

# How Poverty, Residence Status and Health Insurance Predict Unmet Healthcare Needs among Chinese Elders?

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## Abstract

This study focuses on the variability in unmet healthcare needs among vulnerable Chinese elders and the degree to which these unmet needs are associated with socioeconomic disadvantages. We use the 2013 wave of China Health and Retirement Longitudinal Study (CHARLS) and a multinomial logistic model to investigate how poverty, residence status and particular health insurance schemes influence unmet healthcare needs independently and in combination. Our results show that poverty and rural residence are strong predictors of unmet healthcare needs due to financial and non-financial constraints, respectively. Although health insurance can reduce financial barriers, its influence varies with different insurance schemes, thus generating unequal healthcare access among heterogeneous vulnerable subgroups of elders and putting poor rural migrants at the highest risk for unmet healthcare needs. Our findings direct attention to the differences in resources available to various subgroups of elders and the importance of social stratification in predicting unmet health care needs.

**Keywords:** poverty, residence status, health insurance, unmet health care needs, elders

## 1. Introduction

China is facing a growing aging population. In 2000, when China stepped into the aging society, the percentage of people over the age of 65 was 7%. That percentage rose to 11.9% in 2018 (National Bureau of Statistics of China) and is expected to reach 22.6% by 2050 (United Nation, 2002). Since healthcare needs tend to increase with advanced age, a rapidly aging population inevitably leads to greater needs for healthcare services. Such needs, however, cannot be met with current levels of social security benefits and institutional care. This is an undesirable feature of the Chinese healthcare and social systems. The latest statistics from the Chinese Health Ministry show that one third of older patients in China have unmet healthcare needs, meaning they are not receiving needed healthcare (Center for Health Statistics and Information, 2014). Since ensuring everyone has access to necessary health services is required under an equal healthcare system, it is important to understand why some fail to obtain the healthcare they need. In this paper, we assess unmet healthcare needs of Chinese elders and investigate factors associated with these unmet needs.

Unmet health care needs, defined as the difference between the health care services deemed necessary and the actual services received, represent a measure of access to healthcare. There is a dearth of empirical research aimed at identifying the factors that contribute to unmet healthcare needs among Chinese elders. However, theoretical research in developed countries offers a number of possibilities. In general, unmet healthcare needs depend on the particular circumstances of the individuals seeking care and the characteristics of the healthcare system. In this study, we draw on an existing dataset and evaluate the empirical validity of these hypotheses in a sample of elders in China. We examine socioeconomic vulnerabilities in old adults, looking especially at their heterogeneity. We also investigate how the distribution of economic and social resources among elders affects the degree of their unmet healthcare needs. Although socioeconomic and institutional mechanisms have long been the focus of public health research on healthcare needs which are met (or healthcare utilization), little is known about how these are associated with potential or unmet healthcare needs in old age.

As for socioeconomic vulnerabilities, poverty and rural residence may be potential risk factors for elders' unmet healthcare needs in China. According to the WHO World Health Survey 2015 (World Health Organization, 2015), more than 60% of elderly people in China have unmet healthcare needs due to poverty, in contrast to less than 16% in

developed countries. In China, poverty is also related to unmet needs as it may reflect how place of residence makes accessing healthcare services more difficult. Evidence shows that the majority of poor elders live in remote rural areas, where the lack of higher quality medical personnel and the low efficiency of medical services leave much of the population with health service utilization shortages (Zheng, Gong, & Zhang, 2019). Elders living in rural areas with low socioeconomic status may face multiple risk factors for unmet healthcare needs, but to date, little attention has been paid to examining to what extent elders' poverty and residence status influence their unmet healthcare needs independently and in combination.

Any analysis of unmet healthcare needs among Chinese elders must also consider equality and efficiency within the healthcare system, as well as the mechanism for distributing healthcare benefits. During the past decades, the Chinese healthcare system has undergone a series of reforms, with the goal of ensuring equal access to needed healthcare. The state managed to achieve near-universal health insurance coverage by 2011 (Cheng & T.-M., 2012; Zhang, Nikoloski, & Mossialos, 2017). This remarkable progress has attracted a large body of research into the association between China's providing health insurance and the healthcare subsequently received (Huang & Gan, 2015; H. Liu & Zhao, 2014; Q. Liu, Wang, Kong, & Cheng, 2011; Ye, Shia, Fang, & Lee, 2019; Zhang et al., 2017). But few studies have investigated how effective China's health insurance has been in reducing the possibility of not receiving needed healthcare. In addition to this uncertainty surrounding health insurance's overall effects, the distributional effects of China's health insurance on unmet healthcare needs are also unclear. In China, the basic insurance system consists of three schemes: Urban Employee Basic Medical Insurance (UEBMI), Urban Resident Basic Medical Insurance (URBMI), and New Rural Cooperative Medical Scheme (NRCMS). These schemes target different populations based on their residence registration (*hukou*) and/or employment status. With different benefit packages being provided between urban and rural *hukou* holders (Jin, Hou, Zhang, & Zhang, 2016), fragmented health insurance schemes have been suggested to be inextricably linked with inequity in healthcare access.

Although there is abundant evidence showing the correlation between socioeconomic disadvantage, as well as institutional constraints, and unmet healthcare needs, current knowledge is only partial due to considering only a limited number of factors. It was well-known that the dual economy and society in China have caused a distinct welfare system, under which its health system also features an "urban–rural duality." In this system, inequalities and discrimination that stem from *hukou* restrictions still exist and exacerbate social differentiation. The discrimination has led to unequal outcomes associated with access to healthcare services. Moreover, the hardships of socioeconomic disadvantages and institutional discrimination may cluster, potentially making those caught in the "urban–rural duality" gap the most vulnerable subgroup not offered strong institutional protection against unmet healthcare needs. However, the relationship between socioeconomic disadvantage and unmet healthcare needs — and how the association varies by health institutional arrangements — is still unknown. Therefore, in addition to studying variables such as poverty and residence status, it is necessary to examine the relationship between institutional discrimination and unmet needs for healthcare. Further, there is a need for more evidences with which to assess the effectiveness of the various health-focused interventions being offered across vulnerable population subgroups.

The aim of this paper is to bridge the above research gaps. Empirically, we apply the 2013 China Health and Retirement Longitudinal Study (CHARLS) to capture updated evidence on health utilization gaps among the older people in China. We pose these research questions: Has health insurance reduced unmet healthcare needs of the elderly? Have differences in insurance schemes contributed to inequality in older people's potential healthcare utilization? What are the effects of institutional and socioeconomic characteristics on older people's access to healthcare services? By answering these questions, we generate important insights to better understand healthcare inequality in recent years.

Additionally, in order to deepen our understanding of the unique resource allocation mechanisms in China, and the resulting patterns of healthcare inequality, we develop a framework for analyzing the Chinese healthcare system. To this end, we study both financial and non-financial barriers to health service access, and conceptualize two distinct sets of indicators related to inequality in health service access. Through this investigation, we can reveal not only the overall consequences but also the distributional effects of Chinese health reforms in terms of unmet healthcare needs.

## 2. Background

In China, there is no specific medical coverage scheme targeting old people. Instead, the elderly population participates in a universal basic health insurance system. This insurance system covers 95% of the entire population in China, and tends to create more equitable access to healthcare by reducing income related barriers and out-of-pocket payments for healthcare service. It mainly consists of three different schemes: the Urban Employee Basic Medical Insurance (UEBMI), the Urban Resident Basic Medical Insurance (URBMI), and the New Rural Cooperative Medical Scheme (NRCMS). These insurance schemes are designed to cover different people: UEBMI is intended to cover urban employees and retirees in formal sectors; URBMI provides insurance to informal-sector employees, the self-employed and unemployed; and NRCMS aims to cover the registered rural population. Clearly, these three schemes are classified

mainly by *hukou* status, which has long been regarded as one of the most significant institutions in China in defining persons' access to social welfare. Although insurance should offer protection for vulnerable groups such as the poor and older adults, inequalities in schemes arising from *hukou* policy may give rise to disparities in healthcare access and utilization.

These three insurance schemes have different regulations, premiums and coverage amounts. Generally speaking, UEBMI provides the most generous benefit packages, whereas NRCMS is usually regarded as the most rudimentary type of insurance (Jin et al., 2016), with the highest deductibles, lowest reimbursement rates, and highest coinsurance rates (Lei & Lin, 2009; Wagstaff, Lindelow, Gao, Xu, & Qian, 2009). Many services, particularly outpatient care, are not covered, or only partially covered, by NRCMS. An individual's ability to upgrade insurance schemes is tightly constrained because one's *hukou* status is difficult to change (e.g. from rural to urban) (Jin et al., 2016).

Meanwhile, China's long-lasting urban-rural structure results in enormous differences between urban and rural areas in terms of the economy, government subsidies, infrastructure construction and so on. These gaps might be associated with urban-rural medical resources. In China's rural regions, there are three types of healthcare institutions: village clinics, township hospitals, and county (and higher level) hospitals. Since NRCMS has higher reimbursement rates for health services provided by local healthcare institutions, rural patients are encouraged to seek healthcare firstly from primary village clinics and only go to higher level care facilities if needed (Xi Li, Lu, Hu, Cheng, & Hu, 2017). However, the quality of primary care is poor. Most village doctors have less than a high school education, and few of them have received professional training and supervision (Yang, 2018). With reference to a survey conducted among rural residents in three provinces in China, around 30% of residents rated quality of healthcare provided by village clinics as poor or very poor (Ratigan, 2015). Therefore, some patients bypass primary care facilities and go directly to higher level hospitals (Fe, Powell-Jackson, & Yip, 2016), while some forgo or postpone the utilization of healthcare.

In addition to insurance and residence disadvantage, economic status is another potential risk factor for old people's unmet healthcare needs. A strong association between low income status and unmet healthcare need has been consistently found in previous studies (S. Kim & Huh, 2011; Park, Kim, & Kim, 2016). However, there has been no research focusing on the combined effects of poverty and residence status. Under China's dual structure, rural residents are more likely to be poor and less likely to have access to government-related income and social programs than urban residents (Pei & Xu, 2011). Thus, their access to health services is more likely to be affected by poverty because they receive fewer health insurance benefits. Moreover, health insurance is tied to the local *hukou* and managed by different government agencies (Xin Li & Zhang, 2013), which usually designate local health care facilities as their coverage network. This means that health services received non-locally might not be reimbursed by local insurance (Jin et al., 2016). This regional segregation poses a significant institutional barrier to rural migrants. With *hukou* registered at a rural county, migrants can have healthcare in their places of residence, but their NRCMS are not eligible for enrollment in urban destinations. Meanwhile, they are generally not eligible for enrollment in local urban insurance (except that URBMI is offered to migrants in some cities (Yip et al., 2012)). It follows that this situation would be most detrimental to poor rural migrants. With a number of urban hospitals refusing NRCMS, poverty would make rural migrants more sensitive to healthcare costs and more likely to forgo healthcare services.

### 3. Data and Methods

#### 3.1 Data

We draw our data from the 2013 wave of the China Health and Retirement Longitudinal Study (CHARLS), a broad-purposed social science and health survey of residents aged 45 or above in continental China. As a high-quality nationally representative survey, CHARLS 2013 adopted multi-stage stratified Probability Proportional to Size (PPS) sampling and covered 18,621 individuals scattered over 450 villages/urban communities in 28 provinces. A major element of this survey was devoted to recording health status, health-related behaviors, healthcare utilization and health expenditures. It also included questions pertaining to unmet healthcare needs of the population. CHARLS asked respondents whether or not they have needed healthcare but did not receive the needed services. Those answering yes, were also asked to provide their reasons for not receiving the services. In addition, the survey contained rich information on demographic background, residence, household income, and the type(s) of health insurance. Therefore, CHARLS offers a strong dataset with which to study the distribution of unmet healthcare needs across different socioeconomic subgroups of elderly Chinese citizens.

In this study, 8973 elders were selected who were 60 and older. After dropping non-responses to healthcare-related questions (0.2%) and covariates (5.0%), the selected sample includes 8000 individuals.

#### 3.2 Measurements

##### *Unmet need variables*

In this study unmet healthcare needs were measured by respondents' subjective self-assessments that they had not

received the care that they needed. It included two aspects: “not receiving needed outpatient services” and “not receiving needed inpatient services.” In CHARLS data, “not receiving needed outpatient services” was measured by respondents’ not visiting doctors although they had been ill during the previous 4 weeks; “not receiving needed inpatient services” was defined as not getting hospitalized after receiving a doctor’s recommendation for hospital admission during the previous year. This subjective self-reported evaluation is helpful because respondents were able to assess their health status (Idler & Benyamini, 1997) and were more able to identify deficiencies in their healthcare experiences. In addition, the survey respondents’ reasons for forgoing medical care provide possible targets for policy actions (J. Kim, Kim, Park, & Cho, 2015).

In CHARLS, the reasons for forgoing medical services grouped into several categories, including financial constraints, not having a serious illness, inconvenient traffic, no available treatment, poor healthcare service, and lack of time. Among these, financial burden dwarfed the other explanations for unmet healthcare need. For our analysis, we planned to focus mostly on respondents who reported financial barriers. Thus, we distinguished the types of unmet needs by coding no unmet needs as “0,” finance induced unmet needs as “1” and unmet needs due to any other reason as “2.”

#### *Independent variables*

*Poverty status.* We used China’s national poverty line to measure poverty. This measure was chosen because it is adjusted according to household size and the consumer price index each year. This threshold was divided by disposable income to calculate income-to-needs ratio (INR). Following the previous research (Park et al., 2016), we classified poverty status into three categories. A respondent was categorized poor if the per-capita household income was lower than the poverty line, i.e. the INR fell below 1; near-poor if the INR ranked between 1 and 1.2; non-poor if the INR was higher than 1.2. Thus three dichotomous variables are generated.

*Residence status.* The second key independent variable was the place of residence (current location). It was a binary indicator of whether a respondent currently resides in a rural or urban area (rural residence=1, urban residence=0).

#### *Covariates*

In addition to identifying two main independent variables, we controlled for a comprehensive set of covariates that could have potential associations with unmet healthcare needs. Following previous studies, we grouped these covariates into three categories: predisposing, enabling and need.

Predisposing variables, indicating individuals’ propensity to use healthcare services, included age measured in 3 categories (60-69, 70-79 and 80 plus), gender, marital status (married or partnered, separated or divorced or widowed, single), education (illiterate, literate or primary school, junior high and above) and number of people within the household.

Enabling variables included income and health insurance. The health insurance variables were represented by several dummy variables capturing UEBMI, URBMI, NCMS, GMI, and other insurance. We also used county fixed effect dummies to capture regional disparity within each province.

Need factors reflecting the need for healthcare included self-reported health status, chronic conditions, functional impairments involving activities of daily living (ADLs) and instrumental ADLs (IADLs). Self-rated health was defined by good, fair and poor. Chronic condition was a dummy variable which equaled 1 if the respondent had any self-reported chronic diseases such as hypertension, dyslipidemia, diabetes, chronic lung diseases and so on. We also used a dummy variable to indicate whether the respondent has ADL difficulties. We measured IADLs based on 3 categories according to numbers of activities with difficulties (0, 1-3, or 4 and above).

### *3.3 Statistical Methods*

We applied multinomial logistic in a multilevel framework for two dependent variables — “not receiving needed outpatient services” and “not receiving needed inpatient services” — to estimate the relative risk ratios of experiencing unmet healthcare needs. The possibility of unmet needs for healthcare was estimated separately because both socioeconomic disadvantage and health insurance could have different effects on these two unmet needs components.

We added variables in a model-building process sequentially. Model 1 tested the main influences of poverty status and residence status on unmet need for healthcare, with predisposing and need factors added as covariates. In Model 2, health insurance factors were added to examine their effects on unmet needs. Model 3 estimated the joint effects by adding interaction terms between poverty, rural residence and insurance status.

## **4. Results**

### *4.1 Sample Characteristics*

Unmet healthcare needs were reported by 29.3% (95% CI: 27.6%-31.2%) of the study population. Table 1 shows the

descriptive characteristics of the sample, as well as their bivariate associations between poverty and residence status. Of 8000 participants, 51.3% of the sample was poor and 3.7% near poor; 60.3% lived in rural areas. Elders who were poor, near poor or living in rural areas were more likely to have financially-induced unmet healthcare needs.

Those who were poor were more likely to be female and less educated; they were also more likely to have poor self-rated health status, more chronic diseases, and more disabilities. Near poor elders had the biggest family size and were most likely to rate their health as fair. Poor (89.6%) and near poor elders (72.9%) were more likely to be insured under the NRCMS. Very few poor elders enjoyed the UEBMI (1.1%) or the URBMI (1.5%). The majority (77.8%) of the poor lived in rural regions. Compared to those who lived in urban areas, rural elders tended to be less educated and to have bigger families. They had poorer self-rated health status and a higher likelihood of having ADL and IADL difficulties. Most rural elders (88.47%) were insured by the NRCMS, and most of them (66.32%) were poor.

Table 1. Sample descriptive at by poverty status and residence status of Chinese elders

	Poor (51.34%)	Near poor (3.73%)	Non-poor (44.93%)		Rural (60.31%)	Urban (39.69%)	
<b>Unmet healthcare (%)</b>				$\chi^2(4)=28.66^{***}$			$\chi^2(2)=3.29$
Economic reason	5.75	4.17	1.99		4.51	3.23	
Non-economic reason	23.15	32.29	27.31		24.66	26.42	
<i>Predisposing</i>							
Age groups (%)				$\chi^2(4)=5.23$			$\chi^2(2)=5.97^*$
60-69	61.20	70.83	62.92		63.75	60.18	
70-79	32.00	21.88	29.73		30.07	31.41	
80 and over	6.81	7.29	7.35		6.18	8.41	
Female (%)	55.07	54.17	51.60	$\chi^2(2)=3.00$	54.02	52.64	$\chi^2(1)=0.47$
Marital status (%)				$\chi^2(4)=10.90^{**}$			$\chi^2(2)=5.24^{***}$
Married/partnered	77.61	76.04	81.59		78.82	80.14	
Divorced /separated/widowed	21.18	20.83	17.72		19.77	19.37	
Single	1.21	3.13	0.69		1.42	0.49	
Education (%)				$\chi^2(4)=278.76^{***}$			$\chi^2(2)=245.03^{***}$
Illiterate	46.07	35.42	23.42		43.14	23.87	
Literate /primary school	45.31	43.75	43.04		46.17	41.29	
Junior high and above	8.62	20.83	33.54		10.69	34.83	
Family size (M)	4.77	5.70	5.29	$F(1,7998)=42.66^{***}$	5.14	4.89	$F(1,7998)=9.27^{***}$
<i>Health need</i>							
Self-rated health (%)				$\chi^2(4)=54.54^{***}$			$\chi^2(2)=42.44^{***}$
Poor	52.95	41.67	38.98		51.38	38.45	
Fair	35.85	50.00	49.09		38.76	47.75	
Good	11.20	8.33	11.93		9.85	13.80	
Chronic numbers (M)	2.28	2.19	2.42	$F(1,7998)=3.87^{**}$	2.26	2.45	$F(1,799)=7.57^{***}$
ADLs difficulties (%)	13.09	8.33	10.80	$\chi^2(2)=4.27$	12.04	11.64	$\chi^2(1)=0.09$
IADLs difficulties (%)				$\chi^2(4)=47.17^{***}$			$\chi^2(2)=36.07^{***}$
0 activity	50.61	57.29	64.22		52.22	64.19	
1-3 activities	38.73	35.42	28.35		37.80	28.08	
4 or above activities	10.67	7.29	7.43		9.98	7.73	
<i>Enabling</i>							
Health insurance (%)				$\chi^2(8)=652.18^{***}$			$\chi^2(4)=714.62^{***}$
UEBMI only	1.56	4.17	30.08		2.96	31.31	
URBMI only	1.51	8.33	7.69		1.16	9.69	
NRCMS only	89.64	72.92	46.76		88.47	41.29	

Multiple or other	3.63	5.21	11.67		3.73	12.72
No insurance	4.16	9.38	3.80		3.67	4.99
Rural residence (%)	77.84	51.04	40.62	$\chi^2(2) = 359.81^{***}$		
Poverty status (%)						$\chi^2(2) = 355.39^{***}$
Poor					66.32	28.57
Near poor					3.16	4.60
Non-poor					30.52	66.83

#### 4.2 Multivariate Results

##### Effects of health insurance and other factors on unmet outpatient needs

Table 2 presents the results of the multinomial logistic analysis. Being poor was significantly associated with an increased risk of having unmet needs because of economic reasons. Regarding residence status, compared to elders living in urban areas, rural elders were more likely to have unmet needs due to non-economic reasons. Variables related to health insurance were included in Model 2. This model showed that the implementation of the multiple basic insurance programs significantly moderated the influences of poverty on unmet needs, with relative risk ratio (RRR) reduced from 2.32 to 1.94. Moreover, it showed that the insurance schemes have been at least partly effective in reducing unmet outpatient needs. Study elders with health insurance of any kind had a lower possibility of unmet needs than those who were not insured. However, different schemes led to varying outcomes: elders with UEBMI were significantly less likely to have unmet needs compared with those with NRCMS. In addition, although the multiple insurance schemes reduced financial barriers and lowered the risk of not receiving needed health services, insurance schemes were not associated with unmet needs due to non-financial reasons. An unequal distribution of medical care resources still existed, and rural residence significantly accounted for increasing risk of unmet needs. In Model 3, interaction terms between poverty, residence status and health insurance were included in order to examine the extent to which particular health insurance schemes (arising from *hukou* status) boosted the main effects of poverty and residence status on unmet needs. The results showed poor rural elders covered under NRCMS were more likely to have unmet needs due to financial reasons (RRR=1.5,  $p < 0.1$ ). The situation was more serious among poor urban residents insured by NRCMS (RRR=5.37,  $p < 0.01$ ). 92% of them were rural *hukou* holders who had migrated from a rural to an urban destination.

##### Effects of health insurance on unmet inpatient needs

Among the elders who experienced unmet inpatient needs, 51% cited financial problems as the main reason for not accessing inpatient care. Within this group that cited financial obstacles, 66% came from poor or near poor families.

Factors associated with unmet inpatient needs as revealed by the multinomial logistic analysis are presented in Table 3. After controlling for elders' level of ill health, being poor was the main risk factor for unmet inpatient needs, with a more than 3-fold increase in poor elders compared with non-poor ones. Although health insurance coverage was protective against the risk of not receiving appropriate outpatient care for economic reasons, it did not significantly associate with reducing unmet needs of more expensive care, such as hospitalization. The Chinese insurance system was not effective enough to protect vulnerable elders from high healthcare expenses. By including interaction terms in Model 3, this result was even more obvious. Poor rural residents and rural-urban migrants had a significantly higher likelihood of experiencing unmet needs due to financial reasons (RRR=1.44, and 1.91 respectively). Coverage under NRCMS did not offer them enough protection from hospitalization.

Table 2. Multinomial logistic model of unmet healthcare needs for Chinese elders (Outpatient)

	Financial reason	Non-financial reason	Financial reason	Non-financial reason	Financial reason
<i>Predisposing</i>					
Age groups (ref.=60-69)					
70-79	1.097 (0.26)	0.914 (0.10)	1.118 (0.26)	0.895 (0.10)	1.143 (0.27)
80 and over	0.572 (0.28)	0.916 (0.17)	0.635 (0.31)	0.896 (0.17)	0.675 (0.33)
Female (%)	1.458 (0.34)	0.889 (0.09)	1.408 (0.33)	0.883 (0.09)	1.369 (0.32)
Marital status (ref.=single)					

Married/partnered	0.639 (0.51)	0.748 (0.33)	0.802 (0.66)	0.656 (0.29)	0.835 (0.68)
Divorced /separated/widowed	0.437 (0.36)	0.782 (0.35)	0.516 (0.44)	0.701 (0.32)	0.540 (0.46)
Education (ref.= illiterate)					
Literate /primary school	1.463 (0.34)	1.054 (0.12)	1.542 (0.36)	1.022 (0.12)	1.509* (0.36)
Junior high and above	0.338** (0.17)	0.737** (0.11)	0.426* (0.22)	0.699** (0.11)	0.401* (0.21)
Family size (M)	0.953 (0.06)	1.025 (0.02)	0.938 (0.06)	1.032 (0.03)	0.918 (0.06)
<i>Health need</i>					
Self-rated health (ref.=good)					
Poor	2.379* (1.27)	0.692** (0.11)	2.313 (1.24)	0.699** (0.11)	2.267 (1.22)
Fair	1.899 (1.03)	1.000 (0.14)	1.917 (1.04)	0.994 (0.14)	1.918 (1.04)
Chronic numbers	1.166*** (0.07)	0.984 (0.03)	1.180*** (0.07)	0.974 (0.03)	1.178*** (0.07)
ADLs difficulties	1.265 (0.37)	0.958 (0.16)	1.256 (0.37)	0.960 (0.16)	1.307 (0.39)
IADLs difficulties (ref.= 0 activity)					
1-3 activities	1.618** (0.40)	0.958 (0.10)	1.607** (0.40)	0.961 (0.11)	1.606* (0.40)
4 or above activities	3.203*** (1.09)	1.376* (0.26)	3.112*** (1.07)	1.403* (0.27)	2.986*** (1.02)
Enabling					
Poverty status (ref.=non-poor)					
Poor	2.316*** (0.62)	0.845 (0.09)	1.938** (0.54)	0.902 (0.10)	
Near poor	2.136 (1.22)	1.259 (0.29)	1.674 (0.97)	1.327 (0.31)	
Rural residence	0.805 (0.19)	2.869*** (0.10)	0.739 (0.18)	2.782*** (0.12)	
Health insurance (ref.= NRCMS only)					
UEBMI only			0.342* (0.23)	1.217 (0.21)	0.352* (0.23)
URBMI only			0.741 (0.48)	2.032 (0.44)	0.892 (0.57)
Multiple or other			0.536 (0.33)	1.028 (0.20)	0.638 (0.40)
No insurance			1.810 (0.70)	0.589 (0.16)	2.413** (0.99)
Poor*rural					1.501* (0.39)
Poor*urban* NRCMS					5.600*** (3.43)
Constant	0.013*** (0.01)		0.013*** (0.01)	0.646 (0.32)	0.015*** (0.01)
LR chi2	125.55		149.96		149.56
Log	-1796.921		-1784.714		-1784.966
Pseudo R <sup>2</sup>	0.034		0.040		0.040

\* &lt; 0.1; \*\* &lt; 0.05; \*\*\* &lt; 0.01.

Table 3. Multinomial logistic model of unmet healthcare needs for Chinese elders (Inpatient)

	Model 1	Model 2	Model 3
<i>Predisposing</i>			
Age groups (ref.=60-69)			
70-79	0.565*** (0.11)	0.570*** (0.11)	0.575*** (0.11)
80 and over	0.313*** (0.14)	0.320*** (0.14)	0.328*** (0.14)
Female (%)	0.855 (0.15)	0.848 (0.15)	0.848 (0.15)
Marital status (ref.=single)			
Married/partnered	0.772 (0.51)	0.805 (0.53)	0.794 (0.52)
Divorced /separated/widowed	0.891 (0.60)	0.933 (0.63)	0.940 (0.64)
Education (ref.= illiterate)			
Literate /primary school	0.928 (0.18)	0.929 (0.18)	0.934 (0.18)
Junior high and above	0.732 (0.21)	0.763 (0.22)	0.760 (0.22)
Family size	0.990 (0.04)	0.988 (0.04)	0.989 (0.04)
<i>Health need</i>			
Self-rated health (ref.=good)			
Poor	2.643** (1.08)	2.584** (1.05)	2.577** (1.05)
Fair	1.782 (0.73)	1.770 (0.73)	1.783 (0.74)
Chronic numbers	1.284*** (0.06)	1.285*** (0.06)	1.284 (0.06)
ADLs difficulties	1.038 (0.25)	1.031 (0.25)	1.034 (0.25)
IADLs difficulties (ref.= 0 activity)			
1-3 activities	1.613*** (0.31)	1.599*** (0.31)	1.594** (0.30)
4 or above activities	2.314*** (0.65)	2.290*** (0.65)	2.256*** (0.64)
<i>Enabling</i>			
Poverty status (ref.=non-poor)			
Poor	1.351* (0.25)	1.301 (0.27)	
Near poor	1.093 (0.50)	1.053 (0.49)	
Health insurance (ref.= NRCMS only)			
UEBMI only		0.949 (0.31)	1.005 (0.33)
URBMI only		1.095 (0.45)	1.213 (0.51)
Multiple or other		0.407* (0.21)	0.464 (0.25)
No insurance		1.103 (0.42)	1.339 (0.53)
Poor*rural			1.440* (0.29)
Poor*urban* NRCMS			1.908* (1.23)
Constant	0.022*** (0.02)	0.023*** (0.02)	0.022*** (0.02)



LR chi2	182.24	193.04	198.68
Log likelihood	-1131.189	-1125.790	-1122.970
Pseudo R <sup>2</sup>	0.075	0.079	0.081

\* < 0.1; \*\* < 0.05; \*\*\* < 0.01.

## 5. Discussion

The elders with unmet needs usually had worse health status, suffered with a higher number of chronic diseases, and experienced more limitations in IADL. Their healthcare needs were more urgent than the average elderly individual's, but their access to healthcare was not sufficient. Other than "need factors," we observed socioeconomic and institutional predictors of unmet healthcare needs. If using healthcare services was mainly associated with other factors, rather than *need for care*, inequality of access to health emerged.

With reference to the health inequality literature, our study examined relationships between socioeconomic disadvantage and unmet healthcare needs among elders in China by controlling for predisposing and health need factors. In detail, we investigated to what extent elders' low-income status and residence status influence their unmet healthcare needs, and how this association varied under China's multiple health insurance schemes. To the best of our knowledge, this is the first study focusing on poverty and residence status to explore unequal influence of insurance schemes on unmet needs for healthcare.

Our findings demonstrated a pattern of association between socioeconomic disadvantages and unmet healthcare needs. Poor elders generally had a high likelihood of experiencing unmet healthcare needs due to financial constraints, even after accounting for poor health status that was more prevalent in populations with socioeconomic disadvantages, indicating that economic barriers to healthcare access still existed. Poverty could also be related to unmet needs as it may reflect residence areas that make accessing healthcare services more difficult. In our study population, 77% of poor elders lived in the vast, remote rural areas. Although a primary goal of China's New Healthcare Reform was developing rural healthcare and medical systems, and narrowing the urban-rural gap, healthcare facilities in rural China are still generally equipped with a less qualified workforce, and they provided less comprehensive services compared to secondary or tertiary hospitals (Xi Li et al., 2017), which are mostly concentrated in urban areas (Wang, Yang, Duan, & Pan, 2018). The unbalanced distribution of health resources between rural and urban areas has widened the gap in healthcare availability, with poor rural elders more likely to suffer an increased risk of unmet needs due to non-financial constraints.

Therefore, implementing equal and efficient health insurance should focus on benefiting the poor, especially the poor in rural areas to avoid the regressive benefit on the urban rich (Pan, Xu, & Meng, 2016). Our findings, however, indicate that although health insurance has reduced income-related barriers and offered protection for vulnerable older adults, its multiple schemes have created unequal results. In contrast to urban-based insurance schemes, NRCMS did not exhibit statistically significant effects on improving unmet healthcare needs among the Chinese elderly. This could be due to the nature of NRCMS coverage: the deductibles of NRCMS were generally high; the reimbursement of NRCMS was typically low; and NRCMS appeared to make insured patients more likely to use lower-level providers. Altogether, the insurance scheme designed for rural *hukou* holders is relatively meagre when compared with the schemes for urban employees or urban *hukou* holders.

This study also examined the effects of NRCMS on the unmet needs of poor elders migrating from rural to urban destinations. We found that these migrants hardly benefited from health insurance even if they were technically covered by one of the schemes. Although residing in urban areas, the majority of migrants (92%) with *hukou* registered in their home counties were on NRCMS. Since the public funding for insurance schemes was managed by local governments to serve local residents (Zhu & Österle, 2017), rural migrants could have healthcare in their places of residence, but under NRCMS, they were generally not eligible for enrollment in urban destinations. Only those with local insurance account, which was mainly driven by having more than two or other insurances, resulted in a higher likelihood of using health services in urban destinations (Zhang et al., 2017); otherwise they were limited to healthcare facilities in rural regions (Y. Li et al., 2016). Additionally, low-income migrants were not able to satisfy their needs by means of private services. Therefore, they had a higher possibility of forgoing or postponing healthcare utilization. These disadvantages among rural migrants highlight institutional barriers in the current health insurance system. Such institutional discrimination has exacerbated the adverse effects of socioeconomic disadvantages on unmet healthcare needs.

Although insurance schemes in China have achieved almost universal coverage for elders in both rural and urban areas, the poor, rural residents, and migrants are still marginalized by the system. To eliminate these socioeconomic disparities in access to health services, the government should put more effort into reforming the current healthcare system by

redistributing healthcare resources towards the rural areas, and integrating the urban and rural insurance schemes and making a unified insurance system managed by one government agency. Future research will focus on how these efforts influence the association between socioeconomic disadvantage, unmet healthcare need, and health insurance. And more waves of CHARLS will provide longitudinal data and a time-adjusted understanding for further study as well.

## 6. Conclusion

Previous studies on health service utilization among elders had largely focused on factors associated with realized healthcare utilization, i.e. why patients choose to visit doctors and how much they spend. This study is the first to focus on elders' lack of healthcare utilization. Our findings suggest that those at the lower end of the socioeconomic distribution can be identified as a vulnerable subgroup in China, despite the country's near-universal health insurance system. Their lower socioeconomic standing will not only contribute to their greater healthcare needs but also contribute to their not having these needs met. Adding health insurance coverage to the socio-demographic variables can moderate the predictive power of socioeconomic disadvantage. However, the effects of insurance vary with the schemes. Integrating the relatively meagre NRCMS scheme with poor socioeconomic status, our findings showed that poor rural migrating elders are the most vulnerable subgroup, experiencing the greatest unmet healthcare need. These findings provide needed evidence on the vulnerability of this subgroup, which is proven to be influenced by both socio-demographic and institutional arrangements. From a public policy perspective, these findings direct attention to the importance of social stratification and the differences in resources available to elders of different status.

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