

# Achieving Equitable Social Health Insurance Benefits in China: How Does Domestic Migration Pose a Challenge?

Zhiyuan Hou (✉ [zyhou@fudan.edu.cn](mailto:zyhou@fudan.edu.cn))

Fudan University <https://orcid.org/0000-0003-3413-0076>

Haiqin Wang

Fudan University <https://orcid.org/0000-0002-0452-2442>

Di Liang

Fudan University

Donglan Zhang

University of Georgia College of Public Health

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## Research

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1     **Achieving equitable social health insurance benefits in China: how does domestic**  
2   **migration pose a challenge?**

3                   **Zhiyuan Hou<sup>1\*</sup>, Haiqin Wang<sup>1,2\*</sup>, Di Liang<sup>3</sup>, Donglan Zhang<sup>4</sup>**

4     1 School of Public Health, National Key Laboratory of Health Technology Assessment  
5     (National Health Commission), Collaborative Innovation Center of Social Risks  
6     Governance in Health, Fudan University, Shanghai 200032, China.

7     2 Administrative Office, The International Peace Maternity & Child Health Hospital of  
8     China Welfare Institute, 910 Heng Shan Road, Shanghai 200030, China

9     3 Department of Family Medicine and Public Health, University of California, San  
10    Diego, 9500 Gilman Drive #0628, La Jolla, CA 92093, USA.

11    4 Department of Health Policy and Management, College of Public Health, University  
12    of Georgia, 100 Foster Road, Wright Hall 205D, Athens, GA 30602, USA

13  
14    \* Co-first author, equally contribute to the article.

15    Haiqin Wang: whq\_16@126.com

16    Corresponding author: Zhiyuan Hou. [zyhou@fudan.edu.cn](mailto:zyhou@fudan.edu.cn)

17 **Abstract**

18 **Background:** Universal coverage through social health insurance is promoted by many  
19 researchers and policymakers to improve health equity within a country or region. In  
20 China, the mass internal migration since 1980s has posed challenges for the social health  
21 insurance to ensure equitable benefits for migrant population. This study evaluated the  
22 benefit distribution of social health insurance among internal migrants in China.

23 **Methods:** Using the 2014 China National Internal Migrants Dynamic Monitoring  
24 Survey, , by applying a two-part model, we conducted a benefit analysis of social health  
25 insurance among a representative sample of migrants in China.

26 **Results:** The study found that the broader the geographic scope of migration, the lower  
27 the probability of receiving reimbursements from the social health insurance and the  
28 reimbursement ratio; but among those who received reimbursements, the broader the  
29 geographic scope of migration, the larger amounts they were reimbursed for health care  
30 use. We attributed this unequal benefit distribution to the current insurance design that  
31 relies on localized administration and patients paying services up-front and requesting  
32 reimbursement later.

33 **Conclusion:** To improve the equity in social insurance benefits between migrants and  
34 non-migrants and among migrants, policies that promote the insurance portability across  
35 regions and immediate reimbursement are warranted, while at the same time efforts  
36 should be done to control inflation of health care expenditures and to prevent inverse  
37 government subsidies from the regions that have more out-migration to regions that have  
38 in-migration.

39 **Keywords:** health insurance, health service, migrant, equity, China

## 40 **Background**

41 Over the past decades, China has been experiencing the most rapid urbanization and  
42 internal migration[1]. Domestic (internal) migrants who lived outside their place of  
43 origin reached 245 million in 2016[2]. However, migrants faced huge barriers to obtain  
44 health insurance in the places where they lived[3]. Research has shown that migrants  
45 were less likely to be covered by social health insurance than permanent residents[4].  
46 Although China established a nationwide social health insurance system, this system  
47 was quite fragmented and administrated locally, leading to large variation in insurance  
48 benefits across health insurance programs and regions. The unequal benefits in insurance  
49 might be amplified among the migrant population for the following reasons[5].

50 Firstly, the social health insurance system consisted of three separate insurance  
51 programs designed based on citizen's residence registration status and employment  
52 status[4]: the New Rural Cooperative Medical Scheme (NCMS) covering the registered  
53 rural residents, the Urban Employee Basic Medical Insurance (UEBMI) covering urban  
54 employees only, and the Urban Resident Basic Medical Insurance (URBMI) covering  
55 urban non-working residents[5-7]. UEBMI was jointly financed by employers and  
56 employees, while URBMI and NCMS were financed mostly by general taxes in addition  
57 to individual's premium. Subsidies from government accounted for up to 70% of the  
58 URBMI and NCMS funds [7]. Among the three insurance programs, UEBMI offers the  
59 most generous benefit package that provides reimbursement for both outpatient and  
60 inpatient services with high reimbursement rates, whereas URBMI and NCMS mainly  
61 reimburse for inpatient services[8]. Additionally, UEBMI and URBMI covered more

62 than 2100 drugs, almost twice the coverage of NCMS. To promote urbanization, the  
63 Chinese government issued policies to allow migrants to enroll in UEBMI or URBMI  
64 depending upon their employment status[9], and thus migrants may be enrolled in any of  
65 the three insurance programs. This may result in the variation in insurance benefits  
66 among migrants.

67 Secondly, the social health insurance programs are administrated and financed by  
68 local county or city government[10]. Each county or city designs its own benefit  
69 package which mainly covers health services delivered within the county / city, and  
70 generally does not reimburse health services delivered outside of the county / city[8].  
71 Even if some counties / cities cover health services provided outside of the county / city,  
72 lack of insurance portability across regions could create an additional barrier for  
73 insurance enrollees to receive the benefits. Migrants may enroll in health insurance at  
74 one place, but move to another place and receive health services at this new place, which  
75 thus results in separation between the location of health care use and that of health  
76 insurance coverage. For many internal migrants, they need to go back to their place of  
77 origin to get insurance reimbursement.

78 Previous benefit analysis among general population showed that government  
79 subsidies for social health insurance were pro-rich for both inpatient and outpatient  
80 services from 2003 to 2013 in China, although inequity in benefit distribution had been  
81 narrowed[11-13]. Evidence from URBMI also showed that the lower-income groups  
82 benefited less than the higher-income groups between 2007 and 2011[14]. Huang's  
83 study further pointed out that with the fragmented feature and increased benefit

84 disparities, social health insurance not only reinforced the existing rural-urban inequity,  
85 but also generated a new inequity between urban residents and migrants who lived in  
86 urban areas[7]. The only one study focusing on migrant workers presented that  
87 enrollment in UEBMI, URBMI or NCMS did not significantly increase health care  
88 utilization or reduce out-of-pocket health care expenditures[15]. In addition to income  
89 inequity, there is a unique contributor to health inequity among migrants – scope of  
90 migration – that where they migrated to. However, no literature has focused on the  
91 benefit distribution of social health insurance by scope of migration for the huge migrant  
92 population in China.

93 Using the 2014 China National Internal Migrants Dynamic Monitoring Survey, we  
94 conducted a benefit analysis of social health insurance among a representative sample of  
95 migrants in China. This study was the first to assess the benefit distribution by the  
96 geographic scope of migration and health insurance programs. We aimed to generate  
97 new evidence on the continuously changing health insurance system in China, and  
98 provide policy implications for other developing countries striving to achieve universal  
99 health coverage under rapid urbanization.

100

## 101 **Methods**

### 102 **Data and study design**

103 Data used for this analysis were from the 2014 China National Internal Migrant  
104 Dynamic Monitoring Survey. The survey was conducted by the National Health and  
105 Family Planning Commission of China in May 2014. This was a national cross-sectional

106 survey representing 15-59 year-old internal migrants who have lived in a city of new  
107 residence for more than one month but do not have a “Hukou” of the city (registered  
108 resident certificate).

109 In this survey, a stratified multi-stage random sampling method by Probability  
110 Proportional to Size (PPS) was employed, and the annual national data on internal  
111 migrants from each province in 2013 was considered as the basic sampling frame. A  
112 total of 348 cities from 32 provincial units in China were surveyed. Within each city,  
113 townships were randomly selected and followed by neighborhoods using the PPS. And  
114 then, in each neighborhood, 20 internal migrants were randomly selected to participate  
115 in the survey, finally reaching a total sample of 200,937 respondents. Face-to-face  
116 interview was conducted by trained interviewers, using a structured questionnaire. The  
117 informed consent was sought from the study respondents.

118 Questionnaires included demographic information and family structures,  
119 socioeconomic status, migration characteristics, health insurance, health care services,  
120 and family planning services. In this study, we focused on internal migrants who used  
121 inpatient care in the city of new residence during the previous year of the survey, and  
122 analyzed the benefits they received from their social health insurance. Thus, our sample  
123 comprised internal migrants who used inpatient care services in the city of new  
124 residence and had social health insurance, with a sample size of 1165 in total.

## 125 **Measurements**

126 In this analysis, benefits of health insurance were measured using three outcomes: the  
127 probability of receiving reimbursements from social health insurance, total amounts of



128 reimbursement received, and the percentage of reimbursements of total health care  
129 expenditures (reimbursement ratio). In the survey, we identified the first outcome by a  
130 multiple choice question “where did you receive reimbursement for your last  
131 hospitalization in this year”, answers including: allowance from NCMS, allowance from  
132 UEBMI, the employer, the NCMS office, the local health centers, the commercial  
133 insurance, allowance from the Family planning operation, the Family planning operation,  
134 and else. We recognized those who answered only “the commercial insurance” or “else”  
135 or both “the commercial insurance” and “else” as receiving no reimbursement from  
136 social health insurance. We identified the second outcome by the question “how much  
137 reimbursement did you receive from social health insurance. We identified the last  
138 outcome by the question for the second outcome and the question “how much did you  
139 cost in total”.

140 Our primary predictors of interest were social health insurance programs and the  
141 geographic scope of migration. Social health insurance programs included UEBMI,  
142 URBMI and NCMS. The geographic scope of migration was categorized into three  
143 subgroups: migration across counties but within a city, migration across cities but within  
144 a province, and migration across provinces (Under China’s administrative division, a  
145 county is smaller than a city).

146 Controlled variables included demographic characteristics, socioeconomic status,  
147 other migration characteristics, and the facility level for hospitalization. Demographic  
148 characteristics included gender, age and marital status. Marital status was measured by a  
149 binary variable indicating whether the respondent was married or not married (e.g.

150 widowed, divorced or never married). Socioeconomic status was measured by  
151 educational attainment, monthly household income per capita, whether the respondent  
152 had a job, whether the respondent had rural “Hukou”, and whether the respondent lived  
153 in urban areas. Educational attainment was categorized into four subgroups: primary  
154 school and below, junior high school, senior high school, and college degree and above.  
155 “Hukou” represents the record in the residency registration system in China; people can  
156 be registered as having either a rural or urban “Hukou” at birth and cannot be easily  
157 changed throughout lifetime[16]. Other migration characteristics were measured by  
158 reasons for and duration of migration. The reasons for migration included seeking jobs,  
159 family members following them to migrate or other reasons. Migration duration was  
160 categorized into four groups: less than one year; one to five years; five to ten years; and  
161 ten years and above. Finally, the facility level for hospitalization included primary care  
162 facility, secondary hospital, tertiary hospital, and private hospital.

### 163 **Statistical analysis**

164 We first described the general characteristics of our study sample. Chi-square test and  
165 one-way variance analysis were used to compare the differences of the probability of  
166 receiving reimbursement, the amount and ratio of reimbursement received according to  
167 the geographic scope of migration.

168 Since there were many “zero observations” - patients who used inpatient care but  
169 received no reimbursement, we used the two-part model to estimate the benefits  
170 migrants received from the social health insurance, which can be expressed as follows:

$$171 \quad \Pr[(\text{Reimburse amount})_i > 0 / (\text{Migration scope})_i] = \Phi[\beta *]$$

172 
$$(\text{Migration scope})_i + \eta * X_i + e_i] \quad (1)$$

173 
$$\log[(\text{Reimburse amount})_i / (\text{Reimburse amount})_i >$$

174 
$$0, (\text{Migration scope})_i, X_i] = \theta * (\text{Migration scope})_i + \gamma * X_i + \psi_i \quad (2)$$

175 
$$(\text{Reimburse ratio})_i / (\text{Reimburse amount})_i > 0, (\text{Migration scope})_i, X_i = \varepsilon * \text{$$

176 
$$(\text{Migration scope})_i + \delta * X_i + \alpha_i \quad (3)$$

177 Where  $(\text{Reimburse amount})_i$  and  $(\text{Reimburse ratio})_i$  are the reimbursement  
 178 amount and reimbursement ratio received by individual  $i$ .  $(\text{Migration scope})_i$  is a  
 179 set of dummies representing migration scopes of individual  $i$ , and migrants who  
 180 migrated across counties within a city is taken as the reference group. The parameter  $\beta$ ,  
 181  $\theta$  and  $\varepsilon$ , the key coefficients of interest, identify the association between migration  
 182 scope and the probability of receiving reimbursement, and also the amount and ratio of  
 183 reimbursement conditional on reimbursement received, respectively.  $X_i$  is a vector of  
 184 control variables including social health insurance coverage, demographic  
 185 characteristics, socioeconomic status, other migration characteristics, and the facility  
 186 level for hospitalization as mentioned above.

187 The above two-part model assumes that the benefit migrants received from the social  
 188 health insurance is determined by two separate decision making process: equation (1),  
 189 the ‘participation equation’, captures the fundamental difference between the  
 190 respondents who received reimbursements from social health insurance and those who  
 191 did not; as the ‘intensity equation’, equation (2) or equation (3) characterizes the  
 192 determinants of the amount and the ratio of reimbursement received among those who  
 193 actually received reimbursements. In equation (2) and equation (3), the amount and the

194 ratio of the reimbursement fits the Gamma distribution, and the logarithm transformation  
195 was taken on the amount of the reimbursement to reduce the impact of extreme values.  
196 Following the previous studies [e.g. Jan pan, Sen Tian, Qin Zhou and Wei Han  
197 (2016)][6,14], we estimated equation (1) with the Probit Model, and equation (2) and  
198 equation (3) with the Generalized Linear Model (GLM), respectively. Marginal effects  
199 with standard errors were reported.

200 All of the analyses were conducted for the total sample, rural social insurance sample  
201 (the NCMS subsample), and urban social insurance sample (the URBMI & UEBMI  
202 subsample), respectively. All analyses were performed using STATA 12.0 (StataCorp LP,  
203 College Station, TX, USA).

204

## 205 **Results**

### 206 **Characteristics of the study sample**

207 Table 1 presents the descriptive statistics for our study sample. Of the 1165  
208 respondents, 66.70% enrolled in NCMS, and 23.00% and 10.30% enrolled in UEBMI  
209 and URBMI respectively. The average expenditures per inpatient stay were 10,366  
210 Chinese Yuan (=1,567 US dollar), and there was little difference (about 500 Yuan,  
211  $P=0.643$ ) of inpatient expenditure between the NCMS subsample and URBMI &  
212 UEBMI subsample. 66.78% of respondents who used inpatient care received  
213 reimbursement from social health insurance, with 60.49% for NCMS enrollees and  
214 79.38% for URBMI & UEBMI enrollees. Among the respondents who received  
215 reimbursement, the average amount and ratio of the reimbursement received were 5,506

216 Yuan (=832 US dollar) and 46.77%. The average amount and ratio of the reimbursement  
217 received for NCMS enrollees were much smaller than those for URBMI & UEBMI  
218 enrollees.

219 The average age and monthly household income per capita of the respondents was 38  
220 years old and 2,256 Yuan. Less than half of the respondents were female. Most of them  
221 were married (89.27%), had education level of high school or below (89.70%), had rural  
222 “Hukou” (87.81%) and owned a job (79.57%), and lived in urban areas (69.36%).  
223 Nearly half of the respondents migrated across provinces, while those who migrated  
224 across cities but within a province and those who migrated across counties but within a  
225 city were 28.76% and 25.41% respectively. A total of 84.21% respondents migrated for  
226 better job opportunities, and 87.38% respondents had lived in the city of new residence  
227 for more than one year. Most of respondents (80.51%) chose inpatient care at secondary  
228 and tertiary hospitals instead of primary care facilities.

229

230 Table 2 summarizes the total expenditures per inpatient stay, the probability of  
231 benefiting from the social health insurance. It also presents that among the benefit  
232 recipients, the amount and ratio of reimbursement received according to the geographic  
233 scope of migration. The univariate analysis showed that the broader the migration scope,  
234 the lower the probability that migrants would receive reimbursements; but among those  
235 who received reimbursements, those who migrated across cities or across provinces  
236 received the larger amounts of reimbursement than those who migrated within a city.  
237 There was no significant difference in total expenditure and reimbursement ratio by the

238 geographic scope of migration.

239 **Association between insurance programs, migration scope and benefit of social**  
240 **health insurance**

241 Table 3 reports the association between insurance programs, migration scope, other  
242 factors and benefit of social health insurance, estimated from a two-part model.  
243 Compared with NCMS enrollees, URBMI or UEBMI enrollees were more likely to  
244 receive reimbursement, and among the benefit recipients, urban insurance enrollees  
245 received larger reimbursement amount and ratio. The probability of receiving  
246 reimbursement for UEBMI enrollees was 37.5% ( $P<0.01$ ) higher than that for the  
247 NCMS enrollees. Among insurance benefit recipients, UEBMI enrollees received 42.8%  
248 ( $P<0.01$ ) more reimbursement amount and 20.1% ( $P<0.01$ ) higher reimbursement ratio  
249 than NCMS enrollees.

250 According to the association between insurance benefit and migration scope, the  
251 geographic scope of migration significantly reduced the probability of receiving  
252 reimbursement and the reimbursement ratio, but increased the reimbursement amounts  
253 they received. Specifically, the probability of receiving reimbursement for those who  
254 migrated across cities and provinces was 14.7% and 26.0%, respectively, lower than  
255 those who migrated within a city ( $P<0.01$ ). However, they received 33.4% and 27.2%  
256 higher amount of reimbursement than those who migrated within a city ( $P<0.01$ ). And  
257 those who migrated across provinces had the lowest reimbursement ratio ( $P<0.10$ ).

258 In addition, there was no significant difference in insurance benefits by age, gender,  
259 marriage status, education, Hukou status, and migration duration. Income had no

260 significant influence on the probability of receiving reimbursement and reimbursement  
261 ratio, but significantly increased the reimbursement amount. Having jobs significantly  
262 decreased the probability and amount of receiving reimbursement, whereas living in  
263 urban areas significantly increased the probability of receiving reimbursement by 6.3%  
264 than living in suburban areas. Compared with migration for seeking jobs, family  
265 members following migrants significantly increased the reimbursement amount and ratio.  
266 The higher the level of health care facility, the greater probability and amount of  
267 receiving reimbursement, but the lower the reimbursement ratio.

268

269 Considering the differences in reimbursement policy between NCMS and urban  
270 health insurance, we further conducted the above regressions among the subsamples of  
271 NCMS enrollees and URBMI & UEMBI enrollees (Table 4). The relationships between  
272 migration scope and the probability of receiving reimbursement and reimbursement  
273 amount did not change, while it differed in its relationship with reimbursement ratio.  
274 Those who migrated more broadly had a significantly lower reimbursement ratio among  
275 NCMS enrollees, but had a significantly higher ratio among URBMI & UEMBI  
276 enrollees.

### 277 **Reasons for not receiving reimbursement from social health insurance**

278 We further investigated the reasons why migrants did not receive reimbursement from  
279 their social health insurance. Figure 1 showed that the need or plan to go back to  
280 hometown to get reimbursement was the main reason for not getting reimbursement,  
281 accounting for 66.5%, followed by a lack of knowledge about the reimbursement

282 process (16.7%) and the policy coverage issues (10.6%). Figure 2 further compares the  
283 proportion of not receiving reimbursement due to the need or plan to go back to  
284 hometown by migration scope. The broader the migration scope, the higher the  
285 likelihood that migrants did not receive reimbursement because that they must get  
286 reimbursement later from their hometowns.

287

## 288 **Discussion**

289 Using recent data from the China National Internal Migrants Dynamic Monitoring  
290 Survey, this study documented the benefit distribution of social health insurance among  
291 internal migrates. Among migrants who utilized inpatient care in the past year, only 67%  
292 received reimbursements from their social health insurance, and the reimbursement  
293 amount only accounted for 47% of the total expenditure per inpatient stay. There were  
294 large disparities by health insurance programs and migration scope. The broader the  
295 migration scope, the lower the probability of receiving reimbursement and the  
296 reimbursement ratio, but the higher the reimbursement amount they received.

297 Comparing this finding with other studies we found there was an inequity in insurance  
298 benefits between migrants and non-migrant population. The probability of receiving  
299 reimbursement and the reimbursement ratio for migrants were far smaller than those for  
300 the general population. Only 60% of migrants who were NCMS enrollees received  
301 reimbursement from NCMS, which was 30% lower than that for general NCMS  
302 enrollees (91.1% in 2013), whereas the reimbursement ratio among this group of  
303 migrants was 10% lower than that among general NCMS enrollees (39.4% vs. 50.1% in



304 2013)[17]. For URBMI & UEBMI enrollees, the probability of receiving reimbursement  
305 among migrants was about 10% lower than that among general population (79.4% vs.  
306 95.3% for UEBMI and 88.7% for URBMI enrollees), although small difference existed  
307 in the reimbursement ratio between the two groups (around 60%) [17]. A previous study  
308 also pointed out that migrants only partially benefited from health insurance  
309 coverage[15].

310 The results should be understood in the China specific context. There were several  
311 challenges for migrants to get insurance benefits under the current insurance policy  
312 design. In China, migrants faced more challenges of getting insurance reimbursement  
313 than non-migrants. There have been two common approaches to reimburse health care  
314 services (immediate reimbursement and later reimbursement)[18]. Immediate  
315 reimbursement means that the insured patient gets reimbursement immediately for the  
316 treatment and only pay out-of-pocket for the copay or coinsurance rate, whereas later  
317 reimbursement means that the insured patient pays the total expenditures out-of-pocket  
318 up-front and gets reimbursement later from their health insurance[18]. Local residents  
319 usually get reimbursement immediately, but migrants in general receive reimbursement  
320 later as they must travel back to their hometown where they enroll in social health  
321 insurance to receive reimbursement. Our study showed that up to 22% of migrants  
322 reported that did not get reimbursement because they needed to get reimbursement from  
323 their hometowns. In addition, research has shown that many services were not  
324 reimbursed and the reimbursement process was much more complex for migrants than  
325 for local residents[19]. One study showed that more migrants were treated in a hospital

326 that outside of the NCMS designated network than local residents, and thus their  
327 healthcare use were less likely to be covered by NCMS[19].

328 Our findings also showed inequity in insurance benefits among migrants by migration  
329 scope. Although the scope of migration was associated with larger reimbursement  
330 amount per inpatient stay, it was significant associated with a lower probability of  
331 receiving reimbursement and a lower reimbursement ratio. In China, all three social  
332 health insurance programs were administered, financed and operated by local county or  
333 city governments. Each county or city designed its own benefit packages and made the  
334 benefit localized[8,20], which limited individual coverage choices outside of the local  
335 region. This poses a challenge for internal migrants who typically use health care in the  
336 city of new residence, but may enroll in health insurance at their hometown according to  
337 their residence (“Hukou”) status. The separation between where health care is received  
338 and where health insurance is administered provided an additional hurdle for the  
339 internal migrants to receive benefits from their social health insurance. It became even  
340 more difficult when they lived far away from their hometowns. The localized  
341 administration of social health insurance and the later reimbursement approach  
342 contributed jointly to the inequity in benefit coverage for migrants[21]. To resolve this  
343 inequity, policies that promote the portability of insurance across regions and link health  
344 information to ease the reimbursement approach should be encouraged[21,22].

345 Another important finding of this study was that migrants who got reimbursement  
346 received larger reimbursement amounts if they migrated more broadly. Compared to  
347 migration within a city, migration across cities or across provinces was significantly

348 associated with 30% higher reimbursement amount per inpatient stay. This mainly  
349 attributed to higher health care costs in larger cities and more affluent regions where  
350 migrants who migrated more broadly like to locate. However, these reimbursements  
351 were mainly paid by health insurance funds in smaller counties / cities which were less  
352 affluent. This may pose financial difficulties for local governments in those  
353 out-migration regions, as if the current barriers to reimbursement were to be removed,  
354 there would have been larger amounts of insurance funds flowing into the health care  
355 system in more prosperous in-migration regions, which would worsen the already  
356 skewed regional inequity in economic development and health. Therefore, the inverse  
357 subsidies of health insurance funds from the less-developed out-migration regions to the  
358 highly-developed in-migration regions became an ongoing challenge and policy  
359 dilemma for countries like China that experience a mass domestic migration. Strategies  
360 that control health expenditures inflation and allow central government to redistribute  
361 welfare funding to less-developed regions may be warranted to address the possible  
362 financial difficulties faced by out-migration regions[5].

363 In addition to the above inequity related with migration. There were two other types  
364 of inequity in benefits due to the fragmented social insurance system and income  
365 inequity. Although China has almost achieved universal insurance coverage through  
366 social health insurance expansion[5], migrants who enrolled in UEBMI and URBMI  
367 benefited more than those who enrolled in NCMS[8,23]. One national study found that  
368 among general population, UEBMI enrollees had a higher benefit level than those  
369 covered by URBMI or NCMS[24]. Even for the same condition - tuberculosis inpatient

370 care- the reimbursement rate was the highest for UEBMI enrollees, followed by URBMI,  
371 and NCMS enrollees in 2012[23]. Income inequity also explains some of the benefit  
372 inequities. Among the benefit recipients, we found that migrants with higher income  
373 received greater reimbursement amount, which was consistent with prior studies among  
374 the general population[11,14,25]. On average, the higher-income group tended to have  
375 higher inpatient expenditure, and it was not surprising that they also received greater  
376 reimbursement amount[26].

377 This study contained some limitations. First, the outcomes related with reimbursement  
378 were self-reported, which may lead to measurement bias. Future research will use health  
379 insurance claims data to minimize this bias. Second, health status may influence health  
380 care utilization as well as whether a person chooses to migrate. Studies have detected the  
381 healthy migrant effect for internal migrants in China, showing that healthier people were  
382 more likely to migrate and to move farther away from home[27]. Unfortunately, there  
383 was no measurement on health status of migrants in this dataset. Third, we could not  
384 accurately distinguish the administration location of social health insurance, which may  
385 affect the insurance benefit for internal migrants. To reduce this bias, we conducted the  
386 analysis separately on two subsamples of NCMS enrollees and UEBMI & URBMI  
387 enrollees.

388

## 389 **Conclusion**

390 This study has important policy implications for China and other developing countries  
391 that experience rapid urbanization and internal migration. The broader the migration

392 scope, the lower the probability of receiving reimbursements from the social insurance  
393 and the reimbursement ratio; but among those who received reimbursements, the  
394 broader the migration scope, the larger amounts they were reimbursed for health care  
395 use. We attributed this unequal benefit distribution to the current insurance design that  
396 relies on localized administration and patients paying services up-front and requesting  
397 reimbursement later. To improve the equity in social insurance benefits between  
398 migrants and non-migrants and among migrants, policies that promote the insurance  
399 portability across regions and immediate reimbursement are warranted, while at the  
400 same time efforts should be done to control inflation of health care expenditures and to  
401 prevent inverse government subsidies from the regions that have more out-migration to  
402 regions that have in-migration.

403

#### 404 **Declarations**

#### 405 **Ethics approval and consent to participate**

406 The dataset is publicly accessible, and Ethical approval for this research was waived  
407 by Fudan School of Public Health's IRB.

#### 408 **Consent for publication**

409 This manuscript is an original work and has been done by the authors, ZH, HW,DL  
410 and DZwho all are aware of its content and approve its submission. This manuscript has  
411 not been published, and is not under consideration by another journal.

#### 412 **Availability of data and materials**

413 The data analyzed during the current study are not publicly available because they

414 contain information that could compromise research participant privacy and consent, but  
415 are available from the corresponding author on reasonable request.

#### 416 **Competing interests**

417 The authors have no competing interests to declare.

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#### 422 **Authors' contributions**

423 ZH designed the study and drafted the manuscript. HW conducted the literature  
424 review, analyzed the data, and contributed to the manuscript writing. DL and DZ revised  
425 the manuscript. All authors read and approved the final manuscript being submitted.

#### 426 **Authors' information**

427 1 School of Public Health, National Key Laboratory of Health Technology  
428 Assessment (National Health Commission), Collaborative Innovation Center of Social  
429 Risks Governance in Health, Fudan University, Shanghai 200032, China.

430 2 Administrative Office, The International Peace Maternity & Child Health Hospital  
431 of China Welfare Institute, 910 Heng Shan Road, Shanghai 200030, China

432 3 Department of Family Medicine and Public Health, University of California, San  
433 Diego, 9500 Gilman Drive #0628, La Jolla, CA 92093, USA.

434 4 Department of Health Policy and Management, College of Public Health, University  
435 of Georgia, 100 Foster Road, Wright Hall 205D, Athens, GA 30602, USA

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# Figures

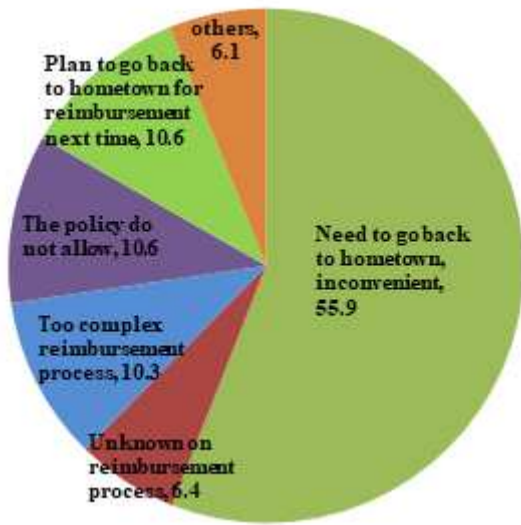


Figure 1

Reasons not getting reimbursement from social health insurance (on the left)

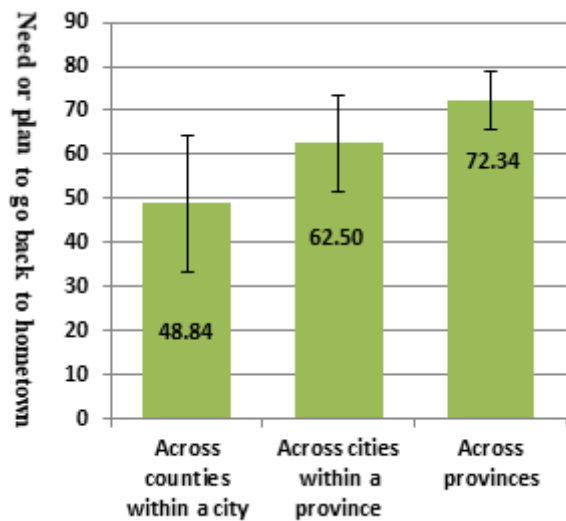


Figure 2

Proportion of not getting reimbursement due to the need or plan to go back to hometown for reimbursement, by geographic scope of migration (on the right)