury rate and non-road injury rate were higher in rural areas. Among respondents of different marital status, the road injury rate for divorced people (3.1%) was highest, while for non-road injuries the rate for widowed people (6.4%) was highest. Road injury prevalence differed little by income, whereas other injury prevalence generally decreased as income levels increased.

### 7.3 Oral health and cataracts

Table 7.3 shows that edentulism rate was 9.1% and the cataract rate was 8.1%, both of which were higher for women than for men and increased considerably with age. The edentulism rate in urban areas was lower than in rural areas, whereas the cataract rate in the urban areas (13.1%) was much higher than in rural areas (3.6%). The edentulism rate (19.6%) and cataract rate (16.5%) were highest among widowed people, and as income levels increased, the edentulism rate decreased but the cataract rate tended to increase.

**Table 7.3** Self-reported prevalence of edentulism and cataracts by selected demographic characteristics

Characteristics	Edentulism		Cataracts	
	Percent	N	Percent	N
<b>Sex</b>				
Male	8.1	6,415	5.3	6,383
Female	10.1	6,475	10.9	6,432
<b>Total</b>	<b>9.1</b>	<b>12,890</b>	<b>8.1</b>	<b>12,815</b>
<b>Age group</b>				
50-59	2.8	5,827	2.4	5,823
60-69	8.5	4,121	8.1	4,080
70-79	19.0	2,386	18.3	2,365
80+	37.1	556	25.0	548
<b>Total</b>	<b>9.1</b>	<b>12,890</b>	<b>8.1</b>	<b>12,815</b>
<b>Residence</b>				
Urban	7.6	6,129	13.1	6,093
Rural	10.5	6,761	3.6	6,722
<b>Total</b>	<b>9.1</b>	<b>12,890</b>	<b>8.1</b>	<b>12,815</b>
<b>Marital status</b>				
Never married	9.1	131	12.7	124
Currently married	7.6	10,972	6.9	10,922
Cohabiting	13.5	28	1.2	28
Separated/divorced	7.9	200	9.2	202
Widowed	19.6	1555	16.5	1,535
<b>Total</b>	<b>9.1</b>	<b>12,886</b>	<b>8.1</b>	<b>12,811</b>
<b>Income quintile</b>				
Lowest	15.4	2,061	6.3	2,049
Second	10.9	2,317	7.5	2,299
Middle	10.2	2,624	8.7	2,607
Fourth	6.5	3,014	7.5	3,012
Highest	4.9	2,812	10.1	2,787
<b>Total</b>	<b>9.1</b>	<b>12,829</b>	<b>8.1</b>	<b>12,754</b>

## 7.4 Cervical and breast cancer

The SAGE collected information on the screening of two major types of cancers, cervical and breast cancer, as indicator conditions for assessing health systems coverage and performance. Female respondents were asked if they were screened for breast cancer and cervical cancer. Table 7.4 shows that more than one-quarter (27.4%) of all women aged 50-plus were covered by breast cancer screening, and that even fewer (20.5%) had cervical cancer screening.

The percentage of women covered by breast cancer screening and cervical cancer screening both decreased significantly with age. The percentage of cervical cancer screening in urban areas was far higher than in rural areas, and the urban percentage of breast cancer screening was three times that in rural areas. As household income levels increased, the percentage of both cancer screenings increased.

**Table 7.4** Percentage of women covered by breast and cervical cancer screening by selected demographic characteristics

Characteristics	Breast cancer screening		Cervical cancer screening	
	Percent	N	Percent	N
<b>Age group</b>				
50-59	32.2	2776	24.9	2727
60-69	26.5	1995	18.7	1993
70-79	20.9	1304	16.1	1316
80+	17.3	295	11.2	298
<b>Total</b>	<b>27.4</b>	<b>6371</b>	<b>20.5</b>	<b>6335</b>
<b>Residence</b>				
Urban	41.1	3239	29.7	3276
Rural	13.3	3132	10.6	3059
<b>Total</b>	<b>27.4</b>	<b>6371</b>	<b>20.5</b>	<b>6335</b>
<b>Marital status</b>				
Never married	33.2	39	19.7	39
Currently married	29.0	5103	21.9	5051
Cohabiting	21.0	14	21.0	14
Separated/divorced	38.7	95	19.4	94
Widowed	19.2	1117	14.2	1133
<b>Total</b>	<b>27.4</b>	<b>6367</b>	<b>20.5</b>	<b>6331</b>
<b>Income quintile</b>				
Lowest	10.4	1054	7.7	1051
Second	16.1	1134	13.8	1125
Middle	25.4	1290	17.5	1279
Fourth	31.5	1485	22.6	1465
Highest	47.5	1374	36.1	1385
<b>Total</b>	<b>27.4</b>	<b>6337</b>	<b>20.5</b>	<b>6305</b>



## 8. Health examination

In the SAGE, anthropometric and performance tests were included as more objective measures to assess the health of older people. Prior to body measurement and testing, the participants were asked to sign an informed consent document. Topics for testing include:

1. **Anthropometry.** Weight and height were measured to calculate body mass index (BMI), and waist and hip measurements were used to calculate the waist-hip ratio (WHR).
2. **Blood pressure and pulse measurement.** Blood pressure and pulse was measured regardless of whether or not respondents reported having hypertension.
3. **Measurements of functional independence and strength.** A 4-meter timed walk at normal and rapid pace was completed by the respondent. The ability to walk is necessary to complete many activities of daily life, and it can predict health outcomes such as mortality and health care needs. Grip strength, using a dynamometer, is a useful proxy for functional dependency, mortality and morbidity.
4. **Visual acuity.** Both respondent eyes were measured for near and distant vision. Older peoples' sensory (sight or hearing) damage is significantly associated with physical disability, and may be an important risk factor for balance disorders and falling.
5. **A set of cognition tests including, verbal recall, digit span and verbal fluency, tested learning ability, concentration and memory.**

### 8.1 Anthropometry

Obesity is a risk factor for cardiovascular disease and diabetes. Weight and body composition are important for physiological functions and joint diseases. Body mass index (BMI) can be used as an indicator of body composition and obesity, and is an independent risk

factor for a variety of health outcomes. Overweight and underweight are both associated with mobility difficulty and disability among older people. Overweight also aggravates the symptoms of certain diseases such as knee osteoarthritis. Low weight, especially among older people, may indicate deteriorating health and an increased risk of death. In addition, waist circumference and waist-hip ratio are independent risk factors for cardiovascular disease and other health outcomes.

Body mass index, waist circumference, and waist-hip ratio were first classified according to WHO standards to identify the risk of different health conditions and to facilitate comparison between countries. But the WHO Expert Consultation on body mass index has concluded that there are different cut-off points for different ethnic groups, especially Asian people, with a substantial lower cut-off point for overweight [57, 58]. Therefore, Chinese measurement standards were also established, and Chinese classifications are given for some indicators in this report.

#### 8.1.1 BMI and health

Body mass index (BMI) is calculated using weight and height. The formula is  $BMI = \text{weight (kg)}/\text{height (m)}^2$ . Based on BMI, SAGE participants were grouped into four categories according to WHO criteria [59, 60]: underweight,  $BMI < 18.5$ ; normal,  $BMI = 18.5 \sim 24.9$ ; overweight,  $BMI = 25.0 \sim 29.9$ ; and obese,  $BMI \geq 30.0$ . Participants also were grouped into four categories using the Chinese standards [61]: underweight,  $BMI < 18.5$ ; normal,  $BMI = 18.5 \sim 23.9$ ; overweight,  $BMI = 24.0 \sim 27.9$ ; and obese,  $BMI \geq 28.0$ .

The BMI distribution of respondents aged 50-plus according to the WHO standard (Table 8.1.1) shows that 4.3% of respondents were underweight, 60.5% were normal, 29.6% were overweight and 5.7% were obese.

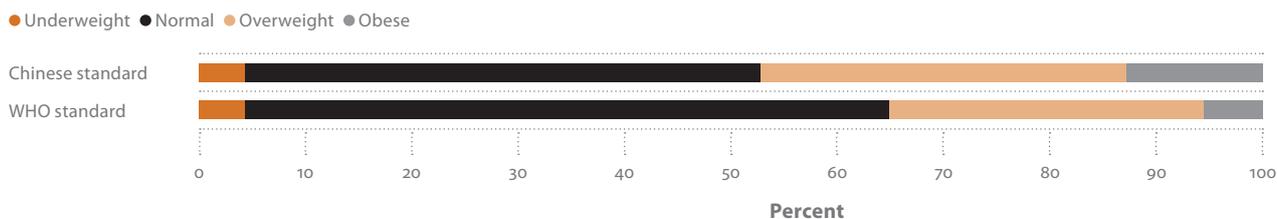
**Table 8.1.1** Distribution of weight types according to WHO BMI standard, by selected characteristics

Characteristics	(%)				N
	Underweight	Normal	Overweight	Obese	
<b>Age group</b>					
50-59	2.6	61.4	30.0	5.9	5,562
60-69	4.3	59.6	30.5	5.6	3,946
70-79	7.1	58.5	29.0	5.4	2,264
80+	8.3	66.0	21.5	4.2	521
<b>Total</b>	<b>4.2</b>	<b>60.5</b>	<b>29.6</b>	<b>5.7</b>	<b>12,293</b>
<b>Sex</b>					
Male	4.1	65.2	27.3	3.4	6,059
Female	4.3	55.9	31.9	7.9	6,234
<b>Total</b>	<b>4.2</b>	<b>60.5</b>	<b>29.6</b>	<b>5.7</b>	<b>12,293</b>
<b>Residence</b>					
Urban	3.5	57.0	33.2	6.3	5,642
Rural	4.9	63.5	26.5	5.1	6,670
<b>Total</b>	<b>4.3</b>	<b>60.5</b>	<b>29.6</b>	<b>5.7</b>	<b>12,312</b>
<b>Education</b>					
No formal education	6.9	61.1	26.5	5.5	2,814
Less than primary	4.7	60.8	28.8	5.7	2,412
Primary school completed	3.7	60.8	30.3	5.2	2,671
Secondary school completed	2.8	60.0	30.5	6.7	2,462
High school completed	2.4	59.0	33.3	5.3	1,450
College/post-graduate degree completed	2.0	60.1	32.4	5.5	486
<b>Total</b>	<b>4.3</b>	<b>60.5</b>	<b>29.6</b>	<b>5.7</b>	<b>12,312</b>
<b>Marital status</b>					
Never married	5.6	69.7	17.7	7.0	126
Currently married	3.8	60.2	30.4	5.5	10,468
Cohabiting	0.0	49.7	36.0	14.3	27
Separated/divorced	7.1	61.3	27.3	4.3	195
Widowed	6.8	61.8	24.9	6.4	1,492
<b>Total</b>	<b>4.3</b>	<b>60.5</b>	<b>29.6</b>	<b>5.7</b>	<b>12,308</b>
<b>Income quintile</b>					
Lowest	8.4	67.8	20.2	3.7	2,020
Second	5.2	64.8	25.2	4.9	2,294
Middle	2.9	61.0	30.2	5.9	2,527
Fourth	3.3	56.8	33.4	6.6	2,890
Highest	2.7	55.2	35.7	6.4	2,523
<b>Total</b>	<b>4.3</b>	<b>60.6</b>	<b>29.5</b>	<b>5.6</b>	<b>12,253</b>

**Table 8.1.2** Distribution of weight types according to Chinese BMI standard, by selected characteristics

Characteristics	(%)				N
	Underweight	Normal	Overweight	Obese	
<b>Age group</b>					
50-59	2.6	48.5	35.9	13.0	5,562
60-69	4.3	47.9	34.3	13.4	3,946
70-79	7.1	48.2	32.0	12.6	2,264
80+	8.6	54.5	28.5	8.5	521
<b>Total</b>	<b>4.2</b>	<b>48.5</b>	<b>34.3</b>	<b>12.9</b>	<b>12,293</b>
<b>Sex</b>					
Male	4.2	52.8	33.3	9.6	6,059
Female	4.4	44.3	35.3	16.0	6,234
<b>Total</b>	<b>4.2</b>	<b>48.5</b>	<b>34.3</b>	<b>12.9</b>	<b>12,293</b>
<b>Residence</b>					
Urban	3.5	44.1	37.9	14.5	5,642
Rural	4.9	52.2	31.4	11.5	6,670
<b>Total</b>	<b>4.3</b>	<b>48.5</b>	<b>34.3</b>	<b>12.9</b>	<b>12,312</b>
<b>Education</b>					
No formal education	7.0	51.3	29.6	12.1	2,814
Less than primary	4.7	49.9	32.7	12.7	2,412
Primary school completed	3.7	48.6	35.0	12.7	2,671
Secondary school completed	2.9	45.2	37.8	14.0	2,462
High school completed	2.4	46.6	38.3	12.7	1,450
College/post-graduate degree completed	2.0	47.3	36.6	14.0	486
<b>Total</b>	<b>4.3</b>	<b>48.5</b>	<b>34.3</b>	<b>12.9</b>	<b>12,312</b>
<b>Marital status</b>					
Never married	5.6	57.2	23.9	13.3	126
Currently married	3.8	47.8	35.4	12.9	10,468
Cohabiting	0.0	42.8	36.5	20.8	27
Separated/divorced	7.1	51.8	30.3	10.8	195
Widowed	6.8	52.3	28.3	12.5	1,492
<b>Total</b>	<b>4.3</b>	<b>48.5</b>	<b>34.3</b>	<b>12.9</b>	<b>12,308</b>
<b>Income quintile</b>					
Lowest	8.4	59.6	24.4	7.6	2,020
Second	5.2	54.2	29.5	11.1	2,294
Middle	2.9	47.4	36.2	13.4	2,527
Fourth	3.3	43.3	38.4	15.1	2,890
Highest	2.7	42.3	39.8	15.2	2,523
<b>Total</b>	<b>4.3</b>	<b>48.7</b>	<b>34.3</b>	<b>12.8</b>	<b>12,253</b>

**Figure 8.1** Distribution of BMI according to Chinese and WHO standards



With increasing age, the proportion underweight gradually increased and the proportion obese decreased. Normal BMI was highest among the oldest (80+) respondents, and this group also had the lowest proportion of overweight. Women were less likely than men to have normal BMI, and more likely to be overweight and obese. Urban dwellers were more likely than their rural counterparts to be overweight and obese. The proportion underweight was highest among people with no formal education, and declined with increasing education. Higher-educated individuals were more likely to be overweight, as were married people compared to widowed people. As household income quintile increased from a low to high level, the proportion of underweight and normal-weight individuals decreased while the proportion of overweight increased.

The distribution of BMI according to the Chinese standard is shown by various respondent characteristics in Table 8.1.2. Figure 8.1 presents a graphic comparison of BMI based on the WHO versus Chinese standard. The proportion underweight is seen to be the same, while the proportions overweight and obese are greater using the Chinese standard. Using the Chinese BMI standards, almost half of the older adult population are overweight or obese.

### 8.1.2 Waist circumference and health risk

In recent years, many epidemiological studies have shown that body fat distribution, especially abdominal fat accumulation, is associated with the occurrence of insulin resistance syndrome and cardiovascular disease [62, 63]. Waist circumference as a simple indicator to collect, with relatively good measurement accuracy, has become widely used in the diagnosis of central obesity (abdominal obesity) to study the inter-relationship with chronic diseases. Moreover, many studies have shown that, in assessing the risk of cardiovascular disease, waist circumference is a more sensitive indicator than BMI. This is because body fat that accumulates around the stomach area poses a greater health risk than fat stored in the lower half of the body [64, 65].

Increased disease risk is associated with a male waist circumference equal to or greater than 94 cm. and a female waist circumference equal to or greater than 80 cm. A substantially increased risk, based on published criteria for central obesity[66], is indicated by male waist circumference equal to or more than 102 cm, and female waist circumference equal to or more than 88 cm.

Data in Table 8.1.3 indicate that more than half (56.3%) of all respondents had no health risk according to the waist circumference criterion, while those at increased risk and substantially increased risk were 21.5% and 22.2%, respectively. Proportions in both risk categories tended to increase with age, and were higher in urban than in rural areas. The most eye-catching difference in Table 8.1.3 is the much higher implied risk among women compared to men. Proportions of women with increased and substantially increased risk were 29.3% and 39.9%, compared to male levels of 13.6% and 4.0%.

Patterns by level of education were mixed, although there was an association between lower education and substantially increased risk. Risks were higher among widowed than among married people, and risk levels increased with increasing household income.

### 8.1.3 Waist-hip ratio and health risk

The assessment of body weight and waist-hip ratio both are important indicators of health risks. Waist-hip ratio (WHR) may be used for the assessment of cardiovascular disease and other related health risks. When male waist-hip ratio is equal to or greater than 0.90 and female waist-hip ratio equal to or greater than 0.85, it is considered to be high risk. A male WHR less than 0.90, and a female WHR less than 0.85, is considered low risk. When reaching high risk levels, WHR is considered to be in line with central obesity criteria [66].

Based on these WHR criteria, Table 8.1.4 shows that 57.5% of all respondents exhibited high risk, and the proportion of people in the high risk category increased with age. The proportion of high risk among women (68.8%) was much higher than among men (45.9%),

**Table 8.1.3** Distribution of health risk according to waist circumference by selected characteristics

Characteristics	(%)			N
	Low risk	Increased risk*	Substantially increased risk**	
<b>Age group</b>				
50-59	59.7	20.9	19.5	5,585
60-69	54.9	22.2	22.9	3,972
70-79	51.8	21.0	27.2	2,277
80+	51.4	24.7	23.9	527
<b>Total</b>	<b>56.3</b>	<b>21.5</b>	<b>22.2</b>	<b>12,361</b>
<b>Sex</b>				
Male	82.5	13.6	4.0	6,104
Female	30.8	29.3	39.9	6,257
<b>Total</b>	<b>56.3</b>	<b>21.5</b>	<b>22.2</b>	<b>12,361</b>
<b>Residence</b>				
Urban	48.3	24.8	26.9	5,666
Rural	63.1	18.7	18.2	6,695
<b>Total</b>	<b>56.3</b>	<b>21.5</b>	<b>22.2</b>	<b>12,361</b>
<b>Education</b>				
No formal education	48.7	23.2	28.1	2,832
Less than primary	57.2	18.7	24.1	2,425
Primary school completed	59.6	20.1	20.3	2,680
Secondary school completed	59.9	21.5	18.6	2,483
High school completed	56.5	25.3	18.2	1,456
College/post-graduate completed	59.7	22.8	17.6	482
<b>Total</b>	<b>56.3</b>	<b>21.5</b>	<b>22.2</b>	<b>12,361</b>
<b>Marital status</b>				
Never married	70.7	12.7	16.6	124
Currently married	57.5	21.2	21.2	10,514
Cohabiting	40.1	30.9	29.0	28
Separated/divorced	60.1	22.8	17.1	196
Widowed	46.3	23.9	29.8	1,495
<b>Total</b>	<b>56.3</b>	<b>21.5</b>	<b>22.2</b>	<b>12,357</b>
<b>Income quintile</b>				
Lowest	65.5	18.1	16.4	2,030
Second	62.2	18.8	19.0	2,306
Middle	56.4	20.3	23.3	2,544
Fourth	53.2	22.5	24.3	2,898
Highest	47.2	27.2	25.7	2,525
<b>Total</b>	<b>56.3</b>	<b>21.6</b>	<b>22.1</b>	<b>12,302</b>

Note:

\* Increased risk:  $\geq 94$  cm (male);  $\geq 80$  cm (female)

\*\* Substantially increased risk (central obesity):  $\geq 102$  cm (male);  $\geq 88$  cm (female)

**Table 8.1.4** Distribution of health risk according to waist-hip ratio by selected characteristics

Characteristics	(%)		No. of respondents
	Low risk	High risk	
<b>Age group</b>			
50-59	47.7	52.3	5,584
60-69	40.5	59.5	3,971
70-79	35.6	64.4	2,277
80+	33.2	66.8	526
<b>Total</b>	<b>42.5</b>	<b>57.5</b>	<b>12,358</b>
<b>Sex</b>			
Male	54.1	45.9	6,102
Female	31.2	68.8	6,256
<b>Total</b>	<b>42.5</b>	<b>57.5</b>	<b>12,358</b>
<b>Residence</b>			
Urban	38.6	61.4	5,665
Rural	45.9	54.1	6,694
<b>Total</b>	<b>42.5</b>	<b>57.5</b>	<b>12,358</b>
<b>Education</b>			
No formal education	34.0	66.0	2,830
Less than primary	41.0	59.0	2,425
Primary school completed	42.7	57.3	2,680
Secondary school completed	49.5	50.5	2,482
High school completed	47.4	52.6	1,456
College/post-graduate degree completed	49.0	51.0	482
<b>Total</b>	<b>42.5</b>	<b>57.5</b>	<b>12,358</b>
<b>Marital status</b>			
Never married	42.5	57.5	124
Currently married	44.0	56.0	10,513
Cohabiting	31.5	68.5	28
Separated/divorced	47.5	52.5	195
Widowed	31.8	68.2	1,494
<b>Total</b>	<b>42.5</b>	<b>57.5</b>	<b>12,354</b>
<b>Income quintile</b>			
Lowest	40.5	59.5	2,027
Second	46.4	53.6	2,306
Middle	43.9	56.1	2,544
Fourth	43.3	56.7	2,898
Highest	38.6	61.4	2,525
<b>Total</b>	<b>42.6</b>	<b>57.4</b>	<b>12,299</b>

Note:

Low risk: <0.90 (male); <0.85 (female)

High risk: ≥0.90 (male); ≥0.85 (female)

**Table 8.1.5** Prevalence of central obesity according to different standards, by selected characteristics

Characteristics	Central obesity according to different standards					
	Chinese waist circumference (%)	N	International waist circumference (%)	N	Waist-hip ratio (%)	N
<b>Age group</b>						
50-59	57.7	5,585	19.5	5,585	52.3	5,584
60-69	60.1	3,972	22.9	3,972	59.5	3,971
70-79	62.7	2,277	27.2	2,277	64.4	2,277
80+	61.9	527	23.9	527	66.8	526
<b>Total</b>	<b>59.6</b>	<b>12,361</b>	<b>22.2</b>	<b>12,361</b>	<b>57.5</b>	<b>12,358</b>
<b>Sex</b>						
Male	49.8	6,104	4.0	6,104	45.9	6,102
Female	69.2	6,257	39.9	6,257	68.8	6,256
<b>Total</b>	<b>59.6</b>	<b>12,361</b>	<b>22.2</b>	<b>12,361</b>	<b>57.5</b>	<b>12,358</b>
<b>Residence</b>						
Urban	67.9	5,666	26.9	5,666	61.4	5,665
Rural	52.6	6,695	18.2	6,695	54.1	6,694
<b>Total</b>	<b>59.6</b>	<b>12,361</b>	<b>22.2</b>	<b>12,361</b>	<b>57.5</b>	<b>12,358</b>
<b>Education</b>						
No formal education	58.4	2,832	28.1	2,832	66.0	2,830
Less than primary	58.3	2,425	24.1	2,425	59.0	2,425
Primary school completed	59.0	2,680	20.3	2,680	57.3	2,680
Secondary school completed	59.1	2,483	18.6	2,483	50.5	2,482
High school completed	63.7	1,456	18.2	1,456	52.6	1,456
College/post-graduate completed	66.5	485	18.0	485	51.3	485
<b>Total</b>	<b>59.6</b>	<b>12,361</b>	<b>22.2</b>	<b>12,361</b>	<b>57.5</b>	<b>12,358</b>
<b>Marital status</b>						
Never married	45.2	124	16.6	124	57.5	124
Currently married	59.6	10,514	21.2	10,514	56.0	10,513
Cohabiting	72.1	28	29.0	28	68.5	28
Separated/divorced	53.8	196	17.1	196	52.5	195
Widowed	61.0	1,495	29.8	1,495	68.2	1,494
<b>Total</b>	<b>59.6</b>	<b>12,356</b>	<b>22.2</b>	<b>12,357</b>	<b>57.5</b>	<b>12,354</b>
<b>Income quintile</b>						
Lowest	46.6	2,030	16.4	2,030	59.5	2,027
Second	51.3	2,306	19.0	2,306	53.6	2,306
Middle	60.7	2,544	23.3	2,544	56.1	2,544
Fourth	64.8	2,898	24.3	2,898	56.7	2,898
Highest	70.2	2,525	25.7	2,525	61.4	2,525
<b>Total</b>	<b>59.5</b>	<b>12,302</b>	<b>22.1</b>	<b>12,302</b>	<b>57.4</b>	<b>12,299</b>

Note:

Chinese waist circumference:  $\geq 85$  cm (male);  $\geq 80$  cm (female)

International waist circumference:  $\geq 102$  cm (male);  $\geq 88$  cm (female)

International waist-hip ratio:  $\geq 0.90$  (male);  $\geq 0.85$  (female)

and somewhat higher in the urban (61.4%) than in the rural population (54.1%). High risk was more likely among people in the lowest three educational categories, and among widowed versus married people. There was relatively little difference by household income quintile.

### 8.1.4 Central obesity

Central obesity is an indicator of body fat distribution, especially abdominal fat accumulation, which is related to cardiovascular disease, diabetes and other chronic diseases. Internationally, central obesity more often than not is assessed by waist circumference, and is defined as male waist circumference of 102cm or greater and female waist circumference of 88cm or greater. Central obesity also can be defined using adult waist-hip ratio, male WHR more than 0.90 and female WHR more than 0.85. China's adult overweight and obesity prevention and control guidelines, issued in 2002, define central obesity as male waist circumference more than 85 cm and female waist circumference more than 80 cm.

The operational definition of central obesity can make a large difference in measured obesity. The percentage of central obesity among all respondents was 59.6% according to the Chinese waist circumference standard, 22.2% according to the international waist circumference standard, and 57.5% according to the international waist-hip ratio standard. According to waist circumference standards, the percentage of central obesity increased among respondents aged 50 to 79, but decreased among those 80 and over. The percentage increased continually with age using the waist-hip ratio standard. For all three measures, percentages were higher among females than males and higher in urban than in rural areas.

Among respondents with different level of education, central obesity according to the Chinese waist circumference standard increased with educational level, but decreased according to the international waist circumference and waist-hip standards. The prevalence of central obesity among widowed people was higher than among married people, and increased as household income quintile increased regardless of standard.

## 8.2 Blood pressure

Blood pressure has been identified as a risk factor for cardiovascular and other diseases and is an important overall health measurement. In SAGE, blood pressure

was measured a total of three times, at intervals of one minute, including systolic blood pressure, diastolic blood pressure and heart rate (pulse). An average of the latter two measurements was used as the final blood pressure and pulse values. Taking into consideration the device used, and possible factors in measurement, the measurements were meant to be indicative, not diagnostic.

### 8.2.1 Mean blood pressure and pulse

Among all respondents aged 50-plus, mean systolic blood pressure was 142mmHg, mean diastolic blood pressure was 84mmHg, and the mean pulse rate was 76. With increasing age, mean systolic pressure and pulse rate increased while mean diastolic pressure decreased. Differences by sex and area of residence were minor, though rural respondents tended to have higher mean systolic pressure. A higher education level was associated with lower systolic and diastolic blood pressure and a lower pulse rate.

### 8.2.2 Hypertension

The diagnostic criteria and classification of hypertension in this chapter are based on World Health Organization/ International League of Hypertension[67]treatment guidelines. The standard definition of hypertension is systolic blood pressure greater than or equal to 140 mmHg and/ or diastolic blood pressure greater than or equal to 90 mmHg. Blood pressure is a measurement of the force against arterial walls as the heart pumps blood throughout the body. Systolic blood pressure represents the maximum pressure exerted when the heart contracts. Diastolic blood pressure represents the minimum pressure in the arteries when the heart is at rest. With increasing age, arteries tend to stiffen and gradually decrease in elasticity, such that systolic blood pressure tends to increase and diastolic blood pressure decreases.

Table 8.2.2 shows that the prevalence of measured hypertension (systolic and/or diastolic) was 54.5% among respondents aged 50-plus, higher than the self-reported hypertension prevalence of 26.9% seen in Table 7.1.7. High systolic blood pressure was more prevalent than high diastolic pressure. Hypertension increased with age, varied little by sex, was significantly higher in the urban population, and was higher among widowed than married people. Both systolic and diastolic blood pressure declined with increased level of education and with increased income.

**Table 8.2.1** Mean systolic and diastolic blood pressure and pulse rate by selected demographic characteristics

Characteristics	Mean systolic blood pressure (mmHg)	Mean diastolic blood pressure (mmHg)	Mean pulse rate (per minute)	No. of respondents
<b>Age group</b>				
50-59	137.4	84.8	75.4	5,912
60-69	143.6	84.1	75.1	4,192
70-79	147.2	81.5	76.2	2,447
80+	150.5	81.1	78.1	606
<b>Total</b>	<b>141.8</b>	<b>83.8</b>	<b>75.6</b>	<b>13,157</b>
<b>Sex</b>				
Male	141.0	84.4	74.9	6,546
Female	142.5	83.2	76.2	6,611
<b>Total</b>	<b>141.8</b>	<b>83.8</b>	<b>75.6</b>	<b>13,157</b>
<b>Residence</b>				
Urban	136.9	83.1	75.9	6,230
Rural	145.9	84.4	75.3	6,928
<b>Total</b>	<b>141.8</b>	<b>83.8</b>	<b>75.6</b>	<b>13,158</b>
<b>Education</b>				
No formal education	146.2	84.2	77.3	3,037
Less than primary	143.3	84.0	75.1	2,492
Primary school completed	142.1	84.1	75.0	2,766
Secondary school completed	138.8	84.3	75.4	2,612
High school completed	136.8	82.7	75.0	1,660
College completed	136.3	79.5	73.6	585
Post-graduate completed	135.5	77.3	67.4	7
<b>Total</b>	<b>141.8</b>	<b>83.8</b>	<b>75.6</b>	<b>13,158</b>
<b>Marital status</b>				
Never married	142.0	84.1	74.9	148
Currently married	141.1	83.9	75.4	11,156
Cohabiting	144.3	83.2	70.8	28
Separated/divorced	137.6	84.1	75.2	204
Widowed	146.7	83.2	77.0	1,616
<b>Total</b>	<b>141.8</b>	<b>83.8</b>	<b>75.6</b>	<b>13,152</b>
<b>Income quintile</b>				
Lowest	144.8	84.7	76.9	2,131
Second	143.0	83.1	76.0	2,374
Middle	142.0	83.2	75.6	2,684
Fourth	141.3	83.7	74.6	3,059
Highest	138.3	84.5	75.1	2,849
<b>Total</b>	<b>141.8</b>	<b>83.8</b>	<b>75.6</b>	<b>13,097</b>

**Table 8.2.2** Prevalence of measured hypertension by selected demographic characteristics

Characteristics	Measured hypertension prevalence			N
	Systolic	Diastolic	Systolic or diastolic	
<b>Age group</b>				
50-59	40.4	31.2	47.9	5,609
60-69	52.5	29.9	57.6	3,992
70-79	58.9	25.3	62.3	2,309
80+	64.7	26.3	67.2	541
<b>Total</b>	<b>48.7</b>	<b>29.5</b>	<b>54.5</b>	<b>12,450</b>
<b>Sex</b>				
Male	47.7	30.9	54.0	6,138
Female	49.7	28.0	55.0	6,312
<b>Total</b>	<b>48.7</b>	<b>29.5</b>	<b>54.5</b>	<b>12,450</b>
<b>Residence</b>				
Urban	41.2	27.0	48.0	5,720
Rural	55.1	31.5	60.0	6,730
<b>Total</b>	<b>48.7</b>	<b>29.5</b>	<b>54.5</b>	<b>12,450</b>
<b>Education</b>				
No formal education	55.4	31.3	60.8	2,859
Less than primary	50.7	30.7	56.2	2,444
Primary school completed	50.7	30.1	56.5	2,695
Secondary school completed	44.0	30.7	51.0	2,505
High school completed	40.6	24.5	46.1	1,460
College completed	38.0	17.8	41.6	484
Post-graduate completed				3
<b>Total</b>	<b>48.7</b>	<b>29.5</b>	<b>54.5</b>	<b>12,450</b>
<b>Marital status</b>				
Never married	49.4	33.0	55.4	130
Currently married	47.6	29.4	53.6	10,570
Cohabiting	44.6	27.7	50.6	28
Separated/divorced	44.9	26.9	49.1	196
Widowed	57.5	30.0	61.7	1,522
<b>Total</b>	<b>48.7</b>	<b>29.5</b>	<b>54.5</b>	<b>12,445</b>
<b>Income quintile</b>				
Lowest	53.2	34.0	59.7	2,059
Second	49.2	27.3	54.8	2,319
Middle	49.5	28.6	54.6	2,570
Fourth	48.5	28.0	54.1	2,905
Highest	43.9	30.5	50.3	2,539
<b>Total</b>	<b>48.7</b>	<b>29.5</b>	<b>54.5</b>	<b>12,391</b>

Note:

Systolic hypertension: systolic blood pressure  $\geq 140$  mmHg

Diastolic hypertension: diastolic blood pressure  $\geq 90$  mmHg

Systolic or diastolic hypertension: systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg

**Table 8.2.3** Percentage of measured hypertension type by selected demographic characteristics

Characteristics	Hypertension type (%)			No. of respondents
	ISH	IDH	Both high	
<b>Age group</b>				
50-59	34.9	15.7	49.5	2,641
60-69	48.0	8.9	43.1	2,261
70-79	59.5	5.5	35.0	1,415
80+	60.8	3.7	35.5	358
<b>Total</b>	<b>45.9</b>	<b>10.6</b>	<b>43.5</b>	<b>6,675</b>
<b>Sex</b>				
Male	42.6	11.6	45.8	3,257
Female	49.0	9.6	41.3	3,418
<b>Total</b>	<b>45.9</b>	<b>10.6</b>	<b>43.5</b>	<b>6,675</b>
<b>Residence</b>				
Urban	43.7	14.1	42.2	2,701
Rural	47.4	8.2	44.3	3,974
<b>Total</b>	<b>45.9</b>	<b>10.6</b>	<b>43.5</b>	<b>6,675</b>
<b>Education</b>				
No formal education	48.5	8.8	42.7	1,708
Less than primary	45.4	9.8	44.8	1,350
Primary school completed	46.7	10.4	42.9	1,499
Secondary school completed	39.7	13.7	46.6	1,257
High school completed	46.9	11.9	41.2	662
College/post-graduate completed	57.2	8.8	34.0	199
<b>Total</b>	<b>45.9</b>	<b>10.6</b>	<b>43.5</b>	<b>6,675</b>
<b>Marital status</b>				
Never married	40.4	11.0	48.6	71
Currently married	45.1	11.2	43.6	5,570
Cohabiting	45.2	11.9	42.9	14
Separated/divorced	45.2	8.6	46.2	95
Widowed	51.3	6.8	41.9	923
<b>Total</b>	<b>45.9</b>	<b>10.6</b>	<b>43.5</b>	<b>6,672</b>
<b>Income quintile</b>				
Lowest	43.1	10.9	46.0	1,212
Second	50.2	10.2	39.7	1,251
Middle	47.7	9.3	43.1	1,381
Fourth	48.2	10.4	41.4	1,549
Highest	39.3	12.6	48.1	1,257
<b>Total</b>	<b>45.9</b>	<b>10.6</b>	<b>43.5</b>	<b>6,650</b>

Note:

ISH: Isolated Systolic Hypertension, systolic blood pressure $\geq$ 140mmHg and diastolic blood pressure $<$ 90mmHg

IDH: Isolated Diastolic Hypertension, diastolic blood pressure $\geq$ 90mmHg and systolic blood pressure $<$ 140mmHg

Both high: systolic blood pressure $\geq$ 140mmHg and diastolic blood pressure $\geq$ 90mmHg

**Table 8.2.4** Distribution of blood pressure types, by selected demographic characteristics

Characteristics	Blood pressure (%)*						No. of respondents
	Optimal	Normal	High normal	HPT mild	HPT moderate	HPT severe	
<b>Age group</b>							
50-59	16.1	16.3	19.8	26.8	13.9	7.2	5,609
60-69	11.5	13.4	17.6	30.9	17.0	9.7	3,992
70-79	10.0	11.9	15.7	30.8	20.1	11.3	2,309
80+	8.6	12.0	12.1	29.1	25.2	12.9	541
<b>Total</b>	<b>13.1</b>	<b>14.4</b>	<b>18.0</b>	<b>29.0</b>	<b>16.5</b>	<b>9.0</b>	<b>12,450</b>
<b>Sex</b>							
Male	12.9	14.5	18.6	29.4	16.0	8.5	6,138
Female	13.4	14.2	17.4	28.5	17.0	9.5	6,312
<b>Total</b>	<b>13.1</b>	<b>14.4</b>	<b>18.0</b>	<b>29.0</b>	<b>16.5</b>	<b>9.0</b>	<b>12,450</b>
<b>Residence</b>							
Urban	16.1	16.6	19.3	28.0	14.3	5.7	5,720
Rural	10.6	12.5	16.9	29.8	18.4	11.8	6,730
<b>Total</b>	<b>13.1</b>	<b>14.4</b>	<b>18.0</b>	<b>29.0</b>	<b>16.5</b>	<b>9.0</b>	<b>12,450</b>
<b>Education</b>							
No formal education	10.9	12.5	15.8	28.9	18.1	13.8	2,859
Less than primary	12.2	12.6	19.0	28.8	18.0	9.3	2,444
Primary school completed	13.5	13.4	16.6	31.7	15.7	9.1	2,695
Secondary school completed	14.0	16.1	18.9	27.3	17.3	6.4	2,505
High school completed	16.5	16.7	20.7	27.8	13.2	5.1	1,460
College/post-graduate completed	14.5	23.2	20.6	27.0	10.5	4.2	488
<b>Total</b>	<b>13.1</b>	<b>14.4</b>	<b>18.0</b>	<b>29.0</b>	<b>16.5</b>	<b>9.0</b>	<b>12,450</b>
<b>Marital status</b>							
Never married	17.1	11.4	16.0	30.7	12.6	12.1	130
Currently married	13.5	14.7	18.2	28.8	16.0	8.7	10,570
Cohabiting	4.0	27.4	18.0	16.3	34.3	0.0	28
Separated/divorced	13.7	19.4	17.7	29.3	14.7	5.1	196
Widowed	10.2	11.5	16.6	30.0	20.1	11.5	1,522
<b>Total</b>	<b>13.1</b>	<b>14.4</b>	<b>18.0</b>	<b>29.0</b>	<b>16.5</b>	<b>9.0</b>	<b>12,445</b>
<b>Income quintile</b>							
Lowest	11.9	12.6	15.7	28.0	18.5	13.2	2,059
Second	12.1	15.1	18.1	28.6	15.8	10.3	2,319
Middle	13.2	13.4	18.8	30.1	16.1	8.3	2,570
Fourth	13.4	14.0	18.5	30.5	15.9	7.6	2,905
Highest	14.9	16.7	18.2	27.3	16.4	6.6	2,539
<b>Total</b>	<b>13.2</b>	<b>14.4</b>	<b>18.0</b>	<b>29.0</b>	<b>16.5</b>	<b>9.0</b>	<b>12,391</b>

\* Category:

Optimal

Normal

High-Normal

HPT Grade 1 hypertension (mild)

HPT Grade 2 hypertension (moderate)

HPT Grade 3 hypertension (severe)

Systolic(mmHg)

<120

<130

130-139

140-159

160-179

>180

Diastolic(mmHg)

<80

<85

85-89

90-99

100-109

>110

Overall hypertension may be classified as isolated systolic hypertension (ISH) or isolated diastolic hypertension (IDH), using the criteria shown in Table 8.2.2. This distinction is useful in analyzing data on older populations because isolated systolic hypertension is particularly common among respondents aged 60 and older. Table 8.2.3 disaggregates the hypertensive survey population into ISH and IDH categories, and shows that 45.9% of hypertensive respondents had measured ISH only, 10.6% had isolated diastolic blood pressure only, and 43.5% had both. The proportion of hypertensive respondents with isolated systolic hypertension only increased with age, reaching 60.8% among respondents aged 80 and over, while the percentage with isolated diastolic blood pressure only decreased. Women were more likely than men to exhibit isolated systolic hypertension, but less likely to have both ISH and IDH.

Blood pressure measurement may be further disaggregated into six categories, based on WHO classification criteria. The “optimal” blood pressure category has systolic pressure less than 120mmHg and diastolic pressure less than 80mmHg. “Normal” refers to systolic pressure less than 130mmHg, and diastolic pressure less than 85mmHg. “Normal high” levels are systolic between 130mmHg and 139mmHg or diastolic between 85mmHg and 89mmHg. Three grades of hypertension are distinguished: Grade 1 (mild), with systolic between 140mmHg and 159mmHg or diastolic between 90mmHg and 99mmHg; Grade 2 (moderate), with systolic between 160mmHg and 179mmHg or diastolic between 100mmHg and 109mmHg; and Grade 3 (severe), with systolic greater than or equal to 180mmHg or diastolic greater than or equal to 110mmHg.

Table 8.2.4 shows the percent distribution of these six blood pressure types within the SAGE sample. Among all respondents, the proportion of grade 1 (mild) hypertension was the highest, 29.0%, followed by normal high (18.0%), grade 2 (moderate) hypertension (16.5%), normal (14.4%), optimal (13.1%), and grade 3 (severe) hypertension (9.0%). Grade 2 and grade 3 hypertension increased with age, while the non-hypertensive percentages declined with age. While gender differences were small, there were significant differences between urban and rural areas. Moderate and severe hypertension tended to decline as educational level increased, while normal and normal high readings tended to increase with education. The likelihood of all three grades of hypertension was lower among married people than among widowed people. As income quintile increased,

the percentage of respondents with optimal and normal blood pressure gradually increased.

## 8.3 Vision acuity

This survey used the “Tumbling E” vision chart to test distant vision (4m) and near vision (40cm). The near and distant categories were divided into normal vision and low vision as per WHO standards. When vision acuity (including corrected vision acuity using eyeglasses) is more than 0.05 but less than 0.3, it is considered to be low vision. Low vision is visual disability, usually caused by organic diseases of the eye.

### 8.3.1 Near vision acuity

The distribution of near vision acuity measurement is shown in the leftmost three columns of Table 8.3. Low vision respondents were 36.2% of the near vision total. As age increased, there was an increase in the proportion with low vision; the proportion of low vision among respondents aged 80-plus is about 2.4 times higher than among respondents aged 50-59. The proportion with low vision was higher among women than among men, and higher in rural compared to urban areas. There was a steady decline in the proportion of low vision as educational and income level increased, except among respondents who completed college. The proportion of low vision among married people was considerably lower than among widowed people.

### 8.3.2 Distant vision acuity

The distribution of distant vision acuity measurement is shown in the right-hand portion of Table 8.3. The low vision respondents accounted for 9.4%, a much lower percentage than recorded during near vision testing. The distribution of distant vision by respondent characteristics is generally the same as that for near vision.

## 8.4 Grip strength

A Smedley hand dynamometer was used to measure respondent grip strength. Two trials were conducted for each hand, with the overall grip strength calculated as the mean of the best result in each hand. If a respondent had significant hand or arm problems, he or she did not participate in the grip strength test.

**Table 8.3** Distribution of low vision, by selected demographic characteristics

Characteristics	Near visual acuity (%)		N	Distant visual acuity (%)		N
	Normal	Low vision		Normal	Low vision	
<b>Age group</b>						
50-59	73.9	26.1	5,568	96.0	4.0	5,545
60-69	60.4	39.6	3,949	92.2	7.8	3,933
70-79	50.4	49.6	2,239	80.8	19.2	2,198
80+	37.9	62.1	497	58.9	41.1	483
<b>Total</b>	<b>63.8</b>	<b>36.2</b>	<b>12,252</b>	<b>90.6</b>	<b>9.4</b>	<b>12,159</b>
<b>Sex</b>						
Male	67.6	32.4	6,066	92.7	7.3	6,025
Female	60.1	39.9	6,186	88.5	11.5	6,134
<b>Total</b>	<b>63.8</b>	<b>36.2</b>	<b>12,252</b>	<b>90.6</b>	<b>9.4</b>	<b>12,159</b>
<b>Residence</b>						
Urban	69.2	30.8	5,632	91.4	8.6	5,571
Rural	59.2	40.8	6,621	89.9	10.1	6,588
<b>Total</b>	<b>63.8</b>	<b>36.2</b>	<b>12,252</b>	<b>90.6</b>	<b>9.4</b>	<b>12,159</b>
<b>Education</b>						
No formal education	48.7	51.3	2,756	79.6	20.4	2,728
Less than primary	58.2	41.8	2,405	90.9	9.1	2,387
Primary school completed	65.7	34.3	2,667	93.1	6.9	2,652
Secondary school completed	74.1	25.9	2,485	95.3	4.7	2,469
High school completed	77.8	22.2	1,453	97.0	3.0	1,442
College completed	72.2	27.8	483	92.9	7.1	477
Post-graduate completed	44.7	55.3	3	100.0	0.0	3
<b>Total</b>	<b>63.8</b>	<b>36.2</b>	<b>12,248</b>	<b>90.6</b>	<b>9.4</b>	<b>12,159</b>
<b>Marital status</b>						
Never married	61.4	38.6	123	90.4	9.6	122
Currently married	65.8	34.2	10,432	92.2	7.8	10,368
Cohabiting	42.7	57.3	28	93.0	7.0	28
Separated/divorced	64.8	35.2	193	91.7	8.3	190
Widowed	49.8	50.2	1,473	78.2	21.8	1,448
<b>Total</b>	<b>63.8</b>	<b>36.2</b>	<b>12,248</b>	<b>90.6</b>	<b>9.4</b>	<b>12,155</b>
<b>Income quintile</b>						
Lowest	53.5	46.5	1,982	82.1	17.9	1,957
Second	60.2	39.8	2,277	89.3	10.7	2,261
Middle	64.1	35.9	2,531	90.6	9.4	2,527
Fourth	71.1	28.9	2,886	94.1	5.9	2,863
Highest	66.6	33.4	2,518	93.9	6.1	2,494
<b>Total</b>	<b>63.8</b>	<b>36.2</b>	<b>12,194</b>	<b>90.6</b>	<b>9.4</b>	<b>12,101</b>

**Table 8.4** Mean grip strength, by selected demographic characteristics

Characteristics	Mean grip strength (Kg)	No. of respondents
<b>Age group</b>		
50-59	29.8	5,912
60-69	26.2	4,192
70-79	22.0	2,447
80+	18.8	606
<b>Total</b>	<b>26.7</b>	<b>13,157</b>
<b>Sex</b>		
Male	32.8	6,546
Female	20.7	6,611
<b>Total</b>	<b>26.7</b>	<b>13,157</b>
<b>Residence</b>		
Urban	27.3	6,230
Rural	26.2	6,928
<b>Total</b>	<b>26.7</b>	<b>13,158</b>
<b>Education</b>		
No formal education	22.1	3,037
Less than primary	26.1	2,492
Primary school completed	28.4	2,766
Secondary school completed	29.9	2,612
High school completed	28.5	1,660
College completed	26.2	585
Post-graduate completed		7
<b>Total</b>	<b>26.7</b>	<b>13,158</b>
<b>Marital status</b>		
Never married	29.2	148
Currently married	27.5	11,156
Cohabiting	20.2	28
Separated/divorced	27.1	204
Widowed	21.2	1,616
<b>Total</b>	<b>26.7</b>	<b>13,152</b>
<b>Income quintile</b>		
Lowest	25.3	2,131
Second	26.4	2,374
Middle	27.1	2,684
Fourth	27.4	3,059
Highest	27.1	2,849
<b>Total</b>	<b>26.7</b>	<b>13,097</b>

Mean grip strength among respondents aged 50-plus was 26.7 kg (Table 8.4). Mean grip strength decreased with age, from 29.8 kg among respondents aged 50-59 to 18.8 kg among those aged 80-plus. Grip strength was greater for men than for women, and for married compared to widowed people. There were only small differences by income and education, although individuals without formal education scored noticeably lower than others

## 8.5 Mobility

The walking test distance in this survey was 4 meters, which involved walking on flat ground without any obstacles. Respondents were asked to perform two tests, one at their normal walking speed and one at a rapid pace. The test excluded people who were unable to stand or walk, but included respondents who used crutches or other assistive devices. In the sample as a whole, the average walking time at a normal pace was 4.4 seconds, and the average time of rapid walking was 3.3 seconds (Table 8.5). Both result times increased with an increase in respondent age. Women tended to be slower than men, and widowed respondents slower than married people. As educational level and income quintile increased, measured walking times (both normal and rapid) gradually decreased.

## 8.6 Cognition

The cognition measures are based on three tests: verbal recall, verbal fluency, and digit span.

### 8.6.1 Verbal recall

The immediate and delayed verbal recall test assesses learning capacity, memory storage and memory retrieval. In the test, the interviewer read the respondent 10 words, and the respondent was asked to repeat as many as possible. This test was repeated three times in an attempt to saturate the learning curve. After about 10 minutes, verbal recall was tested once more. For this report, one point is given for correctly recalling a word. The average of four tests (three immediate and one delayed) was calculated as the verbal recall score.

The average verbal recall score among all respondents aged 50-plus was 5.4 (Table 8.6.1). Scores decreased

as age increased, and were lower in rural than in urban settings, and were lower among widowed versus married respondents. Gradual increases in recall score were seen as educational level and income rose.

### 8.6.2 Verbal fluency

Table 8.6.1 also shows scores for verbal fluency, a test in which subjects were asked to state as many names of different animals as possible within one minute. This is a test of the ability to retrieve semantic memory information. One point was scored when correctly saying an animal name. The average score of verbal fluency score was 12.8. As with verbal recall, fluency scores decreased as age increased. Verbal fluency scores were higher among men, higher in urban areas, and higher for married people relative to widowed respondents. Verbal fluency increased with both educational level and income quintile.

### 8.6.3 Digit span

Digit span testing assesses concentration, attention and immediate memory. Survey respondents were asked to repeat sets of numbers both forward and backward, with the length of the number sets varying from short to long. Respondents were scored according to the correct length of repeated numbers; the highest score for forward mode was 9 point, and the highest score for backward mode was 8 points. The mean score indicates the average number of numbers recalled.

Table 8.6.2 indicates that the average score for forward digit span was 7, and that of backward digit span was 3.4. Forward and backward scores decreased with increasing age. Both average scores were higher for men, higher in urban areas, and higher for married than for widowed respondents. As with the verbal test scores, digit span scores rose with educational attainment and household income quintile.

### 8.6.4 Overall cognition score

This study created an overall cognition score as one point of comparison with respondents' overall cognition status. The overall cognition score was based on the seven separate components of the cognition tests in SAGE, including the four verbal recall trials, the verbal

**Table 8.5** Mean time of normal walk and rapid walk, by selected demographic characteristics

Characteristics	Mean normal walk (seconds)	No. of respondents	Mean rapid walk (seconds)	No. of respondents
<b>Age group</b>				
50-59	4.0	5,912	2.9	5,912
60-69	4.3	4,192	3.2	4,192
70-79	5.0	2,447	3.8	2,447
80+	6.3	606	4.8	606
<b>Total</b>	<b>4.4</b>	<b>13,157</b>	<b>3.3</b>	<b>13,157</b>
<b>Sex</b>				
Male	4.2	6,546	3.1	6,546
Female	4.6	6,611	3.4	6,611
<b>Total</b>	<b>4.4</b>	<b>13,157</b>	<b>3.3</b>	<b>13,157</b>
<b>Residence</b>				
Urban	4.4	6,230	3.4	6,230
Rural	4.4	6,928	3.2	6,928
<b>Total</b>	<b>4.4</b>	<b>13,158</b>	<b>3.3</b>	<b>13,158</b>
<b>Education</b>				
No formal education	4.9	3,037	3.7	3,037
Less than primary	4.4	2,492	3.2	2,492
Primary school completed	4.2	2,766	3.1	2,766
Secondary school completed	4.1	2,612	3.0	2,612
High school completed	4.1	1,660	3.1	1,660
College completed	4.1	585	3.0	585
Post-graduate completed	5.3	7	4.1	7
<b>Total</b>	<b>4.4</b>	<b>13,158</b>	<b>3.3</b>	<b>13,158</b>
<b>Marital status</b>				
Never married	4.4	148	3.4	148
Currently married	4.3	11,156	3.2	11,156
Cohabiting	5.2	28	3.6	28
Separated/divorced	4.4	204	3.4	204
Widowed	5.1	1,616	3.9	1,616
<b>Total</b>	<b>4.4</b>	<b>13,152</b>	<b>3.3</b>	<b>13,152</b>
<b>Income quintile</b>				
Lowest	4.8	2,131	3.8	2,131
Second	4.5	2,374	3.4	2,374
Middle	4.4	2,684	3.2	2,684
Fourth	4.2	3,059	3.1	3,059
Highest	4.1	2,849	3.0	2,849
<b>Total</b>	<b>4.4</b>	<b>13,097</b>	<b>3.3</b>	<b>13,097</b>

**Table 8.6.1** Mean scores of verbal recall and verbal fluency, by selected demographic characteristics

Characteristics	Mean score of verbal recall	No. of respondents	Mean score of verbal fluency	No. of respondents
<b>Age group</b>				
50-59	5.9	5,912	13.5	5,912
60-69	5.4	4,192	12.8	4,192
70-79	4.8	2,447	11.6	2,447
80+	3.8	606	9.8	606
<b>Total</b>	<b>5.4</b>	<b>13,157</b>	<b>12.8</b>	<b>13,157</b>
<b>Sex</b>				
Male	5.5	6,546	13.4	6,546
Female	5.4	6,611	12.2	6,611
<b>Total</b>	<b>5.4</b>	<b>13,157</b>	<b>12.8</b>	<b>13,157</b>
<b>Residence</b>				
Urban	5.7	6,230	13.6	6,230
Rural	5.2	6,928	12.1	6,928
<b>Total</b>	<b>5.4</b>	<b>13,158</b>	<b>12.8</b>	<b>13,158</b>
<b>Education</b>				
No formal education	4.5	3,037	10.5	3,037
Less than primary	5.2	2,492	12.1	2,492
Primary school completed	5.6	2,766	13.1	2,766
Secondary school completed	6.0	2,612	14.0	2,612
High school completed	6.3	1,660	14.7	1,660
College completed	6.5	585	16.1	585
Post-graduate completed	6.6	7		7
<b>Total</b>	<b>5.4</b>	<b>13,158</b>	<b>12.8</b>	<b>13,158</b>
<b>Marital status</b>				
Never married	4.6	148	12.1	148
Currently married	5.6	11,156	13.0	11,156
Cohabiting	5.9	28	15.1	28
Separated/divorced	5.6	204	14.0	204
Widowed	4.6	1,616	11.2	1,616
<b>Total</b>	<b>5.4</b>	<b>13,152</b>	<b>12.8</b>	<b>13,152</b>
<b>Income quintile</b>				
Lowest	4.7	2,131	10.9	2,131
Second	5.0	2,374	11.8	2,374
Middle	5.4	2,684	12.7	2,684
Fourth	5.8	3,059	13.8	3,059
Highest	6.1	2,849	14.2	2,849
<b>Total</b>	<b>5.4</b>	<b>13,097</b>	<b>12.8</b>	<b>13,097</b>

**Table 8.6.2** Mean scores of the digit span tests, by selected demographic characteristics

Characteristics	Mean score of forward digit span	No. of respondents	Mean score of backward digit span	No. of respondents
<b>Age group</b>				
50-59	7.3	5,912	3.6	5,912
60-69	7.0	4,192	3.3	4,192
70-79	6.5	2,447	3.0	2,447
80+	5.8	606	2.7	606
<b>Total</b>	<b>7.0</b>	<b>13,157</b>	<b>3.4</b>	<b>13,157</b>
<b>Sex</b>				
Male	7.1	6,546	3.5	6,546
Female	6.8	6,611	3.2	6,611
<b>Total</b>	<b>7.0</b>	<b>13,157</b>	<b>3.4</b>	<b>13,157</b>
<b>Residence</b>				
Urban	7.3	6,230	3.7	6,230
Rural	6.7	6,928	3.1	6,928
<b>Total</b>	<b>7.0</b>	<b>13,158</b>	<b>3.4</b>	<b>13,158</b>
<b>Education</b>				
No formal education	6.2	3,037	2.5	3,037
Less than primary	6.9	2,492	3.1	2,492
Primary school completed	7.1	2,766	3.5	2,766
Secondary school completed	7.4	2,612	3.8	2,612
High school completed	7.5	1,660	4.2	1,660
College completed	7.8	585	4.6	585
Post-graduate completed	7.5	7	3.9	7
<b>Total</b>	<b>7.0</b>	<b>13,158</b>	<b>3.4</b>	<b>13,158</b>
<b>Marital status</b>				
Never married	6.9	148	3.0	148
Currently married	7.1	11,156	3.4	11,156
Cohabiting	6.5	28	3.1	28
Separated/divorced	7.1	204	3.5	204
Widowed	6.4	1,616	2.8	1,616
<b>Total</b>	<b>7.0</b>	<b>13,152</b>	<b>3.4</b>	<b>13,152</b>
<b>Income quintile</b>				
Lowest	6.5	2,131	2.7	2,131
Second	6.8	2,374	3.1	2,374
Middle	6.9	2,684	3.3	2,684
Fourth	7.1	3,059	3.6	3,059
Highest	7.5	2,849	3.9	2,849
<b>Total</b>	<b>7.0</b>	<b>13,097</b>	<b>3.4</b>	<b>13,097</b>

fluency test, the forward digit span test and the backward digit span test. Factor analysis was applied to evaluate and generate a single overall score. The higher the overall cognition score, the better the cognition status.

The overall cognition score among respondents aged 50-plus was 57.4 (Table 8.6.3). Differences in overall cognition score by respondent characteristics mimic those already described for verbal recall, verbal fluency, and digit span.

**Table 8.6.3 Mean overall cognition score by selected demographic characteristics**

Characteristics	Mean overall cognition score	No. of respondents
<b>Age group</b>		
50-59	61.7	5,912
60-69	57.0	4,192
70-79	51.4	2,447
80+	42.2	606
<b>Total</b>	<b>57.4</b>	<b>13,157</b>
<b>Sex</b>		
Male	58.4	6,546
Female	56.5	6,611
<b>Total</b>	<b>57.4</b>	<b>13,157</b>
<b>Residence</b>		
Urban	60.2	6,230
Rural	55.1	6,928
<b>Total</b>	<b>57.4</b>	<b>13,158</b>
<b>Education</b>		
No formal education	47.8	3,037
Less than primary	54.7	2,492
Primary school completed	58.9	2,766
Secondary school completed	62.7	2,612
High school completed	65.7	1,660
College/post-graduate completed	68.0	592
<b>Total</b>	<b>57.4</b>	<b>13,158</b>
<b>Marital status</b>		
Never married	50.5	148
Currently married	58.6	11,156
Cohabiting	60.4	28
Separated/divorced	59.4	204
Widowed	49.5	1,616
<b>Total</b>	<b>57.4</b>	<b>13,152</b>
<b>Income quintile</b>		
Lowest	49.9	2,131
Second	53.5	2,374
Middle	56.7	2,684
Fourth	61.1	3,059
Highest	63.7	2,849
<b>Total</b>	<b>57.4</b>	<b>13,097</b>



## 9. Health care utilization and health system responsiveness

### Introduction

This section describes respondents' health-care use and associated costs, and the responsiveness of the health-care system. Health care need is what the respondent reports as a result of not feeling well or believing health care is needed, and may involve various types of medical and health institutions at all levels, including public and private medical treatment, self-treatment (such as visiting a drugstore to buy medicine), home care and use of traditional Chinese medicine. In this section, health care utilization refers to individuals who needed and accessed services. Health-care use is differentiated here in terms of inpatient and outpatient services, and results are presented by selected background characteristics.

Population health, health system responsiveness, and fairness of health financing are considered by the World Health Organization to be three objectives of a health system's performance[68]. Health system responsiveness, as one output of the health system, refers to a reasonable expectation of services based on individual awareness and appropriate response, and the extent to which the system meets reasonable expectations in terms of health improvement. Responsiveness relates to patients' experiences with the health system, with a focus on the interpersonal aspects of the care; it differs from patient satisfaction – a construct that reflects people's expectations in addition to their experiences. This chapter starts with results for inpatient and outpatient health care utilization, followed by explanation of results for how responsive the health system was to users.

### 9.1 Health service utilization

This section describes the distribution of inpatient and outpatient health service use, including respondents needing health care, whether respondents received

health care, and the main reasons for respondents to need health services.

Table 9.1 shows the distribution of respondents according to health care need, with need divided into three categories: care needed more than 3 years ago; care needed within the last three years; and care never needed. Nearly 80 percent of respondents required health care at some point during the past three years, with 15.8% last needing health care more than 3 years ago, and 5.5% never having needed health care. Men were more likely to report never having needed care, or needing care more than 3 years in the past. The proportion of respondents who never had health care needs declined slightly with increased age, and was higher in among the urban population (8.8%) compared to the rural population (2.3%).

Table 9.1.2 indicates whether or not respondents received health care during the three years prior to the survey, and if so, whether the care was inpatient or outpatient. If a respondent received both inpatient and outpatient care, they were classified under "inpatient care". About half of all people in Table 9.1.2 had received outpatient care, slightly more than one in five (22.2%) had inpatient care, and another 28.7% had received no health care during the 3-year period. The proportion receiving inpatient care increased with age before declining among the oldest age group. The proportion receiving outpatient care was somewhat lower in urban versus rural areas. The proportion of respondents who received no health care in the past three years declined as income increased, except among the highest income group. Among respondents of different employment status, public sector workers were most likely to have received inpatient care and least likely (along with informal-sector workers) to have received outpatient care. The proportion of respondents receiving no health care in the past three years was highest for those in informal employment (33.1%).

**Table 9.1.1** Distribution of respondents needing health care, by selected demographic characteristics

Characteristics	Needed health care (%)			N
	More than 3y	Less than 3y	Never needed	
<b>Sex</b>				
Male	17.8	75.8	6.3	5,507
Female	13.8	81.4	4.8	5,691
<b>Total</b>	<b>15.8</b>	<b>78.7</b>	<b>5.5</b>	<b>11,198</b>
<b>Age group</b>				
50-59	17.2	76.5	6.3	4,930
60-69	14.4	80.4	5.2	3,597
70-79	14.7	80.6	4.7	2,173
80+	16.0	80.0	4.0	498
<b>Total</b>	<b>15.8</b>	<b>78.7</b>	<b>5.5</b>	<b>11,198</b>
<b>Residence</b>				
Urban	15.2	76.0	8.8	5,566
Rural	16.4	81.3	2.3	5,632
<b>Total</b>	<b>15.8</b>	<b>78.7</b>	<b>5.5</b>	<b>11,198</b>
<b>Marital status</b>				
Never married	25.1	67.8	7.1	110
Currently married	15.8	78.6	5.6	9,483
Cohabiting	28.4	66.8	4.8	23
Separated/divorced	15.3	77.0	7.7	176
Widowed	14.7	80.9	4.4	1,401
<b>Total</b>	<b>15.8</b>	<b>78.7</b>	<b>5.5</b>	<b>11,193</b>
<b>Income quintile</b>				
Lowest	16.3	74.8	8.9	1,809
Second	17.7	77.8	4.5	1,984
Middle	14.7	80.4	4.9	2,220
Fourth	16.1	79.5	4.4	2,635
Highest	14.5	79.8	5.8	2,495
<b>Total</b>	<b>15.8</b>	<b>78.7</b>	<b>5.6</b>	<b>11,143</b>
<b>Employment</b>				
Public	14.9	78.4	6.7	3,937
Private	17.5	71.4	11.2	1,088
Self	13.5	83.8	2.7	4,962
Informal	16.9	72.1	11.0	316
<b>Total</b>	<b>14.6</b>	<b>80.1</b>	<b>5.4</b>	<b>10,303</b>

**Table 9.1.2** Distribution of respondents by health care receipt in the last three years, by selected demographic characteristics

Characteristics	Received health care in the last three years (%)			N
	Inpatient care	Outpatient care	Did not receive	
<b>Sex</b>				
Male	23.3	47.0	29.7	4,988
Female	21.2	51.0	27.8	5,320
<b>Total</b>	<b>22.2</b>	<b>49.0</b>	<b>28.7</b>	<b>10,309</b>
<b>Age group</b>				
50-59	18.9	51.4	29.8	4,452
60-69	22.0	48.7	29.3	3,367
70-79	29.4	45.3	25.3	2,027
80+	24.8	45.2	30.0	462
<b>Total</b>	<b>22.2</b>	<b>49.0</b>	<b>28.7</b>	<b>10,309</b>
<b>Residence</b>				
Urban	22.4	45.7	31.8	4,793
Rural	22.1	51.9	26.1	5,515
<b>Total</b>	<b>22.2</b>	<b>49.0</b>	<b>28.7</b>	<b>10,309</b>
<b>Marital status</b>				
Never married	17.4	55.0	27.5	97
Currently married	22.3	49.1	28.6	8,712
Cohabiting	34.3	23.9	41.8	21
Separated/divorced	13.3	53.1	33.7	155
Widowed	22.9	48.2	28.9	1,321
<b>Total</b>	<b>22.2</b>	<b>49.0</b>	<b>28.7</b>	<b>10,306</b>
<b>Income quintile</b>				
Lowest	21.8	44.3	33.9	1,631
Second	22.1	48.0	30.0	1,827
Middle	22.3	50.2	27.6	2,090
Fourth	22.8	51.6	25.6	2,453
Highest	21.7	49.4	28.9	2,253
<b>Total</b>	<b>22.1</b>	<b>49.0</b>	<b>28.8</b>	<b>10,253</b>
<b>Employment</b>				
Public	25.1	45.0	29.9	3,526
Private	20.1	53.1	26.8	863
Self	20.5	53.1	26.4	5,038
Informal	21.1	45.8	33.1	268
<b>Total</b>	<b>22.2</b>	<b>50.0</b>	<b>27.9</b>	<b>9,696</b>
<b>Number</b>	<b>2254</b>	<b>4972</b>	<b>2914</b>	<b>10,309</b>

Note: Respondents who received both inpatient and outpatient health care are classified under inpatient care.

The main reasons for the most recent respondent hospitalization and the most recent outpatient treatment during the past 12 months were asked. Table 9.1.3 shows data for the latest inpatient treatment according to three groups of causes, namely: chronic non-communicable disease, acute illness, and other reasons. Chronic non-communicable diseases include diabetes and its complications, heart disease, oral and swallowing problems,

breathing problems, hypertension, stroke, paralysis, and cancers. Acute illnesses are predominantly fever, diarrhea, colds, headaches and coughing. The “Other” category mainly includes communicable disease (infection), maternal and perinatal conditions (pregnancy) or nutritional deficiencies, injury, surgery, depression/anxiety/sleep problems, occupation/work related condition, and pain in joints/arthritis (joints, back, neck).

**Table 9.1.3** Percent distribution of respondents receiving inpatient care in the previous 12 months, by selected demographic characteristics

Characteristics	Non-communicable	Acute	Other	N
<b>Sex</b>				
Male	35.4	4.4	60.2	790
Female	34.3	5.2	60.6	782
<b>Total</b>	<b>34.9</b>	<b>4.8</b>	<b>60.4</b>	<b>1,571</b>
<b>Age group</b>				
50-59	25.5	4.0	70.5	587
60-69	36.7	7.5	55.8	487
70-79	43.2	2.3	54.6	427
80+	50.3	7.1	42.7	70
<b>Total</b>	<b>34.9</b>	<b>4.8</b>	<b>60.4</b>	<b>1,571</b>
<b>Residence</b>				
Urban	45.7	3.7	50.6	746
Rural	25.1	5.7	69.2	826
<b>Total</b>	<b>34.9</b>	<b>4.8</b>	<b>60.4</b>	<b>1,571</b>
<b>Marital status</b>				
Never married	44.7	0.0	55.3	16
Currently married	34.3	4.6	61.2	1,335
Cohabiting	30.4	0.0	69.6	2
Separated/divorced	35.2	22.1	42.7	11
Widowed	37.9	5.5	56.7	208
<b>Total</b>	<b>34.9</b>	<b>4.8</b>	<b>60.4</b>	<b>1,571</b>
<b>Income quintile</b>				
Lowest	27.3	6.2	66.5	250
Second	33.7	4.4	61.9	268
Middle	34.6	6.1	59.3	305
Fourth	37.1	4.0	59.0	398
Highest	39.6	3.5	56.9	330
<b>Total</b>	<b>35.0</b>	<b>4.7</b>	<b>60.3</b>	<b>1,551</b>

Note: Non-communicable diseases include diabetes, heart disease, oral and swallowing problems, breathing problems, hypertension, stroke, paralysis, and cancers. Acute illnesses are predominantly fever, diarrhea, colds, headaches and coughing. The “Other” category includes communicable disease (infection), maternal and perinatal conditions (pregnancy) or nutritional deficiencies, injury, surgery, depression/anxiety/sleep problems, occupation/work related condition, and pain in joints/arthritis (joints, back, neck).

Among all respondents aged 50-plus who received inpatient health care, about one-third had non-communicable diseases and 4.8% had acute illness, while other reasons accounted for 60.4% for their last visit. The proportion with non-communicable diseases increased with age, and was much higher in urban (45.7%) than in rural areas (25.1%). The proportion with non-communicable diseases increased as household income increased.

Table 9.1.4 uses the same disease/illness breakdown of reasons for the latest outpatient health care during the past 12 months. Among all respondents aged 50-plus who received outpatient health care, non-communicable disease accounted for 28%, acute illness for 33.1%, and other reasons for 38.9%. The proportion of men reporting acute illness as a main reason for outpatient care was slightly higher than for women. The proportion

**Table 9.1.4 Percent distribution of respondents receiving the latest outpatient care in the previous 12 months by selected demographic characteristics**

Characteristics	Non-communicable	Acute	Other	N
<b>Sex</b>				
Male	27.4	34.8	37.8	2,915
Female	28.4	31.7	39.8	3,317
<b>Total</b>	<b>28.0</b>	<b>33.1</b>	<b>38.9</b>	<b>6,232</b>
<b>Age group</b>				
50-59	21.7	38.2	40.1	2,702
60-69	30.7	31.2	38.1	2023
70-79	36.4	26.3	37.3	1,239
80+	31.3	28.3	40.4	268
<b>Total</b>	<b>28.0</b>	<b>33.1</b>	<b>38.9</b>	<b>6,232</b>
<b>Residence</b>				
Urban	39.8	25.1	35.1	2,722
Rural	18.8	39.4	41.8	3,510
<b>Total</b>	<b>28.0</b>	<b>33.1</b>	<b>38.9</b>	<b>6,232</b>
<b>Marital status</b>				
Never married	24.8	34.8	40.4	61
Currently married	27.5	33.6	38.9	5,267
Cohabiting	34.4	25.3	40.3	10
Separated/divorced	28.6	33.7	37.7	95
Widowed	31.1	30.1	38.8	798
<b>Total</b>	<b>28.0</b>	<b>33.1</b>	<b>38.9</b>	<b>6,232</b>
<b>Income quintile</b>				
Lowest	20.9	41.1	38.1	877
Second	24.3	38.1	37.7	1,077
Middle	25.5	32.3	42.2	1,287
Fourth	29.5	29.5	41.0	1,570
Highest	36.0	29.3	34.7	1,380
<b>Total</b>	<b>28.0</b>	<b>33.2</b>	<b>38.8</b>	<b>6,191</b>

Note: Non-communicable diseases include diabetes, heart disease, oral and swallowing problems, breathing problems, hypertension, stroke, paralysis, and cancers. Acute illnesses are predominantly fever, diarrhea, colds, headaches and coughing. The "Other" category includes communicable disease (infection), maternal and perinatal conditions (pregnancy) or nutritional deficiencies, injury, surgery, depression/anxiety/sleep problems, occupation/work related condition, and pain in joints/arthritis (joints, back, neck).

with non-communicable diseases increased with age until the oldest ages. The major difference in Table 9.1.4 involved place of residence, with the proportion reporting non-communicable diseases in urban areas (39.8%) more than twice as high as in rural areas (18.8%). Among respondents with different income levels, the proportion citing non-communicable diseases increased as household income increased, while the proportion citing other reasons decreased.

## 9.2 Health system responsiveness

The performance of the general health-care system at the national level was evaluated using indicators of health-care responsiveness. Health system responsiveness consists of eight domains, which may be divided into two groups (see Table 9.2). The first part concerns respect for the individual, including dignity, privacy, autonomy (involvement in decision-making about personal health care), choice (of provider) and communication (with provider); the second part is patient-centered, including timeliness/prompt attention, social support, quality of care, infrastructure quality and access/selectiveness. Results for the seven domains covered in SAGE are presented: dignity, confidentiality, prompt attention, autonomy, quality, access and communication.

**Table 9.2 Health responsiveness domains**

Group	Domain	Issue
Interpersonal	Dignity	Talked respectfully
		Privacy
	Communication	Clear explanations
		Time for questions
	Autonomy	Treatment information
		Patient involvement
	Confidentiality	Talk privately
		Confidentiality of records
Structural	Choice of health care provider	Choice of provider
	Quality of basic amenities	Cleanliness
		Space
	Access to support	Family visit
		External contact
	Prompt attention	Travel time
		Waiting time

Health system responsiveness scores are quantitative indicators of the interaction between individuals and their health system, in this case differentiated by inpatient and outpatient experience. SAGE collected information on respondents' impressions of their most recent health care visit from seven dimensions, including waiting time, being treated respectfully, clear explanations, being involved in making treatment decisions, talking privately, happiness with providers, and cleanliness in the health facility. Each dimension had one score to scale responsiveness. Factor analysis was applied to evaluate the total responsiveness score using factor scores. Responsiveness scores range between 0 and 100, with a higher score reflecting better system responsiveness.

The mean inpatient health care responsiveness score among all respondents was 71.7, higher than the outpatient service responsiveness score of 64.7 (Table 9.3). The mean inpatient score in urban areas (69.4) was somewhat lower than that in rural areas (73.7). Other differences in Table 9.3 were rather small.

## 9.3 Health insurance coverage

Health insurance was divided into two types, mandatory and voluntary. In China there are mainly two mandatory insurance programs, a basic medical insurance for urban employees and a relatively new cooperative medical insurance program in rural areas. There also is voluntary insurance referring to commercial insurance. Table 9.4 shows the insurance coverage of respondents by urban/rural residence and by income level. Mandatory insurance coverage was 76.7% among all respondents, 67.1% in urban areas and 85.3% in rural areas. Proportions with either voluntary insurance or no insurance coverage were higher in urban areas. While differences in mandatory and voluntary insurance coverage by income quintile were modest, the proportion of respondents having both types insurance increased as income level rose. The proportion of people with no insurance was highest in the poorest quartile (17.6%).

**Table 9.3** Mean health care responsiveness scores by selected demographic characteristics

Characteristics	Inpatient	N	Outpatient	N
<b>Sex</b>				
Male	71.4	743	64.5	2,854
Female	71.6	721	64.9	3,264
<b>Total</b>	<b>71.5</b>	<b>1,464</b>	<b>64.7</b>	<b>6,118</b>
<b>Age group</b>				
50-59	71.6	5,47	64.6	2,661
60-69	71.5	4,58	64.8	1,975
70-79	71.7	3,91	64.4	1,224
80+	69.9	68	66.3	259
<b>Total</b>	<b>71.5</b>	<b>1,464</b>	<b>64.7</b>	<b>6,118</b>
<b>Residence</b>				
Urban	69.3	676	63.2	2,583
Rural	73.6	719	65.8	3,322
<b>Total</b>	<b>71.5</b>	<b>1,395</b>	<b>64.7</b>	<b>5,905</b>
<b>Marital status</b>				
Never married	62.4	14	64.0	59
Currently married	71.7	1,240	64.5	5,167
Cohabiting	91.4	2	83.7	10
Separated/divorced	69.2	12	64.5	92
Widowed	71.1	196	65.6	789
<b>Total</b>	<b>71.5</b>	<b>1,464</b>	<b>64.7</b>	<b>6,118</b>
<b>Income quintile</b>				
Lowest	71.4	239	63.8	874
Second	72.6	240	64.3	1,060
Middle	71.8	277	66.3	1,247
Fourth	71.8	368	65.1	1,539
Highest	70.4	319	64.2	1,356
<b>Total</b>	<b>71.5</b>	<b>1,444</b>	<b>64.7</b>	<b>6,077</b>

**Table 9.4** Health insurance coverage by selected demographic characteristics

Characteristics	Mandatory	Voluntary	Both	None	N
<b>Residence</b>					
Urban	67.1	8.0	6.9	17.9	6,206
Rural	85.3	4.3	6.9	3.5	6,867
<b>Total</b>	<b>76.7</b>	<b>6.1</b>	<b>6.9</b>	<b>10.3</b>	<b>13,073</b>
<b>Income quintiles</b>					
Lowest	75.9	4.7	2.0	17.4	2,123
Second	81.0	6.0	3.3	9.6	2,372
Middle	77.9	5.3	7.7	9.1	2,682
Fourth	76.9	6.1	9.6	7.4	3,053
Highest	72.1	7.9	10.0	10.0	2,843
<b>Total</b>	<b>76.7</b>	<b>6.1</b>	<b>6.9</b>	<b>10.3</b>	<b>13,073</b>



## 10. Well-being and quality of life

Life expectancy around the world rose by about two decades during the past half century. This increase has been associated with economic growth and rising levels of happiness globally. An increased interest from scientists in studying happiness and its relationship to health and health-related outcomes on the one hand, and economic development on the other, has also been associated with increasing attention to measures of subjective well-being by policy makers. The call for governments to focus on the well-being of their population as a means of measuring progress has meant that the science of well-being has become mainstream in health and social policy [69, 70]. However, the science is still nascent, and controversies abound with regard to conceptualization, measurement and translation of findings into interventions at the individual and population level.

Well-being and quality of life encompass subjective individual feelings about physical health, psychological state, degree of independence, social relationships, personal beliefs, and environment. Psychologists, sociologists and others have tried to quantify measurement of this inherently subjective topic using various concepts such as well-being, subjective well-being, happiness and life satisfaction.

The relationship between subjective well-being and ageing is unclear. Individual aspirations and adaptations to circumstances of health and life influence happiness over the life course. As health declines with age, happiness tends to decline, especially among those with poorer health. Nevertheless, circumstances such as marriage and the extent and nature of social support clearly modify subjective well-being, depending on the cultural context. The effect of ageing on happiness varies internationally, with the decline in life satisfaction with age being more notable in low- and middle-income countries. In high-income countries, this relationship is not monotonic – among the English-speaking high-income countries, the relationship is U-shaped [71].

Understanding differences in the well-being of older adults across and within countries will have significant implications for national policies. As people live longer and the proportion of the older adult population rises, the way they spend their time, the circumstances in which they live, the nature of their work and leisure activities, and changes in these over time, will need to be tracked along with their health and its determinants, to inform all aspects of policy-making. Estimates of national well-being (and inequalities within nations) will make it possible to assess how policies affect people's lives, and perhaps to allocate resources more appropriately. Lessons from comparisons within and across countries will provide important insights into what may be responsible for these differences, given the varying contexts of these populations.

For the purposes of measurement, the notion of subjective well-being can thus be separated into experienced happiness (the affective experiences of daily life) and evaluative life satisfaction. Experienced happiness fluctuates from day-to-day, depending on how people use their time. SAGE used the Day Reconstruction Method (DRM) to measure the evaluative well-being/happiness component of subjective well-being [28]. Evaluative life satisfaction is often measured with single questions such as, "All things considered, how satisfied are you with your life as a whole these days?" or, "Taking all things together, these days, would you say you are very happy, happy, neither happy nor unhappy, unhappy or very unhappy?" These types of overall satisfaction questions can also be asked of specific domains such as health, living environment and other areas of life. Life satisfaction is expected to be fairly stable over short durations of time (for instance, from week to week). SAGE used the eight-item WHO Quality of Life (WHOQoL) instrument to measure evaluative well-being [28, 72].

## 10.1 Happiness and experienced well-being

Experienced happiness is often measured using the experience sampling method (ESM), a gold-standard technique in which respondents are prompted at random intervals to record their feelings and activities [73, 74]. The DRM, which combines experiential and time-use assessments, is a reasonable approximation of the ESM technique. The methodology of the DRM entails asking respondents to think about the preceding day, break it down into episodes and then describe each episode in terms of the activity engaged in, who else was with the respondent, the accompanying positive and negative emotions, the amount of control the respondent had over the activity and the context in which the activity was carried out.

The DRM results in SAGE-China showed that people were more likely to spend larger portions of their day in a positive emotional state (Figure 10.1). Consistent with many reports of happiness, duration-weighted net affect (difference between amount of time spent in positive versus negative affect over the course of yesterday) was lower in earlier adulthood in China, between the ages of late 20s and late 30s, with more positive overall experienced well-being in earlier and later adulthood. Following the low point in the early 30s, affect improved steadily through older ages. Negative affect does not imply lack of positive affect, nor the reverse, but was shown to be quite consistent over all age groups with positive affect – with possibly less change than positive affect over all age groups.

Positive affect seemed highest in the early and late adult ages, implying some adaptations to life and life circumstances with age. Experienced well-being adds information to life satisfaction, described in 10.2 below, when assessing impact on health.

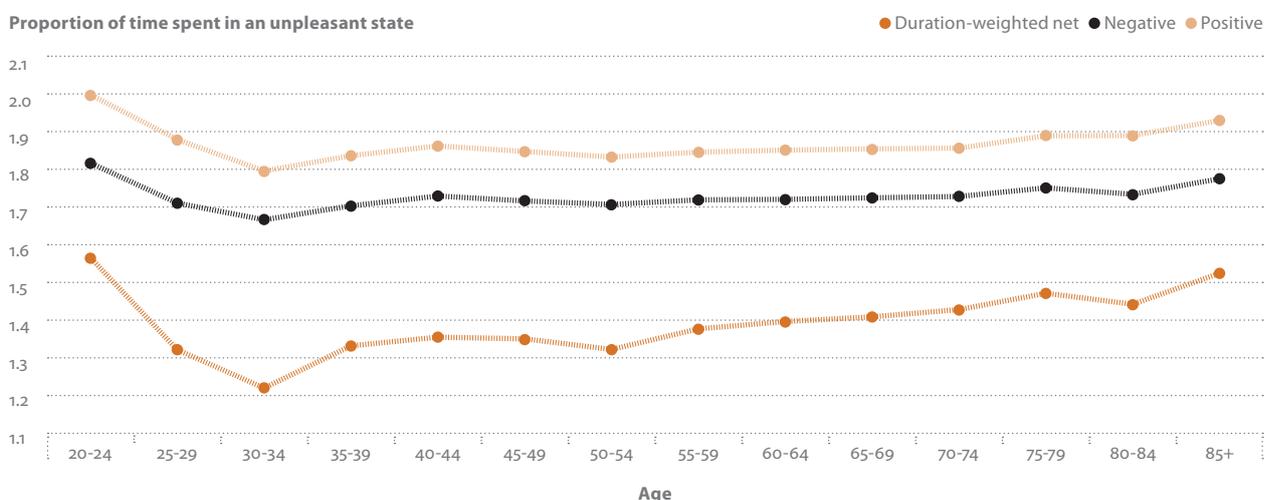
## 10.2 Life satisfaction or evaluative well-being

The World Health Organization initiated its Quality of Life project in 1991, with the aim of developing a cross-culturally comparable quality of life assessment instrument. The WHO Quality of Life Questionnaire (WHOQoL) has become an effective tool for assessing individual perceptions in the context of their culture and value systems, and their personal goals, standards and concerns.

The WHOQoL assesses several domains of an individual's life quality, including physiology, psychology, independence, social relationships, the environment, and spiritual or religious beliefs. The questionnaire has been validated cross-nationally, and has been modified for use in older subpopulations and successfully applied to aging research in Europe [75]. A shortened version of WHOQoL, the WHOQoL-8, was used in this survey. WHOQoL-8 scores range from 0 to 100, but in contrast to the other composite scores presented earlier, a higher score indicates poorer self-reported quality of life.

The average WHOQoL score among respondents aged 50-plus was 47.9 (Table 10.1), with men scoring slightly lower than women. The overall WHOQoL score increased

**Figure 10.1** Experienced well-being as measured by the Day Reconstruction Method (percent of day in positive, negative or duration-weighted net affect by age group)

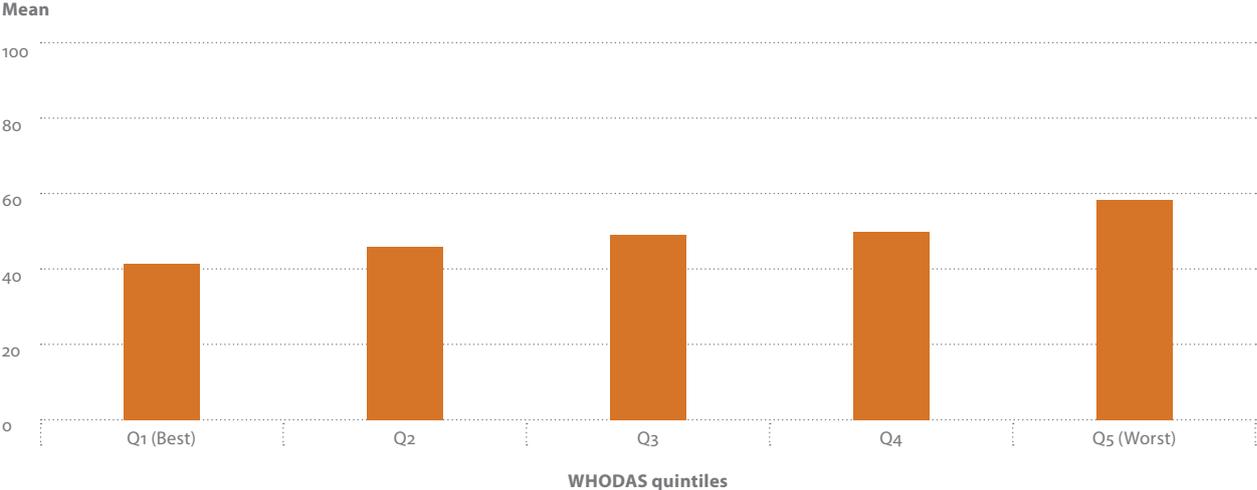


Source: SAGE 2007-2010

**Table 10.1** Mean WHOQoL scores by selected demographic characteristics

Characteristics	Mean WHOQoL score	No. of respondents
<b>Sex</b>		
Male	47.1	6,546
Female	48.6	6,611
<b>Total</b>	<b>47.9</b>	<b>13,157</b>
<b>Age group</b>		
50-59	47.1	5,912
60-69	48.0	4,192
70-79	49.2	2,447
80+	48.7	606
<b>Total</b>	<b>47.9</b>	<b>13,157</b>
<b>Residence</b>		
Urban	46.3	6,230
Rural	49.3	6,928
<b>Total</b>	<b>47.9</b>	<b>13,158</b>
<b>Education</b>		
No formal education	49.9	3,037
Less than primary	49.9	2,492
Primary school completed	47.8	2,766
Secondary school completed	46.5	2,612
High school completed	45.2	1,660
College completed	42.9	585
Post-graduate degree completed	36.4	7
<b>Total</b>	<b>47.9</b>	<b>13,158</b>
<b>Marital status</b>		
Never married	46.8	148
Currently married	47.5	11,156
Cohabiting	47.4	28
Separated/divorced	50.8	204
Widowed	50.3	1,616
<b>Total</b>	<b>47.9</b>	<b>13,152</b>
<b>Income quintile</b>		
Lowest	54.2	2,131
Second	50.0	2,374
Middle	47.1	2,684
Fourth	46.4	3,059
Highest	43.5	2,849
<b>Total</b>	<b>47.9</b>	<b>13,097</b>

**Figure 10.2 WHOQoL score by WHODAS quintiles\***



\* Note: Higher WHOQoL scores connote worse QoL. The lowest WHODAS quintile is best functioning (no disability) and highest quintile equals poorest functioning (highest disability).

slightly with increasing age group, through ages 70-79 years. The score in urban areas was lower than in rural areas, indicating a better self-reported quality of life in urban areas. As level of education and household income quintile increased, the average WHOQoL score trended downward (that is, better reported quality of life). This measure also indicated that widowed respondents had a worse quality of life than did married people.

**10.3 Comparison of quality of life (WHOQoL) and disability (WHODAS)**

A brief examination of the relationship between quality of life and disability by age and income quintile provides a snapshot of the dynamics between these two elements. WHOQoL scores were compared to WHODAS score quintiles, and the results are shown in Figure 10.2. As WHODAS score quintiles increased from low to high, WHOQoL scores rose as well, meaning a relationship between low quality of life and higher disability, and higher quality of life and lower disability that needs to be further explored.



## 11. Emerging policy and research issues

### 11.1 International plan of action on ageing

The world is getting older. The ageing of the world's population is a matter of concern for everyone – all generations in all countries, both developing and developed. To address the challenges associated with this momentous demographic shift, the United Nations General Assembly convened the Second World Assembly on Ageing in April 2002 in Madrid, Spain.

The Madrid International Plan of Action on Ageing (MIPAA), which was adopted during the 2002 World Assembly, is the second international agreement to offer recommendations and guidance to countries seeking to develop and implement policies and programmes on ageing. It reflects the changes that took place over twenty years in the situation of older persons around the world, and represents an evolution in the approach to social policy, to the ageing of societies and to older persons. And it offered a bold new agenda for handling the issue of ageing in the 21st century, focusing on three priority areas: older persons and development; advancing health and well-being into old age; and ensuring enabling and supportive environments [76].

### 11.2 National policies on ageing

In China, a new National Ageing Development 12<sup>th</sup> Five-Year Plan was formulated in 2011 to cater to the challenges of ageing during the period 2011-2015 [77]. The plan identified several key tasks, to: (1) Further improve the old-age social security system, especially with regard to society's poorest elders; (2) Encourage medical and health institutions to set up health archives and organize regular health checks for older people, and pay more attention to health education, spiritual

care and psychological comfort; (3) Enhance family support policies for older people, particularly with regard to elder care; (4) Create multidisciplinary old age community care programs to speed the development of nursing rehabilitation services; (5) Accelerate construction of old-age activity centers, sports fitness facilities, and barrier-free facilities to enrich the educational and cultural lives of older people; (6) Address industry policies targeting old age to promote assistive devices and services, as well as product development for this population; and, (7) Strengthen the foundation of the legal system with respect to legal services for older adults.

### 11.3 Key research issues

In China, aging-related research, particularly in the area of health, started later than in most developed countries. Nevertheless, past studies have accumulated valuable data for the development of an aging research literature, and have laid a good foundation for further research. China's aging studies initially emphasized sociological and demographic effects. These data were unable to reveal the intrinsic links between health and other domains of life, or the interactions between variables such as health, income, household structure, etc. In addition, survey instruments and survey methods were underdeveloped compared to some countries and international research efforts, resulting in a lack of comparability between China and other countries and between China's different regions.

China presently is in a critical period of new health care reform, and the Chinese government has proposed universal access to basic health insurance as a short-term goal. The government is actively developing a comprehensive health services package that includes a basic medical insurance system, a basic drug system,

and a primary health care service system. Correct formulation of policies and measures should be based on a large body of evidence. While the initial SAGE-China data can help fill many research gaps, additional research issues and themes on ageing in China should be investigated.

### **1. Health problems and health care demands**

The older population is characterized by a high prevalence of illness, declines in daily living ability, and other health problems, thus generating a heavy demand for health care. At the same time, the older population is the most vulnerable age group in terms of the ability to pay for health, and the current medical model is still far from meeting their health needs. The new medical reform proposes fairness and accessibility of health insurance, goals that need particular consideration with regard to the older population. How to effectively provide medical care in view of the socioeconomic characteristics of older people has become an important challenge for China's medical reform. More health-relevant evidence is required to understand the true extent of underlying need.

SAGE Wave One collected rich data on health status, health service needs, and utilization of existing health services, and illuminated differences among socioeconomic groups in order to provide the health insurance reform process with a wealth of data support regarding China's older population. SAGE data can be used as important complements and comparisons to the Chinese National Health Survey and health surveillance efforts such as the National Chronic Disease Risk Factor surveillance.

In addition, health promotion and preventive care for the elderly should be emphasized. The uneven accessibility of health care services in urban and rural areas needs urgent attention in the next SAGE waves.

### **2. Ageing and socioeconomic inequality**

Age structure changes and prospective ageing in China, along with their ramifications for the economy and the society, are increasingly attracting attention from researchers and policy-makers. Facing the challenges of an ageing society, researchers and policy-makers must better understand the complex interrelationships of the work, economic status, family structure and health outcomes of the aging population. The SAGE data indicate that socioeconomic inequality and disparities in health outcomes are significant among older people in

China, mainly characterized by: (1) sharp contrasts between economic conditions in urban and rural areas; and (2) regional and gender disparities in health outcomes of Chinese elders. However, these topics beg for further research, and would benefit from analytical comparisons of SAGE data with data from other studies in China, both at the national and regional level.

### **3. Improvements in the social security system**

Another serious issue in China is the inadequacy of the social security system for the aged, especially in rural areas. At present, rural elders mainly depend on family support. According to the 2000 China Urban and Rural Elderly Survey, 85 percent of rural elders aged 60-plus rely on family support to live [78]. So it is urgent for policymakers to speed up the reform of the old-age security system to provide institutional support for smooth economic and social transitions. The SAGE data demonstrate that the coverage of China's health insurance is comparatively wide, but that coverage levels are too low, especially in rural areas. Further policy-oriented research is therefore crucial. The questionnaires of CHARLS include abundant information in this area, and it will be important to use both SAGE and CHARLS to provide more data and evidence.

### **4. Availability of family support and demand for assisted living**

As the proportion of empty-nest households among respondents aged 50-plus is high, and care for older households is declining, the situation of providing home care for the aged in China is serious. Taking good care of the elderly has become a difficult problem both for the government and society.

The traditional-style pension is still the underpinning of elderly well-being in rural areas, and children provide the primary support for older persons. With economic development and the rapid process of urbanization, changes in family structure and large-scale movements of population have had a major impact on the traditional pension model, but government has failed to quickly prepare for the challenge.

SAGE data have begun to shed light on the relationship between old-age health status and the need for household support. Additional information on changes in health status and support demand should be targets in the follow-up data collection process of SAGE.



One area that was not well-documented in the first round of SAGE-China has to do with the daily care of older persons. It would be useful to coordinate information from SAGE with that from other ageing studies such as the Chinese Longitudinal Healthy Longevity Survey (CLHLS) and the China Health and Retirement Longitudinal Study (CHARLS), both of which have paid attention to providing support. A caregiving module will be included in SAGE-China Wave 2.

##### **5. Pension reform and management of retirement**

China now faces problems similar to those in developed countries in terms of funding its pension schemes, and several proposals have been made to increase the retirement age so as to ease the economic burden on younger generations. SAGE provides some information about the cognition and health status of older and/or retired people. As people aged 50-plus are seen to provide more support than they receive, it seems feasible to consider innovative employment opportunities for older people. Promoting productivity among older adults is probably beneficial to society as well as to older people themselves.

Although protecting employment and welfare of the old is important, generating work opportunities for the young is equally if not more important.

Thus, a flexible wage structure may be considered to allow the old to continue working after the mandatory retirement age. Alternatively, older people can be redeployed in other areas of work that require less physical strength and are less mentally demanding, such as caregiving. A pilot study in this area may be necessary. Perhaps the young-old can begin to offer their services to the old-old, or even to young children, whether with reward or otherwise, so that they can “free” working-age adults to concentrate on their jobs. In this way, although their contribution is indirect, it helps to instill sense of worth and fulfillment among the elderly. However, the question of mobilizing older people remains, and more evidence is required.

In conclusion, a comprehensive policy for promoting the health and well-being of older persons – which takes into consideration health, social security, housing, environment, the family and community – should be in place. The development of such a policy needs more research on which to rest. China is fortunate in a way, as it has time to prepare itself for the challenges of an ageing population.



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