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Healthy Aging in China

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Abstract

China has aged rapidly and the rate is accelerating in decades to come. We review positive and negative forces for healthy aging in China now and in the future. The most positive force is the spectacular growth in education over time especially for Chinese women, which should improve all dimensions of cognitive and physical health and eliminate vast gender disparities in healthy aging that currently exist.

Other positive forces include increasing detection and treatment of disease and the availability of health insurance and health services so that diseases like hypertension and diabetes do not remain silent killers in China. Transparency is eased on the research level by publicly available data such as CHARLS, a sharp departure from prior scientific norm in China.

Negative forces center on disturbing trends in personal health behaviors such as growing rates of smoking (among men) and obesity (for both genders), and pollution—,especially in urban centers. Public health campaigns and incentives are needed on all these fronts so that predictable long-term consequences of these behaviors on older age disease are not realized.

There will not be a simple demographic fix to healthy aging in China as fertility rates are unlikely to rise much, while migration will likely continue to rise leaving growing numbers of elderly parents geographically separated from their adult children. Government policy will have to allow migration of elderly parents to live with their adult children while reducing the rigid connection of policy (health insurance and health services) with place of residence.

Keywords

healthy aging; China; retirement

1. Introduction

China has entered into an aging society and will continue to age rapidly in the future while many elderly Chinese remain quite poor. The challenge of population aging in China will come from two sides—economic support and elderly care. Healthy aging can potentially lessen burdens in both areas by reducing or delaying the need for economic support and elderly care. In addition, the future pattern of elderly care in China is likely to fundamentally change due to past fertility reductions and migration patterns that increasingly geographically separate parents from their adult children. The "problem" of population aging is easy to state—to provide income and health security at older ages and to do so at affordable budgets (Smith, 2012; Lee and Mason, 2010).

Throughout this paper we will use data from The China Health and Retirement Longitudinal Study (CHARLS). CHARLS, directed by the lead author of this paper (Zhao et al., 2013), is a nationally representative longitudinal survey of those 45+ in China and their spouses. CHARLS includes assessments of social, economic, family, and health circumstances of community residents (Zhao et al., 2014a). The purpose of CHARLS is to provide publicly available data to researchers in China and around the world and to those in government free of charge to help prepare China for health and economic adjustments to rapid population aging in China. The national baseline survey was conducted between June 2011 and March 2012 on 17,708 respondents living in 10,257 households in 450 villages/urban communities with an average response rate of 80.5%.

Three sampling stages were used. In the first stage, all county-level units in the country, outside Tibet, were stratified by region, within region by urban district or rural county, and by GDP per capita. After this stratification, 150 counties or urban districts were chosen with probability proportional to population size (Zhao et al., 2014a). For each county-level unit, 3 PSUs (villages and urban neighborhoods) were randomly chosen with probability proportional to population (Zhao et al., 2014a). Hence CHARLS is nationally representative and representative of both rural and urban areas within China. Counties and districts in 28 provinces are included in the CHARLS sample. In light of the outdated household listings at the village/community level due to population migration, CHARLS designed mapping/listing software making use of Google-earth map images to list all dwelling units in all residential buildings to create sampling frames within PSUs.

CHARLS respondents will be followed every two years using a face-to-face CAPI interview. Physical measurements are conducted in every wave so far, while blood sample collection takes place every two waves. CHARLS is closely modelled after the Health and Retirement Surveys around the world so that tight comparisons can be made across countries at various stages of economic development. The data in this paper are all weighted using sampling weights, adjusted for survey non-response.

We organize the paper as follows. The next section summarizes salient past and future trends in population aging in China. The second section discusses health patterns of Chinese elderly and what those trends imply for the future. These health patterns include cognitive

health, physical health outcomes, health behaviors, and the provision of health care. Section 3 presents a parallel discussion for living arrangement of the Chinese elderly.

2. Population aging in China

There are several key demographic trends with rapidly changing population aging around the world, and China is no exception. In 1950, average life expectancy was around 40 years in China, but over the subsequent 60 years life expectancy improved dramatically—to around age 70 (Chinese Academy of Social Sciences, 2010). Nor is there any sign of much abatement in these trends. The best demographic projections foresee additional added years of life with China reaching life expectancies of about 80 years, double the level that existed 100 years earlier (Chinese Academy of Social Sciences, 2010).

The second and more important driving demographic force in Chinese population aging is trends in fertility. Using 1950 again as the starting point, average fertility in China was around six children per woman (United Nations, 2012). The speed of the subsequent decline to below replacement levels was rapid in China, no doubt partly due to the one-child policy although the fertility decline did precede implication of the strict one child policy rules (Lei et al., 2012). However, a comparison of fertility trends in India and China from levels of six children per woman in 1950 to below replacement levels of 1.9 in both countries by 2050 suggests that Chinese fertility decline would have happened anyway, although not at the same rapid speed (Smith, 2012). It also suggests that future relaxation of one child policy rules in China will not result in large increases in fertility, implying that this possible demographic change will not be a significant part of adjustments necessary to population aging.

While declining mortality and especially fertility contribute to population aging by making populations on average “older,” it is important to remember that both these fundamental causes of population aging represent enormous progress in the human condition around the world and especially in China.

At the same time, population aging raises important challenges in ensuring a good life for older people in China as they attempt to maintain income security and lower health risk at older ages. Figure 1 plots Chinese population shares for four age groups—60 plus, 65 plus, 70 plus and 80 plus across a one hundred year period starting in 1950. Over the first fifty years plotted in Figure 1 up to the year 2000 changes due to population aging in China were relatively small. To illustrate, the fraction of Chinese people over age 59 was10% in the year 2000 compared to 7.5% 50 years earlier in 1950. Similarly the fraction over age 79 was not only very small but it did not change much over this time period (from 0.3% to 1%).

The next 55 years will be quite different as these Chinese older age population shares will increase at accelerating rates. In the 50 years between 2000 and 2050 the fraction of the Chinese population who are over age 59 more than triples from 10% to 33%.[1] Especially after calendar year 2025, the fraction of the Chinese population eighty years or older begins to accelerate reaching 6.5% in 2050.

[1]Numbers in the rest of this section are calculated from United Nations, 2012.

We included the fraction of the Chinese population over age 64 and over age 69 in Figure 1 for a reason. Support ratios are meant to provide a simple summary of the fraction of the elderly population not receiving financial income from work and so will need to be supported in some other way. If the average age of retirement increases from age 60 to age 65 or even to age 70, a comparison of fractions of the population over age 60 and those over age 64 or over age 69 informs us in a simple way about changing fractions of elderly who need financial support from sources other than their current work. In the year 2050 these fractions are quite different as one-third of the population will be over age 60 while 24% of the population will be age 65 or older and 17% will be age 70 or older.

Increases in the retirement age not only make it easier to support growing numbers of elderly because the numbers of those needing support would be lower but also because the numbers providing support as workers will be larger. The conventional method of demonstrating this is to use support ratios- the number of workers divided by the numbers of elderly. In 2015, the elderly support ratio at a retirement age of 60 is 4.1 workers (defining 20 as work starting age) per person 60 and older. If the retirement age remains at age 60, this support ratio would fall to 1.4 workers per retiree in 2050. If workers had to fully finance retirees at incomes equal to their own the tax rate to finance elderly income benefits would rise from 20% in 2015 to 41% in 2050.

If instead the retirement age rises to age 65 by 2050, the elderly support ratio would be 2.4 workers per retiree instead of 1.4 and the required tax rate would rise to 30% instead of the 41% rate with no change in retirement age. Similarly if the retirement age rises to age 70 by 2050, the elderly support ratio would be 3.6 workers per retiree and the required tax rate would be 22%. Thus an increase in the average retirement age from age 60 to age 65 and especially to age 70 would make a significant contribution toward financing income support for the elderly in China.

Presently retirement is an alien concept for most Chinese elderly because in rural areas where the majority of elderly Chinese live there is no such thing as retirement. People work as long as they are physically able to. This means that the current support ratio is far higher than what the demography implies. However, the great majority of younger people are already living in cities or in nonfarm employment even though they may be living in rural areas. Urbanization is likely to accelerate in decades to come. When these people become old in 2050, they are very likely to retire from the formal retirement system afforded to urban workers today and the support ratio will become binding. Current retirement age for urban people is 60 for men, 50 for female workers and 55 for female cadres. With population aging so rapidly, this will become unsustainable.

Postponing retirement age by itself cannot do the full job. Whether or not retirement can be postponed critically depends on the health status of the elderly. If the extra years of life are healthy, then it would be feasible for the elderly to contribute part of it toward supporting themselves.

3. Health Patterns of Chinese Elderly

In this section we highlight salient facts about the health of the older Chinese population using nationally representative CHARLS data. We begin with a discussion of cognitive health of older Chinese people with a focus on both understanding age patterns and gender differences in cognition. That same focus is maintained when we move on to physical health differences. Both cognitive and physical health exhibit strong negative age patterns and significant gender disparities to the disfavor of Chinese women. Next, we discuss some important changes taking place in China that may fundamentally alter patterns of healthy aging in the future. These changes are taking place both in personal health behaviors and attributes of the Chinese people as well as in the health sector in the provision of health care and health insurance.

3.1. Cognitive Health

Cognitive skills are important for many decisions including those involving health (Cutler and Leras-Muney, 2012). Education is a major determinant of cognitive skills around the world including China and education has a persistently strong association with many health outcomes including mortality (Elo and Preston, 1996; Kitagawa and Hauser, 1973). The more cognitively able not only live longer but they have been shown to be healthier in many other ways including fewer health conditions, adopting better health behaviors, and practicing better adherence behavior to medicines (Goldman and Smith, 2002). These patterns have been persistent in developing and developed countries alike (Strauss et al., 2010.)

Figure 2 plots changes with age by gender in two cognition measures available in the CHARLS—intact mental status and episodic memory (McArdle et al., 1998). In CHARLS, intact mental status questions include the following items—serial 7 subtraction from 100 (up to five times), naming today's date (month, day, year, and season), the day of the week, and ability to redraw a picture shown to /her/him. Answers to these questions are aggregated into a single mental status score that ranges from 0 to 11. Episodic memory captures the ability of respondents to immediately repeat in any order ten Chinese nouns just read to them (immediate word recall) and to recall the same list of words four minutes later (delayed recall). Episodic memory is the average of immediate and delayed recall scores.

Figure 2 illustrates two main facts about cognition for older people in China—large cognitive deficits among Chinese women compared to Chinese men especially in mental intactness and sharp declines with age for both genders, albeit larger declines for Chinese women compared to Chinese men.

Figure 2 would seem to point to a dismal aging future and decline for Chinese people especially for Chinese women but help is already well on the way. The data in Figure 2 capture age differences at a given point in time (in calendar year 2011) and should not be used to predict the future age path of cognition for these people. The reason is that these age paths also are a product of other differences among birth cohort that help shape adult cognitive skills. In China, the most important differences between birth cohorts are a reflection of dramatic improvements in education over time particularly for Chinese women.

To illustrate, among those Chinese women (men in parenthesis) age 75 and over 80 (40%) were illiterate and one in a hundred (6%) had a high school education or more. In sharp contrast, among 45–54 year olds about one fifth (5%) of Chinese women (men in parenthesis) were illiterate and another one fifth (40%) had at least attended high school. Moreover, education levels have continued to rise rapidly and gender education disparities have essentially disappeared among young Chinese adults, an indication of the impressive narrowing of education disparities by gender in China over time (Lei et al., 2014a; Smith et al., 2012).

In recent research we demonstrated the education is by far the most important source of improvement over time in cognitive skills of Chinese men and women (Smith et al., 2012; Lei et al., 2014a). Using the same cognitive outcomes as in Figure 2, controlling for an age quadratic urban/rural and county of residence, and family economic resources, we showed that education was the strongest predictor of cognitive skills for both Chinese men and women. If we apply our estimated effect of education on cognition to improvements in education by age group, we show that more than a third of the age decline in episodic memory in Figure 2 is due to cohort effects reflecting improved education accomplishments over time and that more than almost two-thirds of the age decline in intact mental status are due to education improvements over time.

Therefore age profiles of health in the current period by themselves cannot predict the aging future of the population. Because of this, CHARLS is committed to collecting longitudinal data over the long term so that the actual aging experiences of people can be documented as they age.

3.2 Physical Health of the Chinese Elderly

Most indicators of the physical health status of the older Chinese population point to a population with relatively poor health by international standards, one that deteriorates sharply with age, and is especially dismal among Chinese women. To capture the essence of these facts, Table 1, using CHARLS, presents basic health summary statistics for the older Chinese population (for more details see Lei et al., 2014b). These indicators include the fraction of the older Chinese population reporting themselves in poor or very poor general health status, the fraction with high depressive symptoms, the proportion who experienced any Activity of Daily Living (ADL) or Instrumental Activity of Daily Living (IADL) difficulty, the percent who experienced body pain, and indicators of the prevalence, diagnosis rate, and treatment rate for an important disease at older ages—hypertension. All data are stratified into three age groups—those ages 45–59, those ages 60–74 and those aged 75 and above. Data are presented separately for Chinese men and women.

All health statistics in Table 1 document in isolation and combined a very unhealthy contemporary older Chinese population. 22% of men and 28% of women age 45 and over in China report themselves in either poor or very poor health, a fraction that rises to 39% and 38% among those ages 75 and above. Similarly, 22% of men and 30% of women report at least one ADL or IADL difficulty, rates that rise to a little over half (52%) for men and 64% for women when we examine ages 75 and above. Body pain is also common among the

Chinese elderly with about a fourth of older Chinese men and more than a third of Chinese women experiencing pain.

Healthy and aging appear to be words that should not often be used together for older people in contemporary China. So it is unsurprising that a large number of the elderly display higher levels of depression with Chinese women on the bad end of the comparison. Among those 75 and over, a little under one-third of Chinese men and just under half of Chinese women display higher levels of depressive symptoms (see Lei et al., 2014c for more details).[2]

Rates of hypertension among older Chinese people are quite high. Combining diagnosed and undiagnosed hypertension among those ages 45 and above, 40% of men and 44% of women are hypertensive and the rates are particularly high among those ages 75 and above—59% for Chinese men and 69% for Chinese women. Hypertension in China has been shown to be related to high BMI, poor diet including high sodium intact, and lack of exercise (Wu et al., 2008).

About 40% of older Chinese men and women who are above the conventional thresholds for being diagnosed as hypertensive remain undiagnosed for the disease. Undiagnosed disease is untreated disease and that remains the reality of life among older Chinese even today. The final column in Table 1 shows that close to half of Chinese hypertensives ages 45 and older are not being treated for their hypertension. Even among those older Chinese who were diagnosed as hypertensive a significant fraction (about one in every five) are receiving no treatment for their disease.

Hypertension is not unique as large fractions of older Chinese with other serious diseases remain undiagnosed and untreated as well. CHARLS collects plasma samples to enable the diagnosis of diabetes (Zhao, 2014b). The prevalence of diabetes among China 45 and older is 16.0% for men and 16.1% for women.[3] Under-diagnosis is more serious than hypertension – 60.8% of male and 53.2% female patients are unaware of their conditions.

3.3 Health Behavior and Health Insurance

Table 2 includes by the same three age groups used in Table 1 several salient health risk factors available in CHARLS. These include whether respondents ever and currently smoke and the proportion who are overweight (a BMI that is 25 or above). Table 2 also contains some basic measures of health care access including whether respondents saw a doctor in the last month and the fraction who had some form of health insurance.

As is well known, there are substantial differences in smoking behavior in China with Chinese men smoking at vastly higher rates than Chinese women. In the CHARLS age group Chinese men smoke at a ten times higher rate than women (73% compared to about 8% for women). The age pattern of smoking behavior in the CHARLS cohort documents the

[2]Depressive symptoms are measured using a set of 10 questions developed by the Center for Epidemiological Studies in the US. Each question is scored from 0 to 3, and those with a total score no less than 10 are considered to exhibit higher levels of depressive symptoms

[3]Prevalence of diabetes is defined as self-reporting as being diabetic or testing positive using fasting plasma glucose levels greater than or equal to 126 mg/dL.

secular trend towards increased levels of smoking in China by younger cohorts particularly Chinese men (Yang et al., 1999). While a comparison of ever and current smoking behavior does indicate that there was some quitting behavior among smokers it is nowhere near what took place in many developed countries such as the United States (Preston et. al, 2010). The negative consequences of this widespread smoking behavior lie in the future and will undoubtedly make healthy aging the far more difficult particularly for Chinese men.

A similar concern comes from the overweight data in Table 2 as we see high levels of being overweight now for both men and women alike with particularly high rates among the youngest age group where 38% of the Chinese women and 28% of the Chinese men are overweight.

Up to 2003 the majority of Chinese population did not have access to health insurance and only the urban employees were covered. Since 2003 New Cooperative Medical Scheme (NCMS) was introduced to cover rural residents and since 2008 Urban Resident Medical Insurance was implemented to insure non-workers, i.e., children and the elderly. The government has been subsidizing both of the new medical insurance schemes by paying 3/4 of the insurance premiums. The NCMS, the largest insurance scheme in China, started with extremely low premiums, at 30–40 yuan in 2003, and reimbursed very little of the medical costs. Attracted by the large government subsidy, the insurance expanded rapidly and covered most of the rural population by 2008. In 2011, around 93% of Chinese 45 and older have health insurance (Table 2). The premium and reimbursement rates steadily increased year by year. In 2014, premium has reached nearly 400 yuan. Correspondingly, reimbursement rate has increased significantly.

The NCMS insurance pools are operated at the county level. They discourage medical treatment at higher-level hospitals. Take inpatient care, for example, a typical policy is as follows: copayment/reimbursement at local township hospital is 200 yuan/85% while at tertiary hospital is 700 yuan/55% (city hospital) or 1000 yuan/50% (provincial hospital). Living out of one's county of registration is universally penalized. Co-payment is higher and reimbursement is 10% lower than in one's own county. In addition, patients need the referral from own county hospital in order to get treatment elsewhere. This is costly for a patient living away from home.

4. Living Arrangements of the Chinese Elderly

Family has been the traditional source of elderly support in China for economic assistance and for elderly care. This arrangement is facing unprecedented challenges due to a drastic decline in the numbers of and out migration of children. To illustrate the fertility decline, Chinese women older than 74 have an average of 4.6 children ever born, those between 60 and 75 have 3.4 children while those between 45 and 59 only have 2.2 children (second to last column, Table 2). The number of living children is slightly lower, but the pattern remains (last column, Table 2).

At the same time, adult children are increasingly moving away from their parents. This out-migration is fueled by large and persistent income gaps between urban and rural areas and between inland and coastal regions. Younger people are more likely to migrate due to lower

psychic cost associated with changing living environment and higher future returns from investing in migration (Sjaastad, 1962). The pattern is observed in China as well (Zhao, 1999).

Another driving force behind migration of young adults in China is the significant increase in education in younger generations. Education gives rise to information advantages that reduces search costs. Additionally, most higher education institutions in China are located in developed urban areas so that younger generations often must move to attend school.

The consequence of these fertility and migration patterns is that elderly parents will be increasingly geographically separated from their adult children. At the aggregate level, the availability of children for elderly care appears just fine at the present time. Figure 3 shows that currently, over 90% of elderly have a child living either with them or in the same county or city (38% have a co-resident child, 37% have a child in the same neighborhood, and 15% a child in the same county/city). Of the 9% who do not have a child in the same county/city, 3% have no children. Thus presently the great majority of Chinese elderly have access to care from their children. However, if we examine age patterns of living arrangements, we see a trend towards a lower frequency of living with or near their children. Among Chinese 75 and older, only 6% do not have access to children (defined as living in the same county/city), but at around age 55, this ratio is three times higher, at around 18%. Whether this will continue in the future we cannot say with certainty now from the CHARLS data.

Looking to the future, the number of children is unlikely to rise much. The dramatic decline in fertility is partly due to the draconian one child policy implemented since the early 1980s which affected fertility of the current 45–59 age group, but economic development also played a crucial role. In other East Asian countries/regions where Chinese are the majority of the population, i.e., Taiwan, Hong Kong and Singapore, where no restriction on fertility was in place, total fertility rate is now lower than in China (Mason et al., 2011). Therefore, even though the Chinese government recently relaxed the one-child policy to allow couples who meet the condition of one side having no siblings to have two children, this is unlikely to have any major impact on future Chinese fertility.

Migration, on the other hand, is unlikely to slow down as the underlying pull and push factors are still going strong. In the recent decade, labor shortage in coastal and industrial sectors significantly pushed up the salary for low-skilled workers, so that even older rural people joined the migrant work force. The distance of migration appears likely to continue to rise so that in future decades to come leaving elderly parents and their adult children are further geographically separated.

The potential increased unavailability of children in providing care for elderly parents poses serious challenges in long term care provision. One possible solution will be promoting the migration of elderly parents, i.e., making it possible for elderly parents to tag along with migrant children. This is difficult now because health insurance is not portable in many cases, most notably the rural new cooperative health insurance, which sharply reduces the reimbursement rate the further a patient is away from the hometown. The other alternative, as the government is promoting is to provide community elderly services so that the elderly

people can remain independence from their children as long as possible. In sum, in light of the rapidly declining number of children and increased migration of children, the elderly ought to have the freedom to migrate to where the children live and get treatment there. This should be the future direction of reform for health insurance.

5. Conclusions

The population of China has aged rapidly and the rate is accelerating in decades to come. The necessary provision of income support to the Chinese elderly and elderly care can be significantly eased by healthy aging. We find based on our review positive and negative forces for healthy aging in China now and in the future. The most positive force is the spectacular growth in education over time especially for Chinese women which should improve all dimensions of cognitive and physical health and eliminate the vast gender disparities in healthy aging that currently exist.

Other positive forces include the increasing detection and treatment of disease and the availability of health insurance and health services so that diseases like hypertension and diabetes do not remain silent killers in China. Transparency will be eased on the research level by publicly available data such as CHARLS, a sharp departure from the prior scientific norm in China.

The negative forces center on disturbing trends in personal health behaviors and in particular growing rates of smoking (among men) and obesity (for both genders) and pollution especially in the urban centers. Public health campaigns and incentives are urgently needed on all these fronts so that the predictable long-term consequences of these behaviors on older age disease are not realized.

There will not be a demographic fix to healthy aging in China as fertility rates are unlikely to rise much while migration will likely continue to rise leaving growing numbers of elderly parents geographically separated from their adult children. Government policy will have to encourage and allow migration of elderly parents to live with their adult children while reducing the rigid connection of policy (health insurance and health services) with place of residence.

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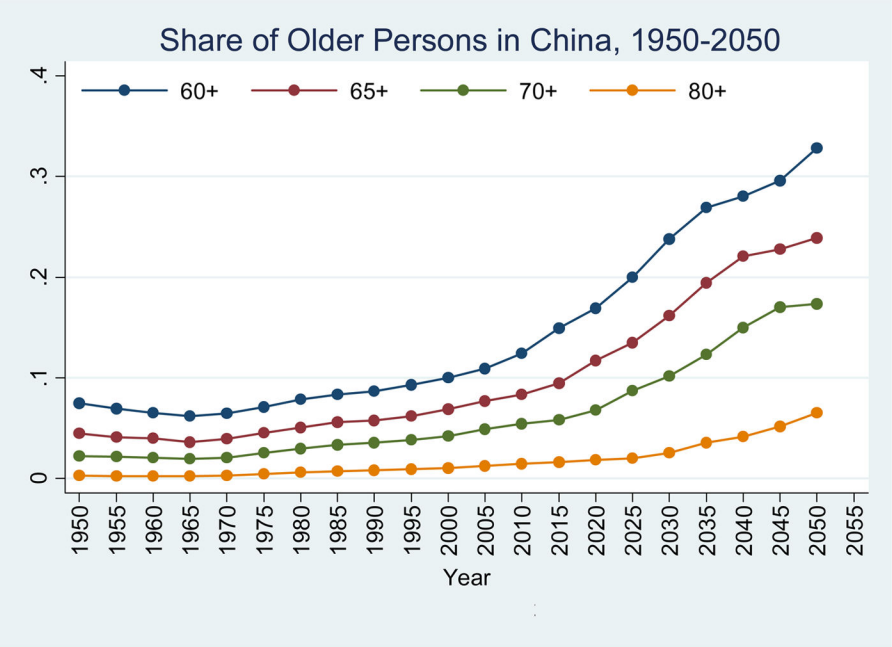

Figure 1.
Source: United Nations, 2012, medium variant.

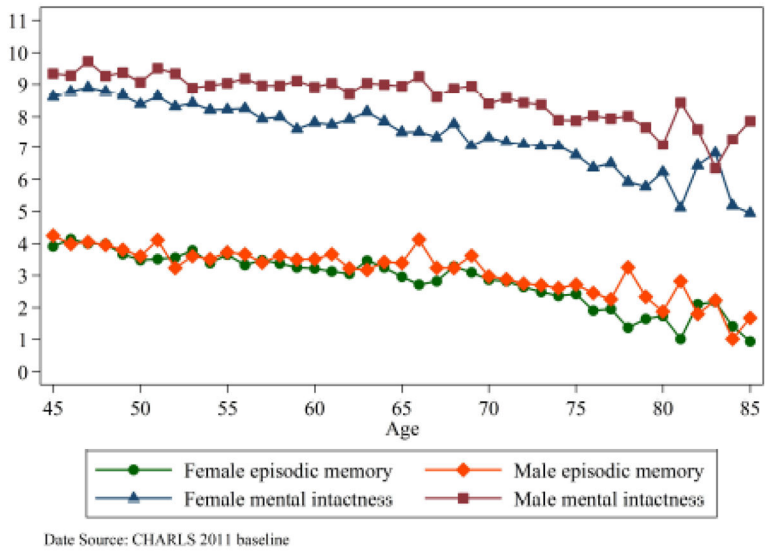

Figure 2. Episodic Memory and Mental Intactness by Age
Date Source: CHARLS 2011 baseline

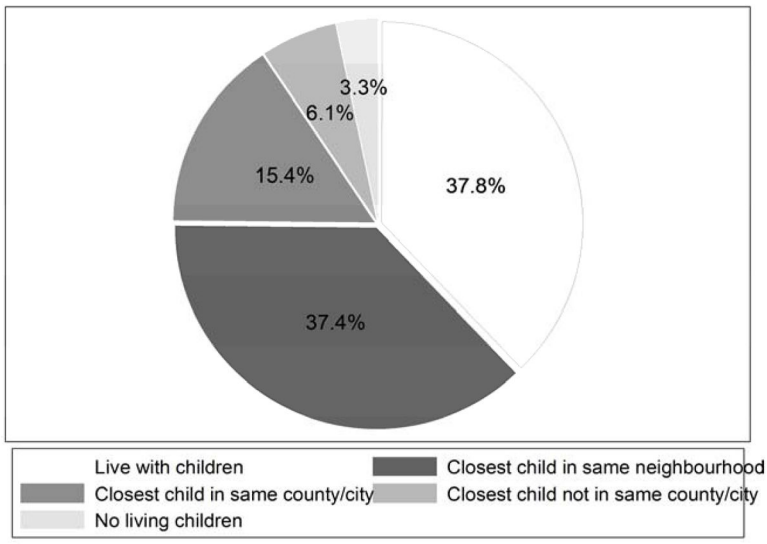

Figure 3.
Proximity to the Elderly of Nearest Children

J Econ Ageing. Author manuscript; available in PMC 2015 December 01.

Table 1

Illustrative Health Differences in CHARLS by Age

Age Group	Poor or very poor health	High Depressive symptoms	ADL/IA DL difficulty	Body pain	Total hyper-tension	% Undiagnosed hypertension	Get treatment if hypertensive
Men							
45–59	17.0	24.8	13.5	22.9	32.6	48.5	37.1
60–74	26.5	31.6	27.1	26.7	46.9	37.0	50.5
75+	39.2	34.4	52.1	30.1	58.5	43.0	50.0
Total (45+)	22.4	28.1	21.8	24.9	40.3	42.8	44.6
Women							
45–59	22.4	35.7	19.3	34.7	32.7	39.9	47.8
60–74	33.1	46.6	36.3	39.7	55.1	37.4	50.9
75+	37.7	51.0	63.7	37.4	69.0	44.3	46.5
Total (45+)	27.5	40.7	29.6	36.6	43.9	39.6	48.8

Source: CHARLS 2011 baseline sample

Table 2

Illustrative Health Behavior Differences in CHARLS by Age

Age Group	Ever Smoked	Currently Smoked	Over weight (BMI>=25)	Fraction saw a doctor last month	Fraction Insured	Number of Children ever born	Number of Living Children
Men							
45–59	74.7	58.3	29.6	14.1	92.4	2.0	2.0
60–74	72.2	50.2	27.6	18.4	95.0	3.1	2.9
75+	63.3	34.2	19.8	28.8	93.5	4.0	3.6
Total (45+)	72.8	53.2	28.1	17.0	93.4	2.6	2.5
Women							
45–59	4.9	3.7	40.1	21.9	92.6	2.2	2.1
60–74	10.1	7.2	38.1	22.7	93.8	3.4	3.2
75+	14.1	7.0	25.1	21.1	87.3	4.6	4.0
Total (45+)	7.5	5.2	37.9	22.0	92.4	2.8	2.7

Source: CHARLS 2011 baseline sample.