Determinants of the use of different types of health care provider in urban China: A tracer illness study of URTI

Dongfu Qian [a,*], Henry Lucas [b], Jiaying Chen [a], Ling Xu [c], Yaoguang Zhang [c,*]

[a] School of Health Policy & Management, Nanjing Medical University, Hanzhong Road 140, Nanjing 210029, Jiangsu Province, PR China
[b] Institute of Development Studies, Sussex, UK
[c] Center for Health Statistics and Information (CHSI), Ministry of Health, NO. 1 xi zhi men wai nan Road, Beijing, PR China

ARTICLE INFO

ABSTRACT

With the reform of urban health delivery systems in China, concern has been growing about the effect of these changes on health care demand and utilization at basic-level health institutions, especially Community Health Services Centers (CHC). Using data from the fourth China National Health Services Survey (NHSS) that was conducted in 2008, the authors conducted a tracer illness study of urban people with acute upper respiratory tract infections (URTI) to examine the factors that affect their use of different outpatient health care providers. The study addresses the observed demand for both public and private providers and is believed to be the first to attempt this for urban China. The findings indicate that overall private clinics are important sources of medical care for low consumption households, that insured patients are less likely to use private clinics and more likely to use CHC and that children are more likely to see a high-level provider. A number of other factors, including city size and severity of illness were found to play a role in determining provider utilization. We discuss the policy implications of the results in terms of meeting the health care needs of the urban population in China.

1. Introduction

The implementation of market-oriented health system reforms in China, which has coincided with increasingly high user fees for health care, mean that patients are now free to use whichever level of provider they can afford. A number of serious problems have resulted, including the co-existence of idle and overburdened facilities, inefficient resource allocation and high medical expenses [1]. For example, high-level, high-cost hospitals are often overloaded with patients, whereas basic-level, lower-cost urban facilities are underutilized. Concerns relating to the utilization of different types of health care provider and implications for the rational use of medical resources have been growing [2,3].

The health care delivery system in urban China had been characterized by the 'three-tier network' of street clinics, district hospitals, and city hospitals. However, changes related to the economic reforms of the 1980s brought new challenges to this system. Referral mechanisms essentially ceased to function, with patients using any provider that they could afford. Partly in response to this situation, major urban health care policy reforms were adopted by the central Chinese government in 1997. From 1999, it has been formally promoting the development of Community Health Services Centers (including affiliated Community Health Service stations) as major providers of primary health care. In 2002, the government further encouraged enterprises, institutions, social organizations and even individuals to invest in the establishment of CHCs and promoted the incorporation of CHCs into urban health care insurance

* Corresponding authors.
E-mail addresses: qiandf006@hotmail.com (D. Qian),
zhangyg@moh.gov.cn (Y. Zhang).

schemes. The aim is to establish CHC networks nationwide as the major providers of primary health care by the year 2010.

Enormous changes have occurred in the Chinese urban health care system over recent years, with many district and community hospitals being converted into CHCs and the specialists who used to work in these hospitals being retrained to become general practitioners (GPs). By the end of 2007, almost every city had developed community health services and a total of 27,069 CHCs (including Health Service stations) had been established (Chinese Health Statistical Yearbook (CHSY)) [4]. As a result, the urban three-tier network is moving toward a two tier system based on CHCs and city hospitals, which include various General and Specialist Hospitals at and above county level. However, a two-way referral system has yet to be established [5] and there are still no regulatory barriers to the use of any level of health care provider by urban residents.

The CHCs and city hospitals are predominantly owned by government. However, in 2007 government provided only 14.3% and 8.5% of their total revenues [4], with the great majority of their income derived from patient fees. At the end of 2007, there were also 129,882 group or solo practice private clinics and 3306 private hospitals, mainly in urban areas [4]. These accounted for 44.85% and 1.14% of total registered medical institutions excluding village clinics. The distinction is based on the capacity to admit inpatients, with Ministry of Health (MOH) regulations requiring that medical institutions designated as 'hospitals' should have at least 20 beds [6]. The development of private hospitals has been relatively slow and urban residents mainly use the other types of health care provider described above.

City hospitals are usually perceived to be the providers of higher quality of care at a higher price, whereas CHCs and private clinics are regarded as providers of lower quality care at a lower price. In addition, private clinics predominately provide curative services, while CHCs also provide health promotion education, disease prevention, family planning and other public health services. With the reform of the health delivery system, the utilization rates of the various health care providers have also changed. Findings from the fourth NHSS indicate that the percentage of initial outpatient visits to primary medical institutions in urban areas (mainly CHCs and private clinics) increased dramatically from 36.6% in 2003 to 48.3% in 2008 [7].

In the context of recent changes in the health delivery system, It is imperative to examine the factors influencing health care demand in urban China. Most of the existing literature on the demand for health care in urban China (e.g. Li et al. [8]), has focused on the overall utilization level or probability. Of those that have investigated use by type of provider, none has controlled for the biases associated with various types of illness (Zhou and Rao [9]; MOH 2003 [10]; Yang et al. [11]; Qian et al. [12]). This is an important limitation which may affect the accuracy of model estimation. Some studies have identified disease-related variables as more important than social and demographic variables for predicting the use of different providers (Fosu [13]; Pillai et al. [14]).

The approach adopted here, in line with many other studies (e.g. Kroeger [15], Newbold [16], Henderson et al. [17]), is to question the extent of the relationships between the use of a particular type of healthcare provider and three types of influencing factors:

- predisposing factors (social and demographic characteristics),
- the perceived need for care (perceived characteristics of perceived illness), and
- enabling factors (access to health care).

To assess these relationships, the current study follows a number of international studies that have restricted analysis to specific types of illness (Pillai et al. [14]; Borah [18]; Luong et al. [19]). This has approach rarely been adopted in China. Furthermore, while the demand for private care providers has received extensive attention in other developing countries (Dow [20]; Sahn et al. [21]; Habtoma and Ruys [22]), there are hardly any such studies for urban China. Finally, some international studies show that children have their own patterns of health care demand and utilization (Borah [18]; Mwabu et al. [23]; Damen [24]; Pokhrel and Sauerborn [25]) but there are few such studies involving children in urban China. This paper attempts to fill each of these gaps in the available literature.

The paper is organized as follows. Section two describes the data and defines the variables in the study. Section three reports the empirical results. The last section provides a discussion of relevant issues and policy implications.

2. Data and variables

The data for this study come from the fourth NHSS, which was conducted in 2008. Following a multi-stage stratified random sampling framework, 46,510 members of 16,802 households in urban areas were selected to provide information on a range of factors including their reported heath care needs, demands, utilization and expenditures. Questions concerning children were answered by parents or guardians. The survey also contains a rich set of socio-economic and demographic information on the respondents. For illness episodes not involving hospitalization during the 2 weeks preceding the day of the survey, the survey collected details of the first outpatient visit including type of provider, health care received and out-of-pocket expenditures.

2.1. Choice of tracer condition

Self-reported acute upper respiratory tract infection (URTI) was reported by more sampled individuals than any other disease. Moreover, URTI is a common ailment that can be treated by all providers. It was therefore regarded as an appropriate tracer illness that could be used to identify the factors influencing the use of different types of health care provider. There were 1058 outpatients who met the criteria for inclusion in the study. Of these, 521 (49.2%) opted for self-treatment, 124 (11.7%) used private clinics, 235 (22.2%) used CHCs, and 178 (16.8%) sought care at city hospitals.

Table 1
Description of variables.

Variable	Description	Mean(S.D.)
Age		
Age 0–14	=1 if age ≤ 14; =0 otherwise.	0.27(0.45)
Age 15–59[a]	=1 if 15 ≤ age < 60; =0 otherwise; omitted group.	0.55(0.50)
Age 60~	=1 if 60 ≤ age; =0 otherwise.	0.18(0.38)
Male	=1 if male; =0 otherwise.	0.45(0.50)
Married	=1 if married; =0 otherwise.	0.52(0.50)
Education of injured/ill person or mother		
Primary	=1 if primary and under education; =0 otherwise; omitted group.	0.26(0.44)
Secondary	=1 if secondary and high school; =0 otherwise.	0.49(0.50)
Junior	=1 if Junior college and above; =0 otherwise.	0.26(0.44)
Occupation		
Unemployed	=1 if unemployment and without job; =0 otherwise; omitted group.	0.48(0.50)
Administrator and professional	=1 if administrators and professionals; =0 otherwise.	0.19(0.39)
Other	=1 if all kinds of other workers; =0 otherwise.	0.33(0.47)
Consumption	Household's annual per capita consumption	
L-consumption	=1 if low consumption group; =0 otherwise; omitted group.	0.33(0.47)
M-consumption	=1 if middle consumption group; =0 otherwise.	0.33(0.47)
H-consumption	=1 if high consumption group; =0 otherwise.	0.34(0.47)
City size		
C-big[a]	=1 if big city; =0 otherwise; omitted group.	0.32(0.47)
C-medium	=1 if medium-sized city; =0 otherwise.	0.28(0.45)
C-small	=1 if small city; =0 otherwise.	0.40(0.49)
Severity of illness		
Low severity	=1 if low perceived severity; =0 otherwise; omitted group.	0.25(0.43)
Medium severity	=1 if medium perceived severity; =0 otherwise.	0.67(0.47)
High severity	=1 if high perceived severity; =0 otherwise.	0.08(0.27)
Insurance status		
No insurance	=1 if no any health insurance; =0 otherwise; omitted group.	0.30(0.46)
UEBMI	=1 if covered by UEBMI; =0 otherwise.	0.30(0.46)
RCMS	=1 if covered by RCMS; =0 otherwise.	0.21(0.41)
Other	=1 if covered by other types of health insurance; =0 otherwise.	0.19(0.40)

[a] Indicates the omitted group in the MNL analysis.

2.2. Factors influencing the demand for health care

As indicated above, we based our analysis on the assumption that the use of a given type of provider would be influenced by three groups of factors: predisposing, perceived need for care, and enabling. Given this assumption and the data available in the NHSS, we analyze three groups of related explanatory variables. The first group, social and demographic characteristics, includes age, gender, marital status, education, economic status, occupation, and city size. The second group relates to the perceived characteristics of the illness. For a single illness study this can be simply represented by perceived severity. The third group addresses heath care characteristics: distance, price and quality of service, and health insurance schemes. Table 1 describes the variables used in the study.

2.3. Social and demographic characteristics

In order to address potentially different patterns of health care provider use by children and the elderly, the study considers three age groups: 0–14 years, 15–59 years, and 60 years and above. The marital status variable is recoded to simply assign individuals as either married or unmarried. The number of cases where education level was recorded as illiterate or university in our sample are small

and thus three categories were defined: primary school or less, secondary and high school, junior college and above. The education level of the mother was used when considering the use of a specific type of provider by a child, on the assumption that she would usually take responsibility for obtaining treatment.

Consumption was used to reflect household economic status (Borah [18]; Hjortsberg [26]; Rous and Hotchkiss [27]). Household annual consumption expenditure was classified into three groups: low consumption, middle consumption, high consumption. The occupations of respondents are divided into three groups: unemployed, administrators and professionals, and other. 'Administrators and professionals' included administrators of government agencies, enterprises and public institutions, and professionals in all kinds of institutions. 'Other' included the common personal of government agencies and public institutions, commerce and service personnel, workers in the non-agricultural sector, and other workers. The city size variable was grouped into three categories by population size: large (500,000 or more), medium-sized (200,000–500,000) and small (200,000 or less).

2.4. Severity of illness

The severity of illness, which was perceived and evaluated by respondents, was classed as low, medium or high.

2.5. Access to healthcare

There is no information in the survey data on the characteristics of all potential providers but respondents were asked to give the most important reasons as to why they used the indicated provider. This was useful information in terms of identifying the roles of distance, price and perceived quality of care. In many similar studies (Borah [18]; Sahn et al. [21]; Jowett et al. [28]) those absent data, especially perceived quality of care, are treated as unobserved factors. We have used the available information to provide supplementary analysis.

Insurance status was divided into four types: no insurance, Urban Employee Basic Medical Insurance (UEBMI), New Rural Cooperative Medical System (RCMS), and other. UEBMI covers workers of all state-owned, and some non-state-owned, enterprises. The population of some urban districts includes some rural citizens. In addition, there is large-scale migration of rural labor to urban areas in China. If these workers reside in urban areas for more than 6 months they will be regarded as urban dwellers for the purposes of the NHSS. These two groups account for the 21% of respondents with RCMS in our data.

Only 32 respondents (2.6%) had Government Health Insurance (GHI, which covers government employees and retirees and disabled veterans), 38 respondents (3.6%) with other types of social health insurance, and 137 respondents (12.9%) covered by urban resident basic medical insurance (URBMI, targeting those not covered by other schemes, including children, students, and the unemployed). All these respondents are categorized as covered by 'other' insurance schemes.

2.6. Dependent variable

Our study identifies four types of health care provider (the dependent variables in model estimation): self-treatment, private clinics, CHCs and city hospitals. A multinomial logit model (MNL) is used to analyze the determinants of outpatient health care provider use because we assumed that the alternative options are distinct, have different attributes and can be considered to be mutually exclusive. The MNL model was also seen as appropriate since all the independent variables in the estimated model are individual characteristics (Econometric Society [29]). We applied the Hausman test to evaluate the independence of irrelevant alternatives (IIA). On the basis of the resulting test statistics, we were unable to reject the null hypothesis that there were no systematically differences in coefficients (Hausman and McFadden [30]; Habtom and Ruys [22]). Thus the multinomial logit model appears appropriate. Train [31] has noted that the IIA assumption in the MNL model is not as restrictive as it might seem.

3. Results

3.1. Descriptive findings

Table 2 shows the percentage distribution by type of provider visited for those reporting illness and seeking care.

3.2. Demographic and social variables

Of the 289 patients aged 14 years old and under with URTI, almost 78% were taken to a health provider. Of these, 45% used a city hospital, 35% a CHC and 20% a private clinic. For older age groups the percentage opting for self-treatment increased sharply, to around 60% and there was a modest increase in the proportion of those seeking care who visited a private clinic.

The proportion deciding to seek a provider was very similar for each education level. However 52% of those with junior college education and above then chose to visit a city hospital, compared to just 28% of those with secondary and 22% of those with primary or less. Less than 15% of those with the highest level of education used a private clinic, compared with 23% of secondary graduates and 31% of those with primary education or less.

3.3. Economic status

Interestingly, there was again very little association between consumption levels and seeking care from a provider, with around 50% of each expenditure category undertaking self-treatment. Among those who obtained care from a provider, 42% of those from low consumption households used a private clinic compared to only 16% and 12% of those in the middle and high consumption categories. All groups, including perhaps surprisingly those in the highest expenditure category, were somewhat more likely to use a CHC than a city hospital.

3.4. Severity of illness

As would be expected, severe URTI is more likely to be treated at city hospitals, while slightly less than 70% of mild cases are self-treated. However, it is of concern that almost 22% of those reporting high severity URTI reported self-treatment.

3.5. Health insurance

The pattern in terms of insurance cover is very mixed. The proportion reporting self-treatment was 49% for those with no insurance, 63% for those with UEBMI and only 36% for those with RCMS. This is interesting in that UEBMI would generally be regarded as having more generous provision than RCMS. More than 77% of those with RCMS who obtained care used a CHC, almost certainly because these facilities are specified as the provider of first choice by many of these insurance schemes. These are administered at county level with regulations that are, in line with common practice in China, adapted by local policy makers in line with what they regard as appropriate to local conditions and may therefore be more or less restrictive in terms of potential providers.

3.6. Multinomial logit model

Table 3 presents maximum likelihood estimates of MNL model coefficients. Note that self-treatment is used as the base alternative in the estimation.

Table 2
Percentage distribution by provider.

Variable	Self-treatment (%)	Private clinics (%)	CHCs (%)	City hospitals (%)	Total number of observations
Age					
Age 0–14	22.1	15.6	35.3	27.0	289
Age 15–59	58.9	10.5	17.7	12.9	582
Age 60~	61.0	9.6	16.0	13.4	187
Male	47.3	12.1	22.5	18.1	480
Female	50.9	11.4	22.0	15.7	578
Married	59.0	10.2	16.8	14.0	549
Unmarried	38.7	13.4	28.1	19.8	509
Education level					
Primary	49.1	15.9	24.0	11.1	271
Secondary	50.4	11.4	24.0	14.1	516
Junior	47.2	8.1	17.0	27.7	271
Occupation					
Unemployed	38.0	15.2	26.7	20.1	513
Administrator and professional	63.5	7.1	11.7	17.8	197
Other	57.8	9.2	21.6	11.5	348
Consumption					
L-consumption	50.9	20.7	15.9	12.5	352
M-consumption	49.4	8.1	24.9	17.6	346
H-consumption	47.5	6.4	25.8	20.3	360
City size					
C-big	63.5	3.5	11.2	21.8	340
C-medium	41.3	13.1	23.8	21.8	298
C-small	43.3	17.4	30.0	9.3	420
Severity of illness					
Low severity	69.2	9.0	12.8	9.0	266
Medium severity	45.0	12.3	25.2	17.5	709
High severity	21.7	15.7	26.5	36.1	83
Insurance status					
No insurance	48.8	18.1	13.8	19.4	320
UEBMI	62.6	5.8	13.1	18.5	313
RCMS	35.6	9.0	49.5	5.9	222
Other	44.3	13.8	19.7	22.2	203

3.6.1. Demographic and social variables

Relative to self-treatment, URTI patients aged 0–14 years had higher probabilities of visiting the other three providers than those aged 15–59 years. A URTI patient aged 0–14 years old had the highest likelihood to seek at city hospital (OR = 7.9), followed by CHC (OR = 4.1), and then private clinic (OR = 2.9). The coefficients were statistically significant (0.01% level) for all health care providers.

The coefficients of the gender, marital status, education level and occupation variables were not statistically significant. It is of interest that the effect of college level and above education, which appears in the descriptive analysis to greatly increase the likelihood of using a city hospital, appears to have been absorbed by other variables in the model. This variable is highly correlated with economic status.

3.6.2. Economic status

As might be expected from the descriptive analysis above, consumption level is inversely related to the use of a private clinic. Relative to self-treatment, the odds of middle and high consumption patients with URTI using a private clinic are 0.49 and 0.37 times those of patients in the low consumption category (0.01% level). The coefficients for middle and high consumption groups are very similar for both CHC and city hospital. Relative to self-treatment, the

odds of middle and high consumption patients using a CHC are 1.72 and 1.66 times those of patients in the low consumption category, while the odds of using a city hospital are 1.61 and 1.67.

3.6.3. City size

City size was also a statistically significant determinant of choice of health care provider. Relative to self-treatment, the odds of URTI patients in a medium-sized city using a private clinic or CHC are 4.8 times and 2.5 times those of patients in the large city category. In addition, relative to self-treatment, the coefficient for small city is statistically significant only in the private clinic model, with URTI patients in small cities having more than 7 times the odds (OR = 7.1) of using a private clinic compared to those in the large city category.

3.6.4. Severity of illness

The coefficients of severity of illness were positive and statistically significant for all health care providers. Relative to self-treatment, the odds of patients with perceived medium severity using a private clinic, CHC or city hospital are 1.9, 2.9 and 3.1 times those of patients in the perceived low severity category. The equivalent odd-ratios for patients with perceived high severity are 5.0, 8.5 and 12.0. Possible interactions between consumption level and

Table 3
Parameter estimates (multinomial logit model).

Variable	Type of provider					
	Private clinic		CHC		City hospital	
	B(std. error)	OR	B(std. error)	OR	B(std. error)	OR
Intercept	−2.828[*](0.517)	–	−3.465[***](0.444)	–	−3.279 [***](0.473)	–
Age 0–14	1.069[***](0.353)	2.911	1.407[***](0.306)	4.083	2.064[***](0.348)	7.878
Age 60~	0.024(0.334)	1.024	0.101(0.278)	1.106	−0.054(0.296)	0.947
Male	0.034(0.220)	1.035	−0.029(0.183)	0.971	0.097(0.194)	1.102
Married	−0.109(0.295)	0.897	−0.225(0.242)	0.799	−0.306(0.281)	1.358
Education level						
Secondary	−0.111(0.272)	0.895	0.300(0.236)	1.349	−0.005(0.279)	0.995
Junior	−0.127(0.362)	0.881	0.238(0.307)	1.268	0.585(0.316)	1.796
Occupation						
Administrator and professional	0.096(0.444)	1.101	−0.415(0.369)	0.660	−0.274(0.386)	0.760
Other	0.104(0.315)	1.110	0.119(0.275)	1.126	−0.201(0.334)	0.818
Consumption						
M-consumption	−0.720[***](0.267)	0.487	0.543[**](0.231)	1.721	0.479[**](0.249)	1.614
H-consumption	−0.998[***](0.286)	0.369	0.506[**](0.236)	1.658	0.510[**](0.251)	1.666
City size						
C-medium	1.575[***](0.366)	4.829	0.914[***](0.250)	2.495	0.164(0.231)	1.179
C-small	1.9665[***](0.359)	7.143	0.175(0.297)	1.192	−0.360(0.284)	0.698
Severity of illness						
Medium severity	0.652[**](0.266)	1.920	1.067[***](0.231)	2.905	1.128[***](0.257)	3.089
High severity	1.610[***](0.455)	5.002	2.142[***](0.398)	8.520	2.487[***](0.392)	12.024
Insurance status						
UEBMI	−0.453(0.385)	0.636	0.279(0.317)	1.321	0.401(0.328)	1.494
RCMS	−0.760[**](0.336)	0.467	1.786[***](0.301)	5.964	−0.443(0.401)	0.642
Other	−0.098(0.300)	0.906	0.233(0.285)	1.262	0.099(0.278)	1.105
N	1058					
−2 Log likelihood	1788.825					
Nagelkerke R^2	0.382					

Note: standard error in parentheses.

[*] Indicates significance at 10%.

[**] Implies significance at 5%.

[***] Indicates significance at 1%.

severity of illness variable were also examined. However, the coefficients were not statistically significant. Table 4 shows the severity of illness among different consumption level and age groups.

3.6.5. Insurance

The coefficient of the RCMS variable is negative and statistically significant in the private clinic model, negative though not statistically significant in the city hospital model, but positive and statistically significant in the CHC model. As indicated above, membership of RCMS has an important impact patient choice of CHC, a finding that will be considered in detail in the discussion below. Relative to self-treatment, the odds of patients with RCMS insurance using a private clinic or CHC are 0.47 times and 6.0 times those of patients in the no insurance category. However, the coefficients of the other insurance variables are not statistically significant in all estimation models.

3.7. Distance, price and perceived quality of care

While distance, price and perceived quality of care were not analyzed in the MNL model due to the lack of relevant data, we can provide some descriptive analysis by con-

sidering responses to a survey question seeking the most important reasons for the use of the health care provider visited.

3.7.1. Distance and perceived quality

The majority of those who used a private clinic stated that the most important reasons were 'proximity' (70.2%) and 'inexpensive' (16.9%). The majority of those who used CHC identified 'proximity' (77.4%) and 'perceived quality of care' (11.2%). The percentage selecting the option 'inexpensive' was lower at 8.5%. A aggregate 'quality of care' measure was calculated by combining the proportions citing 'trusted doctors', 'perceived high level of technical ability', and 'perceived better medical equipment' (Hanson et al. [32]). As shown in Table 5, it is evident that a majority of patients (50.5%) used a city hospital for reasons related to our 'quality of care' indicator. An additional 34.8% reported that their main reason was 'proximity'.

3.7.2. Price of care

The price of health care includes the direct costs (out-of-pocket medical expenditure) and indirect costs (transportation, accommodation, gift costs, etc.). As can be seen from Table 6, the indirect costs for private clinics and

Table 4
Severity of illness among different consumption level and age groups.

	Self-treatment % (frequency)	Private clinics % (frequency)	CHCs % (frequency)	City hospitals % (frequency)	Total number of observations
Among L-consumption					
Low severity	35.2(63)	19.2(14)	16.1(9)	11.4(5)	91
Medium severity	63.1(113)	71.2(52)	73.2(41)	63.6(28)	234
High severity	1.7(3)	9.6(7)	10.7(6)	25.0(11)	27
Among M-consumption					
Low severity	32.2(55)	21.4(6)	5.8(5)	13.1(8)	74
Medium severity	65.5(112)	60.7(17)	84.9(73)	77.0(47)	249
High severity	2.3(4)	17.9(5)	9.3(8)	9.8(6)	23
Among H-consumption					
Low severity	38.6(66)	17.4(4)	21.5(20)	15.1(11)	101
Medium severity	55.0(94)	78.3(18)	69.9(65)	67.1(49)	226
High severity	6.4(11)	4.3(1)	8.6(8)	17.8(13)	33
Among age 0–14					
Minor	32.8(21)	24.4(11)	17.6(18)	10.3(8)	58
Medium	65.6(42)	66.7(30)	75.5(77)	71.8(56)	205
Severe	1.6(1)	8.9(4)	6.9(7)	17.9(14)	26
Among age 15–59					
Low severity	36.5(92)	20.4(10)	13.2(10)	20.0(11)	123
Medium severity	59.9(151)	73.5(36)	73.7(56)	65.5(36)	279
High severity	3.6(9)	6.1(3)	13.2(10)	14.5(8)	30
Among age 60–					
Low severity	34.6(71)	10.0(3)	10.5(6)	11.1(5)	85
Medium severity	61.5(126)	70.0(21)	80.7(46)	71.1(32)	225
High severity	3.9(8)	20.0(6)	8.8(5)	17.8(8)	27

Table 5
Percentage of the most important reasons for the choice of health care providers.

Type of provider	Proximity	Inexpensive	Quality of care		Other
			Different dimensions of quality	Subtotal	
Private clinic	70.2%	16.9%	Having trusty doctors: 4.0%; perceived high technical ability: 3.2%	7.32%	5.7%
CHC	77.4%	8.5%	Perceived high technical ability: 5.6%; having trusty doctors: 5.6%	11.2%	3.9%
City hospital	34.8%	1.7%	Perceived high technical ability: 30.9%; having trusty doctors: 14.0%; perceived better medical equipments: 5.6%	50.5%	13.0%

Table 6
Direct and indirect costs at every type of provider.

Type of provider	Direct costs (yuan)				Indirect costs (yuan)			
	Mean	Median	Std. deviation	N	Mean	Median	Std. deviation	N
Private clinic	103.24	60.00	124.496	123	9.53	0.00	27.180	99
CHC	144.38	85.00	198.749	234	8.42	0.00	20.085	213
City hospital	287.76	200.00	290.567	177	43.60	10.00	103.134	154

Note: the indirect costs include transportation, accommodation, gift costs, etc.

CHC are very similar but the direct costs at private clinics are lower. Direct and in direct costs at city hospitals are both far higher. Overall, the cost of private clinics is lowest while the cost of city hospitals is highest among the three formal provider types in this study. This is consistent with the finding that the percentage of respondents at private clinics giving 'inexpensive' as the reason for their use of a provider is higher than that for patients attending the other providers (see Table 5).

4. Discussion

This study is the first in China to conduct a tracer illness study in order to identify the determinants of the use of health care provider. Therefore, this study can control the biases associated with various types of illness in MNL estimation and obtain more accurate results. It is also the first to include the use of private providers in urban areas of China. The findings have important policy and theoretical implications, especially in the context of the development of CHCs, implementation of urban heath insurance schemes and broader reforms of the health delivery system.

It is often suggested that private providers can offer consumers greater choice, improve access to health care, and increase competition in the health care market (Propper [33]; Mills et al. [34]). Further expansion of this sector is a possible policy option in urban China. As described above, many people currently use such clinics. In this con-

text, it is interesting to note that proximity was the most important reason given for using both private clinics and CHCs, suggesting that expansion of the number of such facilities could improve access to care. However, while the second most common reason for the use of a CHC was quality of care, that for private clinics was low cost. This may relate to findings from other studies that indicators relating to quality of care and availability of qualified staff vary substantially across different private clinics [35]. If the policy of encouraging such clinics were to be adopted, it would seem necessary to strengthen relevant regulatory and supervisory mechanisms. This issue may be of particular importance for poorer households. Our study indicates that private clinics are an important source of medical care for such households, with richer households tending to use CHCs and city hospitals. Policies to improve equity in health delivery for the benefit of poorer urban households could be designed either to make CHCs and city hospitals more accessible to the poor or to enhance the quality of care provided by private clinics.

Patients with RCMS insurance are less likely to use private clinics and much more likely to use CHC. Private clinics are generally not included in the benefit package of public health insurance schemes in China because policy-makers have serious doubts about their quality of care (Yan et al. [35]). If patients with RCMS wish reimbursement, they are usually required to use specific health institutions (e.g. a CHC or city hospital). Although participants are generally able to use any level of provider, the reimbursement rate for a primary health care institution is considerably higher than that for a city hospital [36]. The findings would therefore suggest that RCMS has played an important role in promoting patients make greater use of CHCs. This is very much in line with current policy objectives.

Patients with UEBMI did not exhibit statistically significant differences in terms of their use of provider, suggesting that coverage does not encourage patients to seek at primary health care institutions. UEBMI consists of a pooled fund for inpatient stays and individual medical savings accounts (MSAs) for outpatient visits. In most cities, the regulations relating to MSAs are not designed to encourage utilization of CHC. For example, Yao et al. [37] found that only 3 of 49 investigated cities had schemes that provided a higher reimbursement rate at CHC than that at other high level hospitals. If the government hopes to encourage increased utilization of CHC, it may be necessary to propose revisions to reimbursement mechanisms. Similarly, in most cities URBMI only covers inpatient services and outpatient services due to chronic/fatal diseases, not general outpatient services [38]. Again, the findings of this study suggest that it might be possible to promote CHC utilization by modification of the services covered by URBMI and the reimbursements provided. This argument could be extended to selected private clinics, which might be included among those eligible for reimbursement if they met specified quality requirements. Such an approach might increase competition between private clinics and CHC, potentially to the benefit of patients.

City size appears to be an important factor in influencing the use of a given type of provider. The larger the city, the more likely are URTI patients to use city hospitals. This probably reflects the relatively concentration of such hospitals in the largest urban areas. This would imply that implementation of policies aimed at encouraging urban patients to use lower level health institutions may prove most challenging in the largest cities. One option may be to reconsider the appropriate range of services to be offered by CHCs and private clinics to explore the possibility that extending their service capability might better meet patient demand and thus encourage higher utilization.

An initial finding confirms existing anecdotal evidence that children are much more likely to see a health care provider when they are ill and are often taken to high level facilities. This may be to some extent associated with the greater vulnerability of children to disease. Although the interaction between age and severity of illness was not statistically significant, the percentage of perceived high severity of illness among children was 9.0% as compared to the 6.9% of those aged 15–59 years. However, the primary factor is almost certainly the greater importance that parents in China attach to their children's health as compared to their own, an observation that is often linked to the one-child policy. They are also more concerned with quality of care when they make decisions on provider use for their children, often being willing to pay higher fees and travel further, especially given the relative availability of transport in cities.

In most countries, self-treatment within households is often one of the most important forms of health care (e.g. Borah [18], Habtom and Ruys [22], World Bank's Vietnam Health Sector Review [39]). In China, self-medication has grown in recent years due to the increasing availability of over-the-counter (OTC) drugs. This can well be a positive development if the education and guidance on self-treatment available to patients is sufficient to ensure its safety and effectiveness. The aim must be to encourage those with more serious illnesses to seek professional help, while making appropriate OTC medicines for less serious conditions. The above finding suggests that there is considerable work to be done to achieve this objective. On the one hand, 9% of patients with URTI, one of the most common ailments and which they perceived to be of low severity, made their initial outpatient visit to a city hospital. On the other, some 22% of those who perceived their condition to be of high severity decided to treat it themselves.

Acknowledgements

References

[1] Tao H, Guo Sh. The problems of dual referral and the design of patient rational divert mechanism. Chinese Hospital Management 2007;27(9):50–1.

[2] Wang J, Wang L, Meng Q. Analysis on benefit of patients flow from general hospitals to community health service facilities. Chinese Health Economics 2006;25(4):45–7.

[3] Lu Y, Zhang L, Ou Ch, Qiu Y, Tian W. Study on the dual referral mechanism between hospital and Community Health Service Organization. Chinese Health Economics 2007;26(7):25–7.

[4] Chinese Health statistical Yearbook. Ministry of Health, http://www.moh.gov.cn/publicfiles/business/htmlfiles/zwgkzt/ptjnj/200809/37759.htm; 2008 [accessed 26/05/09].

[5] Yin W, Yan F, Feng X, Li Zh, Wang Z, Fu H. Current status of providing community health services by Community-Based Health Institutions. Chinese Health Resources 2003;6(3):117–9.

[6] Ministry of Health, China. Basic Standards of Medical Institutions, http://www.moh.gov.cn/publicfiles/business/htmlfiles/mohyzs/s3577/200804/18713.htm [accessed 26/05/09].

[7] Ministry of Health, China. Main results from the fourth China National Health Services Survey, http://www.moh.gov.cn/publicfiles/business/htmlfiles/mohbgt/s3582/200902/39201.htm; 2009 [accessed 26/05/09].

[8] Li L, Zhang L, Zhu Y, Ma Q, L, T. Influence Factor Analysis and Countermeasure Study of the potential medical demand of Chinese residents. Chinese Health Economics 2006; 25(7): 36–9.

[9] Zhou H, Rao K. Analysis of affecting factors in choosing medical organ from China rural people. Chinese Hospital Statistics 1999;6(2):67–71.

[10] Ministry of Health, China. China National Health Household Interview Surveys. Beijing: Peking Union Medical College Press; 2003.

[11] Yang X, Xu L, Sun Y, Zhang H. Research on the influencing factors which affected the residents' choice of care provider in Dongying City. Chinese Health Economics 2005;24(8):45–7.

[12] Qian D, Yin A, Meng Q, Song Ch. The analysis of the affecting factors on choice of health care providers by rural inpatients in Gansu Province. Chinese Health Economics 2008;27(1):40–3.

[13] Fosu GB. Childhood morbidity and health services utilization: cross-national comparisons of user-related factors from DHS data. Social Science & Medicine 1994;38:1209–20.

[14] Pillai RK, Williams SV, Glick HA, Polsky D, Berlin JA, Lowe RA. Factors affecting decisions to seek treatment for sick children in Kerala, India. Social Science & Medicine 2003;57:783–90.

[15] Kroeger A. Anthropological and social-medical health care research in developing countries. Social Science & Medicine 1983.

[16] Newbold KB. Equity in health care: methodological contribution to the analysis of hospital utilization within Canada. Social Science & Medicine 1995;40:9.

[17] Henderson G, Akin J, Zhiming L, Shuigao J, Haijiang M, Keyou G. Equity and utilization of health services: report of an eight province survey in China. Social Science & Medicine 1994;39(5):687–99.

[18] Borah B. A mixed logit model of health care provider choice: analysis of NSS data for rural India. Health Economics 2006;15(9):915–32.

[19] Luong DH, Tang Sh, Zhang T, Whitehead M. Vietnam during economic transition: a tracer study of health service access and affordability. International Journal of Health Services 2007;37(3):573–88.

[20] Dow W. Unconditional demand for curative health inputs: does selection on health status matter in the long run? RAND. Labor and population program working paper series 95-22|DRU-1234-RC. 1995.

[21] Sahn D, Younger S, Genicot G. The demand for health care services in Rural Tanzania. Oxford Bulletin of Economics and Statistics 2003;65(2):241–59.

[22] Habtom G, Ruys P. The choice of a health care provider in Eritrea. Health Policy 2007;80:202–17.

[23] Mwabu G, Martha A, Andrew N. Quality of medical care and choice of medical treatment in Kenya: an empirical analysis. The Journal of Human Resources 1993;28:4.

[24] Damen HM. Traditional insurance mechanisms and the choice of health care providers in Ethiopia. UCIAS edited volume 5, article 2; 2003.

[25] Pokhrel S, Sauerborn R. Household decision-making on child health care in developing countries: the case of Nepal. Health Policy and Planning 2004;19(4):218–33.

[26] Hjortsberg C. Why do the sick not utilise health care? The case of Zambia. Health Economics 2003;12:755–70.

[27] Rous JJ, Hotchkiss DR. Estimation of the determinants of household health care expenditures in Nepal with controls for endogenous illness and provider choice. Health Economics 2003;12:431–51.

[28] Jowett M, Deolalikar A, Martinsson P. Health insurance and treatment seeking behaviour: evidence from a low-income country. Health Economics 2004;13(9):845–57.

[29] Econometric Society. Advances in Econometrics, vol. 412. Cambridge, UK: Cambridge University Press; 1982.

[30] Hausman J, McFadden D. A specification test for the multinomial logit model. Econometrica 1984;52:1219–40.

[31] Train K. Qualitative choice analysis. Cambridge, MA: The MIT Press; 1990. pp. 15–20.

[32] Hanson K, Yip W, Hsiao W. The impact of quality on the demand for outpatient services in Cyprus. Health Economics 2004;13:1167–80.

[33] Propper C. The demand for private health care in the UK. Journal of Health Economics 2000;19(6):855–76.

[34] Mills R, Brugha K, Hanson, McPake B. What can be done about the private health sector in low-income countries? Bulletin of the World Health Organization 2002;80:325–30.

[35] Yan D, Lu D, Dai L, Xu W, Xu R, Wu Y. Investigation and analysis on the status of private health institutions in Shanghai. China Chinese Health Resources 2006;9(5):216–7.

[36] Wagstaff A, Lindelow M, Gao J, Xu L, Qian JC. Extending health insurance to the rural population: an impact evaluation of China's New Cooperative Medical Scheme. Journal of Health Economics 2009;28(1):1–19.

[37] Yao L, Chen Q, Chen Y, Liu H. Analysis on the status of community health service included in the urban employee basic medical insurance. Chinese Journal of Hospital Administration 2002;18(1):28–31.

[38] Wanchuan Lin, Gordon G, Liu, Gang Chen. The urban resident basic medical insurance: a landmark reform towards universal coverage in China. Health Economics 2009;18:S83–96, doi:10.1002/hec.1500. Published online in Wiley InterScience (www.interscience.wiley.com).

[39] World Bank. Vietnam Health Sector Review. World Bank report; 1999.