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# Reprint of: Health outcomes and socio-economic status among the mid-aged and elderly in China: Evidence from the CHARLS national baseline data

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ABSTRACT

Using a very rich set of health indicators that include both self-reported measures and biomarkers from the CHARLS national baseline data, we document health conditions of the Chinese mid-aged and elderly, examine correlations between these health outcomes and socio-economic status and compare these associations by gender, hukou status and region. As expected, we find that Chinese mid-aged and elderly are facing challenges from chronic diseases including hypertension. Overnutrition has become a bigger problem than undernutrition, particularly for women, reflected in a higher rate of overweight compared to underweight. Disability rates are also high, especially for female, rural and inland respondents, who also report suffering from more pain than male, urban and coastal ones. In general, education and PCE tend to be positively correlated with better health outcomes, as it is in other countries. For PCE the relationship is very nonlinear. At low levels of PCE, there exists a positive correlation with better health outcomes, while for higher levels of PCE the relationship flattens out. Unmeasured community influences turn out to be highly important, much more so than one usually finds in other countries. We also find a large degree of under-diagnosis of hypertension, a major health problems that afflicts the aged, although less large than in some other developing countries. This implies that the current health system is still not well prepared to address the rapid aging of the Chinese population.



## Introduction

We are concerned in this paper with measuring health outcomes among the mid-aged and elderly in China, and examining the relationships between different dimensions of health status and measures of current socio-economic status (SES). China has undergone a health revolution over the past 50 years, with life expectancy having risen from 46 in the 1950s to just over 74 in 2009 (Wagstaff et al., 2009; World Health Organization, 2012). Driving this change, the mortality rates for those under 5 fell dramatically from 225 per 1000 live births in 1960 to 48 in 1990 and 18 in 2010 (Wagstaff et al., 2009; UNICEF, 2012). Most of this decline was due to an increasing control over infectious disease and undernutrition. As a result, infectious diseases have been progressively replaced by chronic diseases as the major source of ill-health and mortality (Hossain, 1997; Lopez et al., 2006).

As China has been passing through its health transition, it has also been undergoing a nutrition transition, which has both positive and negative aspects (Popkin et al., 1993, 1995a; Popkin, 1999, 2002). Among the principle dimensions of this transition has been a dramatic rise in body mass index (BMI) among adults and a large change in diet towards more 'fatty foods' (Popkin et al., 1995b). For instance Luo (2003), using the China Health and Nutrition Survey (CHNS), documents an increase in overweight adults over 20 years from 1989 to 1997, for women from 11% to 21% and from 6% to 17% for men. [1] At the same time, Luo shows that

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[1] Overweight is defined using World Health Organization standard of having a BMI 25 or above.

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the fraction of elderly adults who are undernourished (a BMI under 18.5) has fallen, particularly so for those over 60 years old, from 19% to 13% for women and 20% to 12% for men from 1991 to 1997.

Related to these health and nutrition transitions has been China's demographic transition. China's elderly population will increase from under 10% of the total population in 2000 to 30% in 2050 (Kinsella and He, 2009). The number of workers per pensioner has already fallen from over 12 in 1980 to 2 in 2005 (Kinsella and He, 2009). This sharp demographic transition is likely to place stress on China's health system, which has been focused on disease at younger ages and on infectious, as opposed to chronic, diseases.

In this paper, we use the China Health and Retirement Longitudinal Study national baseline data (CHARLS) to document health conditions among the mid-aged and elderly (aged 45 and over) in China, focusing on the difference between men and women, respondents with urban and rural residence permits (hukou) as well as those living in inland and coastal areas. We use a very rich set of health indicators that include both self-reported measures and biomarkers. We also examine correlations between these health outcomes and two important indicators of socio-economic status (SES): education and log of per capita expenditure (log PCE), our preferred measure of household resources. While there exists a very large literature that examines the relationships between SES and health measures, little has been done on Chinese data to see whether correlations reported in many other countries are replicated in China, particularly so for the aged.[2] While we cannot in general infer causality from these estimates, they tell us something important about the degree of health differentials by education and per capita expenditure (PCE).

In general, education and PCE tend to be positively correlated with better health outcomes, as it is in other countries. The PCE association is quite nonlinear, positive at lower levels of PCE and flattening out for higher levels. These health–SES associations are not significantly different for the elderly, defined as those 60 years and older, from mid-aged Chinese, aged 45–59. Some significant differences in SES gradients exist between respondents with urban versus rural hukou and between those living in coastal versus inland areas, however no clear pattern is apparent. Unmeasured community influences turn out to be highly important, much more so than one usually finds in other countries. While it is not yet clear which aspects of communities matter and why they matter, we set up an agenda for future research on this topic. We also find a large degree of under-diagnosis of hypertension, a major health problem that afflicts the aged. This implies that the current health system is not well prepared to address the rapid ageing of the Chinese population.

This paper is divided into five sections. The next section briefly introduces the topic. Section "Data and empirical specifications" describes the data while our main empirical findings are presented in section "Results". The final section highlights our main conclusions.

## Health–SES correlations

Across most country settings, no matter which measures of SES are used (income, wealth or education), the evidence of this association between health and SES being large and pervasive is abundant (Marmot, 1999; Smith, 1999; Strauss and Thomas, 1998).

Mainly due to the absence of high quality data, far less research has been conducted on the magnitude and underlying reasons for the SES-health gradient in China for adults. China is about to age very rapidly and has at the same time been experiencing high but very unequal rates of economic growth. The extent to which this recent economic growth has improved the overall health of the Chinese population depends in part on understanding in the Chinese context the influence of economic well-being on health. Similarly, the degree to which growing inequalities in levels of economic resources in China are producing similarly large inequalities in health requires better understanding.

Part of the reason for a lack of any substantial research on this topic in the Chinese context is that until recently data in China were simply not up to the task or were largely unavailable to scholars either inside or outside China. Fortunately, this situation is changing. The investigators on this research project have been involved in a key ongoing data collection effort—the China Health and Retirement Longitudinal Study (CHARLS)—that aims to remedy this situation.

This paper documents in detail the nature of the SES-health gradient in China for the mid-aged and elderly population, aged 45 and over from the CHARLS national baseline, fielded in 2011. The analysis spans many salient measures of health status—including general health status, functional measures of disability (ADLs and IADLs), body pain, body mass index (BMI), hypertension, and survival expectations. In addition to standard measures of economic status widely used in other country settings, notably schooling, we examine a measure of income, household consumption, which is arguably a much better index of economic wellbeing in a country at the level of economic development that China now is, especially in more rural regions.

This analysis builds on the work of Strauss et al. (2010). They use the first wave Pilot data from CHARLS, that cover only the two provinces of Gansu and Zhejiang. While representative of those two provinces, they are not nationally representative, as is the CHARLS national baseline that we use here. Furthermore, in part because the pilot only covers two provinces and has a much smaller sample, Strauss et al. (2010) were not able to examine how sensitive the health–SES gradient was to respondents with rural versus urban hukou and between different regions in China-coastal versus inland. The main results for the national baseline are broadly consistent with the earlier results from the Pilot CHARLS data, if anything the health–SES gradients are somewhat stronger in the national sample.

The salient nature of the SES-health gradient is not difficult to document. In most countries, at each age those in higher income or wealth groups are in much better health. These differences are quantitatively large. In the US the fraction reporting excellent health among the highest income quartile is 40 percentage points higher than those in the lowest quartile (Smith, 1999). The health-income gradient widens until around age 50 after which it gradually contracts. Similar gradients of this magnitude appear in many other countries, so that the US is not unique. While there is a broad consensus about the 'facts', the interpretation of underlying forces creating a strong SES-health gradient and how their relative importance varies across countries at different levels of economic development are controversial.

A basic question in any country is whether differences in health by SES indicators such as education, income, and wealth largely reflect impacts from SES to health, or vice versa. Medical scientists often conclude that the dominant pathway is that variation in SES produces large health disparities for example, Marmot (1999). This view, that the principal direction of causation flows almost exclusively from SES to health, has been challenged (Lleras-Muney, 2005; Cutler and Lleras-Muney, 2010a; Smith, 1999; Strauss, 1986, 1993; Strauss and Thomas, 1995, 1998, 2008; Thomas and Strauss, 1997; Thomas, 2010). The best evidence is in fact that causation goes in both directions, from SES to health and from health to SES.

[2] Some studies have shown health–SES gradients for children, for example, Chen and Li (2009), Chen et al. (2010), Zhang (2013) and Zhu et al. (2013). Much less work has been done on adults and particularly the elderly, see Strauss et al. (2010) for an exception.