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Child health security in China: A survey of child health insurance coverage in diverse areas of the country

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Abstract

China embarked on an ambitious health system reform in 2009, and pledged to achieve universal health insurance coverage by 2020. However, there are gaps in access to healthcare for some children in China. We assessed health insurance status and associated variables among children under five in twelve communities in 2010: two urban community health centers and two rural township health centers in each of three municipalities located in China's distinctly different East, Central and Western regions. Information on demographic and socio-economic variables and children's insurance status was gathered from parents or caregivers of all children enrolled in local health programs, and others recruited from the local communities. Only 62% of 1131 children assessed were insured. This figure did not vary across geographic regions, but urban children were less likely to be insured than rural children. In multivariate analysis, infants were 2.44 times more likely to be uninsured than older children and children having at least one migrant parent were 1.90 times more likely to be uninsured than those living with non-migrant parents. Low maternal education was also associated with being uninsured. Gaps in China's child health insurance coverage might be bridged if newborns are automatically covered from birth, and if insurance is extended to all urban migrant children, regardless of the family's residential registration status and size.

Keywords

Children; Infants; Health insurance; Coverage; China

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Introduction

When China commenced marketization in 1978, health insurance established in the 1950s and 1960s disappeared. In the countryside, dissolution of the agricultural cooperatives led to collapse of the Cooperative Medical Schemes covering most of China's rural population, leaving both children and adults in rural areas without insurance (Blumenthal & Hsiao, 2005; Liu, 2004b). In 1998, around 90% of farmers had no health insurance and paid all medical expenses out of pocket (Liu, 2004b). Similarly, for urban residents, health insurance schemes for employees of State Owned Enterprises and others gradually disappeared, and insurance coverage in urban areas declined from 53% to 42% by 1998 (Ma, Lu, & Quan, 2008).

The situation in cities improved with introduction, in 1998, of the Urban-Employee Basic Medical Insurance scheme for formal-sector workers, but not their families (Liu, 2002), and in 2008 with establishment of Urban Resident Basic Medical Insurance (URBMI), covering unemployed urban residents uninsured since the 1980s, children, students, the elderly, the disabled, and others (Barber & Yao, 2010). Coverage of the eligible population reached 93% by 2010 (Yip et al., 2012). However, some younger children residing in urban areas, although eligible, remain un-enrolled, and migrant children are generally excluded from city health systems due to China's *Hukou* (registered place of residence) policy (Lu, Zhang, Ma, Li, & Quan, 2008).

In response to the growing inequality in health outcomes and access to health-care between rural and urban China, the government re-launched the Rural Cooperative Medical Scheme (RCMS) in 2003 (Liu, 2002, 2004a). As the premium and benefit of the scheme improved, RCMS coverage increased from 21% in 2003 to 97% in 2011 (Meng et al., 2012). However, again there are indications that vulnerable groups such as those in very low-income households, infants, and migrant workers remain uninsured (Xu, Wang, Collins, & Tang, 2007; Zhao, Rao, & Zhang, 2011).

With an investment of 850 billion renminbi (RMB, about US$125 billion in 2009) over 2009–2012, China's health system reform sought to consolidate the impressive increases in insurance coverage already achieved by 2008 (Barber & Yao, 2010). However, the average benefit of China's various health insurance schemes varies quite widely (Brixi, Mu, Targa, & Hipgrave, 2012), and official coverage figures may mask gaps in insurance of certain vulnerable groups.

Uninsured children, in particular, are less likely to receive preventive treatment, and have lower rates of check-ups, vaccination and follow-up care (Qiu, Han, Chang, & Zhou, 2011); when ill, they are less likely to seek medical care, receive fewer indicated medications and treatments and stay for a shorter time in hospital than insured children (Tang et al., 2008). It is therefore important to identify gaps in child health insurance and the types of families with children at most risk of being uninsured.

At the mid-point of China's health system reform, we surveyed families of children aged under five years in 12 communities located in three geographically and economically

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distinct region in 2010. We aimed to provide evidence on health insurance among children in China, and identify factors associated with lack of health insurance coverage.

Methods

In July–August 2010, we interviewed the caregivers of children aged under five in one urban and one rural district in each of Suzhou, Wuhan and Guiyang cities, located in China's Eastern, Central, and Western regions, respectively. The sites were chosen in order to represent China's distinctly different socio-economic regions. Based on 2010 provincial government statistics, per capita disposable income in Suzhou was RMB27,359 (US$4007), in Wuhan RMB16,058 (US$2352) and in Guiyang RMB14,143 (US$2072) (National Bureau of Statistics of China, 2010). Surveyed areas were not sampled in exact proportion to their urban population, nor were the data population-weighted to represent entire provinces. However, the observed rates of urbanization were similar to 2010 national census estimates for the areas surveyed (Suzhou 55.29%, Wuhan 66.61% and Guiyang 38.63%) (National Bureau of Statistics of China, 2010).

Random sampling was used to select two urban community health centers and two rural township health centers in each of three districts. All children under five enrolled in the local immunization program were recruited, but only one child per family, selected randomly without regard for age, was surveyed. It was acknowledged in advance that some children were less likely to be enrolled for these services, due to parents' concern that the legality of their child's residency status might be checked. To minimize this effect, all health centers actively recruited caregivers of children residing in the local area during three days prior to the study. The design and purpose of the study and its confidential nature were promoted by advertising in communities and informing parents or guardians during health check-ups.

Ethical approval for the survey was obtained from the Institutional Review Board at the Tongji Medical College of Huazhong University of Science and Technology. The Ministry of Health and Health Bureau of Suzhou, Wuhan and Guiyang approved the survey. On site, interviewers trained by the principal investigator (author JX) explained the purpose and confidentiality of the survey, and then invited caregivers to participate. Acceptance to participate was given by oral consent and refusal was permitted without question.

The objectives of the research were to identify rates of insurance coverage among children and associated demographic and socioeconomic variables in the surveyed areas. A simple questionnaire covering these variables was developed by the research group and reviewed by pediatricians in Tongji Medical College, and its reliability pretested in Wuhan (Cronbach's $\alpha = 0.71$). The interviewers, six trained graduate students from Tongji Medical College, completed the questionnaires during a face-to-face meeting with each child's parents or caregivers. Caregivers answered individually or after consultation with family members; "don't know" answers were allowed.

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Dependent variable: enrollment in health insurance

Insurance type was classified as UR-BMI, RCMS, or private/other public insurances pooled as “commercial or other”. Children not enrolled in one of these schemes were considered uninsured.

Independent variables

Independent variables were included in the survey questionnaire based on an informal literature review (collected from PubMed, EMBASE and Science Direct electronic literature databases) on factors influencing choices in the purchase of health insurance. Child demographic and household level socio-economic variables were recorded, including child age and sex, parents’ education level, type of caregiver, area of residence, parents’ migrant status and household annual income (HAI) (Blumenthal & Hsiao, 2005; Lu et al., 2008; Wang, Zhang, Yip, & Hsiao, 2006).

Children were divided into three age groups: <12 months, 12–35 months and 36–59 months, based on children’s education eligibility in China and global child health statistics which focus on under-fives. For parents’ migrant status, a comparison of insurance among infants aged 0–6 months and older infants/young children was undertaken to account for the fact that migrant parents often leave home for work even when their children remain very young (Liu, Li, & Ge, 2009).

‘Children of migrant workers’ refers to children whose parents have been granted the legal right to work temporarily in cities in China; these children either are left with other caregivers in their hometown or migrate with their parents (Wong, Chang, & He, 2009). Migrant status was based on reporting by children’s caregivers (parents or other person). Since the study was done in areas where the number of migrant worker families is relatively low, for statistical analysis, the “long term migrant father only”, “long term migrant mother only” and “both parents migrated” variables were grouped together as one “any migrant parent” variable. For parents’ education level, the categories were: primary education (elementary school or less), intermediate education (junior and senior high school or secondary vocational school), and higher education (including college, undergraduate and postgraduate). Mothers’ and fathers’ education were assessed separately.

Caregivers were parents, grandparents or others, but were grouped into “parents” and “non-parents” for the statistical analysis.

HAI was measured by the average annual household disposable income per capita, based on the recall of the interviewee. We categorized HAI according to the Chinese national poverty line (NPL) in 2010 (RMB2300(US$362) per capital) (Sun, Jackson, Carmichael, & Sleigh, 2009; The World Bank, 2010). Three income groups were defined as incomes below 200% of the NPL (low), 200%–399% of the NPL (middle), and 400% of the NPL or more (high) (Holahan & Wang, 2004). Supposing the family household size was 3.0 (Yusuf & Brooks, 2009) with NPL at RMB2300, then low-income was below RMB13,800, middle-income was RMB13,800–RMB27,600, and high income was above RMB27,600 (Zhang & Wang, 2008).

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Statistical analysis

The Chi-square test for frequency data and one-way ANOVA test for continuous data were used to test for significant differences ($p < 0.05$ level, two-tailed) in the dependent and independent variables between three locations (Suzhou, Wuhan, Guiyang). Univariate logistic regression was used to assess association between the potential predictors and child insurance status. In order to test for independent predictors of being uninsured, multivariate logistic regression models were built including all of the potential predictors identified as significantly associated with insurance status in univariate analyses. Statistical analyses were performed in SPSS software (version 16.0, SPSS, Chicago).

Results

Descriptive results

In total 1199 child–caregiver pairs were selected and 1131 questionnaires were completed, a response rate of 94.3%; 12 pairs were excluded as the child's age exceeded five years (Table 1). Among those remaining, 293 (26%) were from Suzhou, 356 (32%) from Wuhan and 470 (42%) from Guiyang. The proportion sampled from urban areas was higher in Wuhan and Suzhou than in Guiyang, consistent with the proportion of population that is urban in these provinces. The mean age of the children was lower in Wuhan than in Suzhou and Guiyang, possibly due to the survey's timing, since children aged over three years were still in kindergarten at the time of the survey there in early July. In Guiyang and Suzhou, the survey was conducted in late July and August, during children's summer holiday.

Across the regions the main caregivers were parents (74.8%) and most were non-migrants (72.6%). Education levels varied widely across the three areas (Table 1). HAI was consistent with regional averages (National Bureau of Statistics of China, 2010), with Suzhou having more households in the high-income categories (40.9%) than Wuhan and Guiyang. Guiyang had the highest percentage falling into the low-income category (43.3%).

There was little variation on child health insurance rates across the regions (Table 1), with 62.2% of the total study sample having insurance. However, in keeping with the different rates of urbanization among the samples, the proportions enrolled in the different schemes varied widely across areas (Table 1).

Factors associated with having child health insurance coverage

Children in families with at least one migrant parent were more likely to be uninsured (48.2%) than those in non-migrant families (33.9%) (OR = 1.82; 95% confidence intervals (CI) 1.39–2.37) (Table 2). The uninsured rate was higher among both younger groups of children compared with the older group of children (for 12–35 months, OR = 1.86, 95%CI 1.27–2.71; for <12 months, OR = 5.63, 95%CI 3.89–8.15).

Infants aged 0–6 months having parents as caregivers were more likely to be uninsured (OR = 2.26, 95%CI 1.07–4.77). Although this association was not significant among infants/young children above six months (OR = 1.25, 95%CI 0.89–1.74), among the entire sample the relationship was significant (OR = 1.77, 95%CI 1.32–2.44).

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Low parental education was another risk factor for children lacking insurance (Table 2). Children whose mothers had only completed primary education were 1.80 times more likely to be uninsured (95%CI 1.23–2.62), and children of mothers with intermediate education were 1.45 times more likely to be uninsured (95%CI 1.00–2.14) compared to children whose mothers had high education. Similarly, children whose fathers had low education had 1.96 the odds (95%CI 1.28–2.98), and those whose fathers had only completed intermediate education had 1.55 the odds (95%CI 1.03–2.40) of being uninsured compared to those whose fathers had higher education.

Children in households with medium HAI had higher odds of being uninsured compared with the rest of the sample (OR = 1.41, 95%CI 1.00–2.00). In the pooled urban sample, compared with high HAI, children in medium- and low-income households had higher odds of being uninsured compared with those in high income households (for medium HAI: OR = 1.93, 95%CI 1.25–3.00; for low HAI: OR = 1.96, 95%CI 1.13–3.42). No significant association between HAI and insurance status was identified in the pooled rural sample (Table 2).

Children in urban areas were more likely to be uninsured than those in rural areas (OR = 1.58, 95%CI 1.23–2.02). Region of residence was not associated with insurance coverage.

Multiple regression results

Seven variables significantly associated with insurance status in univariate analyses were included in the multivariate regression model: migrant status, child's age, mother's and father's education level, HAI, caregiver (parent versus non-parent), and location of residency (urban versus rural). Independent predictors of children under five being uninsured were: having any migrant parent (OR = 1.90, 95%CI 1.39–2.59), younger child age (for <12 months OR = 5.11, 95%CI 3.41–7.66; for 12–35 months OR = 1.66, 95%CI 1.10–2.51), maternal education to primary level only (OR = 1.39, 95%CI 1.06–3.51) and living in an urban area (OR = 1.53, 95%CI 1.13–2.07) (Table 3).

Discussion

This survey of urban and rural families in three geographically and economically distinct regions of China revealed that only 62.2% of children under five were covered by health insurance. At the same time, national insurance coverage exceeded 90% (Yip et al., 2012). Our findings suggest that the government's goal of universal health insurance faces challenges: not only does a high proportion of young children lack insurance, some groups of children are more likely to be uninsured than others. In addition to the child's age, several factors were significantly associated with lacking insurance: urban residency, being a child of migrant workers, and low parental education, all consistent with other research (Lu et al., 2008).

Health insurance coverage in China has expanded from around 30% in 2003 to over 90% in 2012 (Meng et al., 2012). The finding that nearly 38% of children were not covered by the public and commercial health insurance schemes currently available makes them one of the largest uninsured vulnerable populations in China. Although our findings are not nationally

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representative, they imply that major challenges remain to achieving the China's goal of universal affordable and equitable basic healthcare for all by 2020 (Yip et al., 2012).

We found that having at least one migrant worker parent was a significant predictor of a child lacking insurance. Previous research found similarly that children from migrant families in Shanghai were at higher risk for being uninsured due to lower socio-economic status (Lu et al., 2008). Currently in China, unlike Vietnam (Nguyen & Wang, 2013), there is no government-sponsored health insurance program exclusively for children, nor any program enabling those who migrate to transfer insurance enrollment from their place of origin to their place of destination. Moreover, migrant children in urban lacking a valid residency permit usually cannot enroll in the local UR-BMI scheme.

Lack of insurance was also more common among infants. Chinese parents may lack awareness of available health insurance schemes or lack motivation to enroll their infants due to a perceived low marginal benefit, complicated paperwork or other factors (Meng & Tang, 2010). However, we have already described the benefits of insurance for children in China; these are steadily increasing and out-of-pocket expenses remain significant (Meng et al., 2012). Moreover, infants are a highly vulnerable group and certain benefits, such as reimbursement of the cost of essential drugs, are only available to the insured (Yang et al., 2012).

One solution to the identified lack of insurance among children under five in China would be passive enrollment, under which children are automatically enrolled at birth in the same scheme as their mother or father for, say, the first year of life, and automatically re-enrolled in subsequent years if the child's premium is paid by parents. This would also avoid reluctance to ensure children born late in the year for schemes whose premium falls due at the beginning of each calendar year. Second, the lack of insurance among migrant workers and their children could be addressed by providing them either with access to the local insurance program, or introducing portability of the insurance plan they joined in their hometown. We acknowledge that these solutions may be financially disadvantageous to the insurer and administratively complex. A third option would be a specific or additional program exclusively for children. The United States Children's Health Insurance Program reduced the proportion uninsured among those under 18 years from16% in 1987 to 12.5% in 2003 (Hudson & Selden, 2007). However, this option may increase fragmentation of the insurance pool. China's central government is encouraging local piloting of solutions to this issue, including health insurance for migrant workers and their children. Premiums in these pilot programs are paid jointly by the local government, the migrant's employer and the migrants themselves.

Our study has several limitations. Urban and rural residency were associated with children's insurance type and status, but those results may not be generalizable to the three regions surveyed. Second, our sample was not a complete cross section of the local population, and unregistered children were not recruited; these may have resulted in under-sampling of those at most risk of lacking insurance. HAI and other variables may also have been significantly associated with child's insurance status if more unregistered children had been included in the sample surveyed. Finally, regarding the multivariate analysis, the primary limitation is

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that the analysis was cross-sectional, and therefore none of the observed relationships can be inferred to be causal.

Conclusion

Universal health insurance coverage is China's ambition. However, we found that more than one-third of surveyed children under five were uninsured. This deserves confirmation with larger surveys, such as monitoring the status of child health insurance in China's five-yearly national health services survey or periodic household census or other surveys. Infants, children of mothers with low education, children with migrant parents, those living in urban areas and possibly those living with their parents were less likely to be insured. The observed predictors of being uninsured can inform policies directed at bridging these coverage gaps. Achieving truly universal health insurance would almost certainly improve health outcomes for vulnerable children in China.

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Table 1

Characteristics of study subjects (%).

	Suzhou N = 293	Wuhan N = 356	Guiyang N = 470	Total N = 1119	p-Value
Distribution of children					
Urban	52.9	67.7	39.1	51.8	<0.001
Rural	47.1	32.3	60.9	48.2	
Child characteristics					
Male	52.2	54.5	56.2	54.6	0.566
Age mean(months)	23.1	16.5	22.0	20.6	<0.001
Age category (%)					
<12	36.5	49.4	31.9	38.7	<0.001
12–35	25.9	39.0	47.0	39.0	
36–59	37.5	11.5	21.8	22.3	
Parents and household characteristics					
One migrant parent	7.2	13.3	9.8	10.2	<0.001
Both migrant parents	24.5	15.5	13.8	17.1	
Non-migrant parent	68.3	71.2	76.4	72.6	
Main caregiver					
Parents	68.9	74.5	78.7	74.8	<0.01
Non-parent	31.1	25.5	21.3	25.2	
Mother’s education					
Primary	30.4	36.2	62.0	45.6	<0.001
Intermediate	42.6	51.4	28.2	39.4	
High	27.0	12.4	9.8	15.1	
Father’s education					
Primary	32.8	42.8	67.2	50.4	<0.001
Intermediate	45.9	47.9	25.2	37.8	
High	21.4	9.3	7.7	11.8	
Household income					
High	40.9	11.3	10.9	18.9	<0.001
Medium	53.6	60.2	45.8	52.4	

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	Suzhou N = 293	Wuhan N = 356	Guiyang N = 470	Total N = 1119	p-Value
Low	5.4	28.5	43.3	28.7	
Insurance status					
Insured	60.1	60.7	64.7	62.2	0.341
UR-BMI	52.9	32.2	15.7	30.6	<0.001
NCMS	25.4	36.1	74.0	49.1	
Commercial or other	21.7	31.8	10.3	20.4	

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Table 2

Odds ratios for being uninsured according to individual risk factors.

Variables	%	Total number	Odds ratio (OR) (95%CI)
Migrant status			
Non-Migrant	33.9	809	1.00 (Reference)
Migrant	48.2	305	1.82*** (1.39,2.37)
Gender			
Female	40.0	508	1.00 (Reference)
Male	36.0	611	0.85 (0.66,1.07)
Age-group (months)			
36–59	18.8	250	1.00 (Reference)
12–35	30.0	436	1.86*** (1.27,2.71)
<12	56.6	433	5.63*** (3.89,8.15)
Caregiver			
Non-Parents	28.1	281	1.00 (Reference)
Parents	40.8	835	1.77** (1.32,2.37)
Caregiver: 0–6 month old			
Non-parents	50.0	32	1.00 (Reference)
Parents	69.4	235	2.26** (1.07,4.77)
Caregiver: 0<6 month old			
Non-parents	25.3	249	1.00 (Reference)
Parents	29.7	600	1.25 (0.89,1.74)
Mother’s education			
High	28.6	168	1.00 (Reference)
Intermediate	36.8	438	1.45** (1.00,2.14)
Primary	41.8	507	1.80** (1.23,2.62)
Father’s education			
High	26.7	131	1.00 (Reference)
Intermediate	36.1	421	1.55 ** (1.03,2.40)
Primary	41.6	562	1.96** (1.28,2.98)
Household annual income (HAI) (all)			
High	32.5	200	1.00 (Reference)
Medium	40.5	556	1.41** (1.00,2.00)
Low	35.4	305	1.14 (0.78,1.66)
HAI (Urban)			
High	27.9	126	1.00 (Reference)
Medium	56.1	326	1.93** (1.25,3.00)
Low	16.0	94	1.96** (1.13,3.42)
HAI (Rural)			
High	35.1	74	1.00 (Reference)

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Variables	%	Total number	Odds ratio (OR) (95%CI)
Medium	32.2	230	0.88 (0.50,1.52)
Low	30.3	211	0.84 (0.46,1.41)
Development Region			
Eastern	39.9	293	1.00 (Reference)
Central	39.3	356	0.98 (0.71,1.34)
Western	35.3	470	0.82 (0.61,1.11)
Area of residence			
Rural	32.3	539	1.00 (Reference)
Urban	42.9	580	1.58*** (1.23,2.02)

** $P < 0.01$;

*** $P < 0.001$.

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Table 3

Multivariate logistic regression model of risk factors for being uninsured.[a]

	B	**S.E.**	**Wald**	**df**	**Sig.**	**OR (95%CI)**
Migrant parent or parents (migrant compared with non-migrant)	0.64	0.16	16.22	1	<0.001	1.90 (1.39,2.59)
Child's age category (months)						
36–59						1.00 (reference)
12–35	0.51	0.21	5.81	1	<0.01	1.66 (1.10,2.51)
<12	1.63	0.21	62.50	1	<0.001	5.11 (3.41,7.66)
Caregiver (parents compared with non-parents)	0.33	0.17	3.77	1	0.052	1.39 (0.99,1.95)
Mother's education						
High						1.00 (Reference)
Intermediate	0.41	0.27	2.36	1	0.124	1.50 (0.89,2.53)
Primary	0.66	0.31	4.59	1	<0.01	1.93 (1.06,3.51)
Father's education						
High						1.00 (Reference)
Intermediate	0.06	0.29	0.04	1	0.836	1.06 (0.60,1.89)
Primary	0.20	0.33	0.38	1	0.538	1.23 (0.64,2.35)
Area of residence (urban compared with rural)	0.43	0.15	7.63	1	<0.001	1.53 (1.13,2.07)
Household annual Income						
High						1.00 (Reference)
Medium	−0.02	0.20	0.01	1	0.924	0.98 (0.66,1.45)
Low	−0.29	0.24	1.47	1	0.223	0.75 (0.47,1.19)
Constant	−2.56	0.33	61.51	1	<0.01	0.078

a

Migrant parent or parents	0 non migrant	1 migrant	
Child's age category	0 36–59 months	1 12–35 months	2 <12 months
Caregiver	0 non parents	1 Parents	
Mother's education	0 high level	1 intermediate level	2 primary level
Father's education	0 high level	1 intermediate level	2 primary level

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Area of residence	0 rural	1 urban	
Household annual Income	0 High	1 Medium	2 Low