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Meeting the Health-care Needs of the Rural Elderly: The Unique Role of Village Doctors

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Abstract

Despite their recent deterioration, village clinics have historically been an important source of health care for the poor and elderly in rural China. In this paper, we examine the current role of village clinics, the patients who use them and some of the services they provide. We focus specifically on the role of village clinics in meeting the health-care needs of the rural poor and elderly. We find that although clinics are continuing to decline financially, they remain a source of care for the rural elderly and poor. We estimate that the elderly are 10–15 percent more likely than young individuals to seek care at a clinic. We show that clinics provide many unique services to support the rural elderly (and the elderly poor), such as in-home patient care, the option for patients to pay on credit, and free and discounted services.

Key words: elderly, health care, village doctor
JEL codes: I11, I14, I18

I. Introduction

As the foundation of the rural health system, China's village doctors have provided primary health services to more than half a billion people over the past six decades. In the 1950s, in response to the near absence of medical care in China's countryside, hundreds of thousands of community-based village doctors were recruited and trained. These doctors are funded by the central government. During the 1950s, 1960s and 1970s, these village doctors became

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trusted providers. They developed multi-generational patient relationships and served vulnerable populations, such as the elderly and low income farmers (Li, 1975; Zhang *et al.*, 2010). The international community largely considered the village doctor system a success (Li, 1975; WHO, 2008). As a part of the larger rural health system, village doctors have helped China to improve health standards by providing free or inexpensive preventative and primary care to rural communities (Zhang and Unschuld, 2008).

Despite their historical importance, village doctors struggled to remain viable after market-oriented economic reforms were introduced during the 1980s. National funding for their clinics disappeared when governmental (and fiscal) responsibility for social services was decentralized (Wong, 1997; Liu and Mills, 2002), and local governments were unable to fill the void. By the 2000s, village clinics were receiving almost no government support (Han and Luo, 2007). Without funding, many clinics simply closed their doors (Kan, 1990). Those that were able to remain open did so by becoming private practices, mostly supporting themselves through the sale of medicines (Meng *et al.*, 2000; Meessen and Bloom, 2007). In part as a result of this neglect from the state, many of the remaining village doctors failed to upgrade their skills through modern medical training, especially in comparison to other health facilities, such as township health centers (Liu *et al.*, 2003; Han and Luo, 2007). At the same time, village clinics' facilities began to deteriorate, as many village doctors were unable or unwilling to invest in or maintain their facilities (Liu *et al.*, 1996; Fang and Bloom, 2008; Oi *et al.*, 2012). By the late 1990s and early 2000s, village clinics and the entire rural health system were in crisis (World Bank, 2005; Han and Luo, 2007).

Although officials have rolled out a series of reform policies designed to address problems in the rural health system, few of the initiatives appear to be fully focused on addressing the underlying crisis facing village clinics. For example, mandatory facility upgrades for village clinics and strict clinician training requirements have been widely implemented (aided by the threat of the cancellation of clinicians' license to practice (State Council, 2001)), but in many provinces, these policies have come without accompanying state funding commitments (Hu *et al.*, 2008). The New Cooperative Medical Scheme (NCMS) is another example. The program was designed, in the early 2000s, to provide basic co-pay health insurance to patients (WHO, 2004). Despite their popularity among villagers, village clinics were often excluded from the NCMS's lists of reimbursable providers (Babiarz *et al.*, 2010). Even though many were left out of the NCMS system, local health bureau officials still required village clinicians to spend considerable time performing unfunded NCMS program mandates, such as enrolling participants, collecting premiums and publicizing the program (Babiarz *et al.*, 2010). Many burdensome reforms (e.g. zero-profit policy on the drug sales) implemented (often) without adequate financial support have caused fiscal problems for village clinics (Yan, 2010; Zhang, 2010; Huang, 2011).

Who is most likely to be affected if village clinics continue their downward spiral? That is, in a system in which patients can choose from a variety of health-care providers, who continues to rely on village clinics as a primary source of care? Although there is little empirical evidence, a handful of case studies and qualitative reports suggest that the rural poor and the elderly might be particularly reliant on village doctors. For example, some research shows that the poor continue to seek care at village clinics (Yip *et al.*, 1998), and that village doctors are still engaged in the ongoing effort to bring basic health care to the poor through discounted services and flexible payment plans (Zhang, 2010). Zhang and Unschuld (2008) find that village doctors' role as health-care providers for the poor earns them respect among the public. Other researchers find that village doctors are an important source of health care for the rural elderly (Li and Tracy, 1999). The poor and immobile elderly, almost by definition, have limited access to health-care facilities within their villages (and visiting town and county health centers may not be feasible or convenient), and are more likely to have unmet hospitalization needs due to financial constraints (Dong, 2003; Wang *et al.*, 2009). As such, the in-home care provided by village doctors is often the only source of long-term care available to this population (Fu and Xue, 2002). Unfortunately, there is little quantitative evidence of this important role of village doctors beyond small case studies and anecdotes; no empirical study (especially in recent years) has examined the role of village doctors on a national level. To understand what may be lost if village clinics were to continue their decline, we must first understand their role, and identify the clientele that village clinics serve and the nature of the services they provide.

The overall goal of this paper is to fill a gap in the literature by developing an understanding of the current role of village doctors and the services they provide in the rural health system. To meet this goal, we have three specific objectives. First, we document the current state of village clinics by describing the characteristics of village clinics, examining the services they offer and providing a recent accounting of their financial outlook relative to more centralized rural health institutions (specifically, township health centers (THC)). Second, to determine who would be affected if the decline of clinics were to continue, we investigate who is using the village clinics. In light of the existing research outlined above, we focus on the elderly and the poor. Finally, to determine what might be lost if clinics disappear, we compare village clinics to THC in terms of characteristics affecting access to care among the poor and the elderly. These characteristics include physical proximity and unique services, including in-home patient care, the ability of patients to pay by credit, and the provision of free or discounted services to patients. Throughout this paper, we refer to home visits, credit accounts and patient discounts collectively as social welfare benefits.

The rest of the paper is organized as follows. In the next section we describe our data.

Our statistical methods are outlined in Section III. In Section IV, we present our results. In the final section, we discuss our findings and consider the implications for the future of China's rural health system.

II. Data

We use a dataset collected by the Chinese Academy of Sciences' Center for Chinese Agriculture Policy in collaboration with Stanford University. The survey was conducted in April 2008 in 100 villages, 50 towns and 25 rural counties in Jiangsu, Sichuan, Shaanxi, Jilin and Hebei Provinces. The survey collected data on 160 village clinics and 47 THC.[1] Data on health and health-care service use were also collected at the individual level from a total of 8339 individuals in 2000 randomly sampled households across 100 survey villages. The detailed sampling procedures that were followed to create a nationally-representative sample are available in Babiarz *et al.* (2010).

The village clinic survey was designed to collect detailed information on staff qualifications as well as clinic services and finances. The head of each village clinic was asked about the provision of a set of health services commonly offered in primary care clinics in developing countries. Specifically, survey teams raised questions about the ability of the clinic to provide injections, immunizations, intravenous (IV) fluids, treatments for common injuries and ailments, and house calls. For each service offered, the clinician was asked how often the service was provided and the associated fee. Clinicians were also asked if they allowed patients to keep revolving credit accounts to defer payment of service fees. If such credit accounts were offered, enumerators asked the clinicians how many open accounts were held. The survey team also collected information about all clinicians practicing at each clinic, including their age, experience and medical training. Finally, the head clinician was asked to provide an account of all government investments in the clinic over the past 4 years as well as the clinic's net annual revenue for both the current year and the 4 years prior. Descriptive statistics for village clinics and clinicians are shown in Table 1.

To enable comparisons between China's village clinics and larger, more centralized (government-run and supported) primary care providers, survey teams also visited the THC serving each of the sample villages. The survey administered to THC mirrored the village clinic survey, collecting information concerning doctor and facility characteristics. Specifically, the survey teams collected information about the provision of a set of common services and associated fees, including injections and IV treatments. THC doctors and lead administrators were asked if the staff of the THC made house calls. The enumerators also

[1] We only surveyed 47 THC because in the year of the survey 3 towns did not have THC.

Table 1. Village Clinic Characteristics

	Overall sample	Jiangsu Province	Sichuan Province	Shaanxi Province	Jilin Province	Hebei Province
Age of clinics (years)	23	31	20	25	21	22
Share of clinics privatized (%)	77	44	97	81	57	100
Net annual revenue (RMB)	11 363	17 257	7405	4839	21 727	6517
Number of staff (person)	1.65	3.26	1.08	1.46	1.76	1.24
Average physician age (years)	44	47	46	46	43	47
Sample size	160	23	39	28	37	33

Source: Authors' survey.

asked THC respondents about the size and composition of the hospital staff. Finally, survey teams collected information on each THC's annual revenue, investments, subsidies and assets.

To determine who uses village clinics, we also administered a detailed survey on health and health-care use to a randomly drawn sample of households in each village. The household survey included three major blocks. The first block collected demographic data, including gender, age and education. Consistent with prior research on the elderly in rural China, individuals aged 55 years and older are classified as elderly.[2] In the second block respondents were asked to fill out a checklist of household assets that included a series of household durable goods and other assets commonly used on farms (NBS, 2008). Using principal component analysis, a single measure of household wealth was generated with a range of the values of household assets. Those in the bottom 25 percent of their villages were classified as poor households.

The third block of the survey gathered detailed information about health status, health service use and health-care expenditures over the past year for each family member. Enumerators asked individuals to rate their overall health status on a scale from poor to excellent. Enumerators then asked a detailed set of questions about their most recent illness, including questions about the type of illness they most recently experienced and the severity of the episode on a scale of 1 to 5, with 1 being a mild case and 5 being extremely severe. To help characterize patterns of the use of health-care services among several broad categories of illnesses, we developed a list of illnesses by type, classifying them into: (i) chronic illnesses; or (ii) illnesses that are commonly seen and frequently treated (referred to as common illnesses).[3] Each individual was asked if he/she sought care

[2] The official retirement age in China is different for men (aged 60 years) and women (aged 55 years) (Chen and Powell, 2012); we adopt an inclusive definition of elderly as anyone over the age of 55 years.
[3] For example, we classified common colds, stomach viruses, gastroenteritis, dizziness, diarrhea, ear, nose and throat illnesses, and pneumonia as common illnesses.

for his/her illness, the type of facility visited and the total amount spent on the treatment. For those over the age of 55, the survey also collected data on their physical condition (e.g. ability to walk).

III. Statistical Analysis

We use several types of descriptive multivariate analyses to achieve each of our three objectives. First, we use descriptive statistics to compare village clinics to THC in terms of their clinician qualifications, service provision, size and nature of facilities, annual revenues and fiscal outlook. Second, we describe the individuals living in villages served by the clinics and THC in our sample, focusing on their household wealth, overall health status and specific health conditions. Third, to determine which group of individuals is most reliant on village clinics, we use OLS regression analysis to estimate the following model of facility choice:

$$clinic_i = a + b_1 elderly_i + b_2 poor_i + b_3 elderly_i \times poor_i + b_4 Z_i + m + e_i, \quad (1)$$

where $clinic_i$ is whether patient i visits a village clinic for their most recent illness, conditional on seeking medical care; $elderly_i$ denotes whether patient i is over the age of 55; $poor_i$ denotes whether the individual falls within the bottom 25 percent of households in their village in terms of household wealth; and $elderly_i \times poor_i$ denotes whether an individual is both elderly and poor. We adjust for a set of individual characteristics Z_i, including gender, education, self-reported health status, illness severity (as defined above), and whether the illness is common or chronic (also as defined above). To control for unobserved characteristics common to all patients and health-care facilities in the same town, we also include a full set of township-level fixed effects, m (i.e. an indicator variable for each town). The estimated parameters of interest are b_1, b_2 and b_3. In the OLS regression analysis, we correct the error term, e_i, allowing for clustering at the village level.

Fourth, to determine the extent to which providers make their services accessible to the elderly and the poor, we examine descriptive statistics on facility locations and the provision of social welfare benefits (as defined above). To do so, we compare clinics to THC in terms of the share of facilities that perform house calls, allow patient credit accounts and waive service fees.

Finally, we measure the extent to which discounts are given to elderly, poor, and poor elderly patients by village clinics and THC using an OLS model of health-care expenditure:

$$expenditure_i = a + b_1 elderly_i + b_2 poor_i + b_3 elderly_i \times poor_i + b_4 Z_i + m + e_i, \quad (2)$$

where $expenditure_i$ is the log total health-care expenditure of patient i for their most recent

illness, conditional on seeking medical care. We use the same explanatory variables used in our facility choice model, including indicators for elderly individuals ($elderly_i$), poor individuals ($poor_i$) and elderly poor individuals ($elderly_i \times poor_i$). We adjust for the same set of individual and illness characteristics, Z_i, and for unobserved township-level characteristics using a set of town fixed effects, m. The error term, e_i, is clustered at the village level.

IV. Results

To achieve our first objective, we examine the characteristics and fiscal outlook of village clinics and THC. As shown in Table 2, village clinics are small facilities, with just one or two doctors and a single bed for patients (rows 1, 2 and 8). However, we find that clinicians have many years of experience (an average of 22 years) and typically have at least some formal medical education or training (rows 3 to 7). While 45 percent of village clinicians have only completed secondary education, 76 percent have since completed some specialized medical education or training. An even higher share (87 percent) of clinicians have participated in (or are participating in) medical training courses at their local THC or at the county health bureau/hospital. We find that only 3 percent of clinicians rely solely on apprentice-type training.

The micro-nature of village clinics is clear when comparing them to THC. On average, THC have 26 doctors (Table 2, column 2, row 2) compared to fewer than 2 staff members, including clinicians, at village clinics (Table 2, column1, rows 1 and 2). The THC in our sample have an average of approximately 20 beds (as opposed to an average of only 0.8 beds in village clinics). Although we do not have individual data on any THC doctors, another study finds that 74 percent of doctors at THC are licensed, with (assistant) practicing doctors in 400 counties (Guo *et al.*, 2012).

Despite their more limited formal training in comparison with THC clinicians, village clinicians are able to provide a range of services commonly needed in rural areas (Table 2, rows 9 to 16). According to our data, most village clinics administer injections (98 percent), give IV fluids (92 percent) and provide treatment for common illnesses such as colds and stomach ailments (100 percent). Nearly all village clinicians in our sample also report that they are able to provide one or more public health services: 87 percent of village clinicians say they provide routine tuberculosis care; and 60 percent provide immunizations. Hence, although THC typically provide more services than village clinics (column 2, rows 10 to 15), the range of services offered at village clinics is still fairly broad.

Despite offering services relevant to rural farmers, our data show that village clinics

Table 2. Comparing Village Clinics and Township Health Centers: Staff, Services, Facility and Fiscal Health

	Village clinics	Township health centers
Human capital		
Mean number of staff members (person)	1.65	
Mean number of doctors (person)	1.44	26.03
Mean number of years in practice (year)	22	
Share of clinicians with secondary education or higher (%)	45	
Share of clinicians with medical education (%)	76	
Share of clinicians with medical training from county health bureau or hospital (%)	87	
Share of clinicians with apprentice training only (%)	3	
Services available		
Number of beds available (bed)	0.8	19.8
Share of facilities providing immunizations (%)	60	
Share of facilities offering intravenous fluids (%)	92	100
Share of facilities that are able to perform injections (%)	98	100
Share of facilities that are able to treat broken bones or injuries (%)	12	64
Share of facilities that are able to treat tuberculosis (%)	87	75
Share of facilities that are able to treat hepatitis (%)	35	65
Share of facilities that are able to treat gastroenteritis (%)	17	100
Share of facilities that are able to treat severe diarrhea (%)	24	
Facility revenue and investment		
Growth in total revenue 2004–2007 (%)	20	51
Share receiving investment funds (%)	13	45
Mean amount of investment funding (RMB)	25 490	167 100

Source: Authors' survey.

continue to trail larger health institutions in terms of revenue growth (Table 2, rows 17 to 19). On average, village clinic revenues grew by only 20 percent in the 4 years preceding our survey, while THC revenues grew by 51 percent and local household incomes grew by 30 percent over the same period. Village clinics also lag behind THC in terms of investments received from government authorities (in the form of subsidies to upgrade their facilities). Approximately 45 percent of THC received investments, compared with only 13 percent of village clinics. Moreover, the size of the investment was much higher in THC compared with village clinics, at an average RMB167 100 versus RMB25 500.

Table 3 describes individuals living in villages served by these clinics and THC. The average age of our respondents is 43 years old (column 1, row 1). Half (51 percent) of the sample individuals are male (row 2). Nearly all (86 percent) had some formal education (row 3). We also find that most individuals report good or very good overall health (40 and 29

Table 3. Characteristics of Sampled Individuals

	Full sample	Young individuals	Elderly individuals	Non-poor households	Poor households	Poor households with elderly members
Mean age (year)	43	33	61	42	46	62
Share of sample male (%)	51	50	52	51	51	52
Share of individuals with formal education (%)	86	96	71	88	81	68
Variables measuring wealth						
Value of productive assets (RMB)	14 473	15 944	12 043	19 309	1826	1565
Value of consumer goods (RMB)	6165	6365	5837	7730	1940	1783
Value of vehicles (RMB)	1387	1467	1255	1808	244	232
Home value (RMB)	6770	7004	6383	8473	2247	2069
Self-rated health status						
Very good (%)	40	48	27	43	32	20
Good (%)	29	30	28	29	29	29
Ok (%)	16	12	23	14	19	26
Bad (%)	10	5	18	9	13	20
Very bad (%)	1	0	3	1	2	4
Total expenditure on most recent illness (RMB)	910	785	1040	808	1154	1310
Self-rated seriousness of most recent illness						
Mild (%)	20	24	17	22	16	15
Common (%)	43	46	41	44	41	39
Serious (%)	25	22	28	23	29	31
Very serious (%)	9	7	11	8	11	12
Extremely serious (%)	2	2	3	2	3	4
Share of illnesses classified as chronic conditions (%)	35	24	46	33	40	48
Sample size (person)	6885	4287	2598	5076	1903	857

Source: Authors' survey.

percent, respectively) and report having common (43 percent) or mild (20 percent) illnesses most recently (rows 8 to 12).

When comparing elderly individuals (Table 3, column 3) to young individuals (column 2), we find that the elderly are in poorer health and have fewer assets compared to their young counterparts (rows 4 to 7). While 78 percent of young individuals report good or very good health, only 55 percent of elderly report similarly good health. Conversely, just 5 percent of young individuals report bad or very bad health compared to 21 percent of elderly individuals. The elderly are also more likely to suffer from serious, very serious or extremely serious illnesses (42 percent of the elderly compared to 31 percent of young individuals). The elderly are nearly twice as likely to suffer from a chronic illness compared to young individuals. Given the health problems experienced by the elderly in our sample, it is hardly surprising that the elderly also report spending 32 percent more than young individuals on care for their most recent illness episode. The elderly live in households in which the total value of productive assets, consumer goods, vehicles and homes is 17 percent lower than households with young individuals. As a consequence, the elderly are overrepresented among the poor, with 33 percent living in poor households compared to

24 percent of young individuals.[4]

We find that individuals living in poor households (column 5) are more likely than others (column 4) to suffer poor health and more serious illnesses. Approximately 15 percent of individuals in poor households report bad or very bad overall health, compared to 10 percent in other households. In addition to overall bad health, the poor suffer from more severe illnesses, with 43 percent reporting their most recent illness as serious and extremely serious compared to 33 percent among other households. Their illnesses result in considerable health expenditures, which are 42 percent higher among poor households than expenditures among non-poor households.

These disparities become even more pronounced when we compare individuals who are both poor and elderly (column 6) to others. The total value of assets among poor households with elderly members is 80 percent lower than the overall average, and 10 percent lower than the average among other poor households. Nearly one-quarter of the elderly poor report bad or very bad health, compared to 11 percent of all individuals and 14 percent of individuals living in poor households. Their illnesses also tend to be more severe. Whereas 36 percent of all individuals report serious to extremely serious illnesses, 47 percent of the elderly poor report this type of illness. Despite having so few assets compared to others, the average health expenditure among the elderly poor for their most recent illness is approximately 44 percent higher than the overall average and 14 percent higher than the average among the poor.

Having described the health facilities in our sample, and the health-care needs of individuals served by those facilities, we next determine which individuals rely on village clinics rather than larger hospitals or health centers. To do so, we estimate our model of facility choice using Equation (1). Results are reported in Table 4.

According to our multivariate analysis, holding individual and illness characteristics constant, elderly patients are more likely to seek care at a village clinic than younger patients (Table 4). For all illnesses, older individuals are 11 percent more likely to seek care at a village clinic first (column 1, row 1). Among individuals with common illnesses, the elderly are 9 percent more likely to use a village clinic as their first source of care (column 2, row 1). Elderly individuals with chronic illnesses are 15 percent more likely than young individuals to use a village clinic (column 3, row 1).

The results in Table 4 also allow us to examine whether other groups of individuals in villages have a higher or lower likelihood of using village clinics for their health service

[4] This finding is consistent with the published literature on poverty and aging in China (e.g. see Wang and Zhang, 2005).

Table 4. Effect of Age and Poverty on the Likelihood of Seeking Care at a Village Clinic

	All illnesses	Common illnesses	Chronic illnesses
Elderly	0.11***	0.09***	0.15***
	–0.02	–0.03	–0.03
Poor	0.02	0.02	0.06
	–0.03	–0.04	–0.06
Elderly and poor	–0.02	–0.02	–0.1
	–0.04	–0.05	–0.07
Male	0.04**	0.04*	0.02
	–0.01	–0.02	–0.03
Educated	–0.08***	–0.09***	–0.07**
	–0.02	–0.03	–0.04
Poor health	–0.02	0.02	–0.01
	–0.02	–0.03	–0.03
Wealth	0	0	–0.01
	–0.01	–0.01	–0.01
Serious illness	–0.18***	–0.17***	–0.15***
	–0.02	–0.03	–0.04
Chronic illness	–0.07***	–0.15***	
	–0.02	–0.03	
Common illness	0.20***		0.11***
	–0.02		–0.03
Observations	3351	2297	1245
Adjusted R^2	0.229	0.173	0.146

Notes: Robust standard errors clustered by township are reported in parentheses; township fixed effects are included in all specifications. ***, ** and * denote significance at 1, 5 and 10 percent, respectively.

needs. First, the poor who are not elderly are not more likely than the non-poor to seek health-care services from village clinicians (row 2). This is true for all illnesses, common illnesses and chronic illnesses (columns 1 to 3). Second, there is no additional propensity for the elderly poor to receive care in village clinics (row 3). The insignificant coefficient on the interaction term between the poor and elderly indicator variables indicates that all elderly individuals (both the non-poor and the poor) seek medical care from village clinics more frequently than other groups in villages, but that the non-poor and poor elderly behave the same with respect to their health-care decisions.

Our data support several possible explanations for the reliance of the rural elderly on village clinics rather than other providers. First, village clinics are more physically accessible for the rural elderly. Although not reported in tables (for brevity), many elderly in our sample reported trouble walking more than 1 km (24 percent), difficulty standing for longer

Table 5. Comparing Village Clinics and Township Health Centers: House Calls, Patient Credit and Free Services

	Village clinic	Township health center
Share of offering house call service to village patients (%)	91	0
House calls made per week	10	
Average fee for house calls (RMB)	2.75	
Share of waiving house call fee (%)	73	
Injection base fee (RMB)	0.75	0.71
Share of waiving injection fees (%)	35	2
Intravenous base fee (RMB)	2.8	2.97
Share of waiving intravenous service fees (%)	25	1
Share of offering patient credit accounts (%)	96	0
Number of times credit accounts that are used by patients each month	193	

Source: Authors' survey.

than 15 min (15 percent) or difficulty squatting (27 percent). For these individuals, traveling the average distance of 5 km (in some cases up to 30 km) between their village and the nearest THC might be difficult. In contrast, nearly all villages in our sample have at least 1 village clinic located within the village proper.

There are also many services offered by village clinics that improve access for the elderly. For example, for the most immobile patients, almost all village clinics (91 percent) offer house call services (Table 5, column 1, row 1). In the typical village, village clinicians make an average 10 house calls per week, accounting for roughly 20 percent of their weekly patient visits (row 2). Only 27 percent of clinics charge for this service, and those who do have a fee charge an average of just RMB2.75 (rows 3 and 4). No THC offer house calls to surrounding villages (column 2).

In addition to being more physically accessible, services offered by village clinics are generally less expensive than similar services at THC (Table 5, rows 5 to 8). Our data demonstrate that the base fees for common services such as injections and IV fluids are both lower and more likely to be waived at village clinics compared to THC (column 1 vs column 2).

To make basic health care even more affordable and accessible to patients, 96 percent of village clinics in the survey offer revolving credit accounts to help finance health-care costs (Table 5, row 9). Using these accounts, patients are able to pay fees ranging from a few RMB to several hundred RMB over time. These benefits are not provided by THC or other types of health facilities in rural areas (column 2, rows 9 and 10).

Our analysis of health-care expenditure reveals that beyond offering inexpensive

Table 6. Impact of Age and Poverty on Log Health-care Expenditure

	Village clinic patients		Township health center patients	
	Common illnesses	Chronic illnesses	Common illnesses	Chronic illnesses
Elderly	0.09	0.27	–0.07	0.38
	–0.08	–0.24	–0.28	–0.31
Poor	0.04	0.78**	0.28	0.59
	–0.11	–0.32	–0.33	–0.36
Elderly and poor	–0.28**	–0.74*	–0.14	–0.57
	–0.13	–0.39	–0.43	–0.41
Male	–0.03	–0.12	0.32	0.27
	–0.05	–0.2	–0.2	–0.2
Educated	–0.1	0.25	–0.07	0.28
	–0.08	–0.21	–0.2	–0.21
Poor health	0.51***	0.37*	0.85***	0.85***
	–0.12	–0.22	–0.21	–0.19
Wealth	–0.02	0.15**	–0.01	–0.02
	–0.03	–0.07	–0.05	–0.05
Serious illness	1.09***	0.98***	0.85***	0.67***
	–0.1	–0.2	–0.25	–0.25
Chronic illness	0.48***		–0.51**	
	–0.13		–0.24	
Common illness		–0.60***		–0.34*
		–0.17		–0.19
Constant	2.45***	5.28***	6.11***	5.44***
	–0.12	–0.35	–0.45	–0.45
Observations	1217	301	289	320
Adjusted R^2	0.351	0.246	0.257	0.215

Notes: Robust standard errors clustered by township are reported in parentheses; township fixed effects are included in all specifications. ***, ** and * denote significance at 1, 5 and 10 percent, respectively.

services and open credit accounts, clinics might provide additional service fee discounts to elderly and elderly poor patients. Table 6 reports the results of our model of health-care expenditure. Columns 1 and 2 report the results among village clinic patients for common illnesses (column 1) and chronic illnesses (column 2). Columns 3 and 4 present comparable results among THC patients. The combined marginal effect of being both elderly and poor on village clinic expenditure for common illnesses is an RMB15 discount (statistically significant at the 5-percent level). Although regression coefficients for poor and elderly poor clinic patients with chronic illnesses are statistically significant, the combined marginal effect of being elderly and poor on expenditure for chronic illnesses is not significant. We do not observe any significant discounts for either elderly or elderly poor THC patients in

either illness category.

V. Discussion

Overall, we have shown that although village clinics continue to decline financially, they remain an important source of health care in China's villages. Our data show that even as village clinics lag far behind THC in revenue growth and human capital, many rural residents continue to rely on clinics as health-care providers. The elderly are much more reliant on village clinics than are younger individuals, and this is true for both common and chronic illnesses.

Our analysis of the services provided by village clinics gives us some indication as to why elderly individuals may be relatively more reliant on village clinics. A significant share of the rural elderly suffer some level of physical limitation. The rural elderly are also overrepresented among the rural poor. To serve the health-care needs of this population, village clinicians are more likely to make frequent house calls to the immobile, to offer inexpensive services, to extend lines of credit to their patients, and to provide service fee discounts to the elderly poor. Because THC offer virtually none of these services, village clinicians are a particularly important resource for the rural elderly.

More research is needed to determine how future health-care reform policies may be refined to strengthen and support village clinics and to protect the valuable services they provide. In fact, a number of recent policy initiatives might have begun to address the fiscal sustainability issues among village clinics. The most recent round of health reforms beginning in 2009 have attempted to directly assist in alleviating the financial crises of village clinics (MOH, 2009; Xinhua Agency, 2009). New policy promises have included increased government investment in the construction/upgrading of village clinic facilities, especially those in poor, remote and minority villages (MOH, 2009). In addition, in many provinces, basic medical services provided by village clinics will be subsidized through the NCMS outpatient reimbursement system (MOH, 2010).

Despite the prospects of progress in the fiscal aspects of village clinics, there are still serious concerns about the quality of services provided. Of course, if the quality of services is poor, making such clinics fiscally sustainable might not be worthwhile. It has been reported that in many village clinics, antibiotics, hormones, vitamins and glucose are widely overprescribed by clinicians without regard for the actual needs of patients (Fu, 2010). According to Sun *et al.* (2009) the overprescription of drugs becomes even worse when villagers are able to be reimbursed for health services by NCMS health insurance funds.

International experience has shown that it is not enough to simply invest in facilities to improve the quality of health services (Leonard *et al.*, 2007; Das *et al.*, 2008). More is needed, including closer supervision, more effective regulation and better training.

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