

# Who are rural China's village clinicians?

Hao Xue and Yaojiang Shi  
*Center for Experimental Economics in Education (CEEE),  
Shaanxi Normal University, Xi'an, China, and*

Alexis Medina  
*Freeman Spogli Institute, Stanford University, Stanford, California, USA*

## Abstract

**Purpose** – The purpose of this paper is to measure the turnover (or stability in employment) of village clinicians in rural China over the past decade. The authors also want to provide quantitative evidence on the individual characteristics of the clinicians who provide health care to villagers in rural China and whether we should expect these individuals to be interested in continuing to supply quality health care in China's villages in the coming years.

**Design/methodology/approach** – This paper uses data from a survey of rural China's village clinicians conducted in five provinces, 25 counties, and 101 villages in 2005 and 2012. This paper also uses qualitative data from interviews with 31 village clinicians. Using a mixed methods approach, this study describes the turnover of village clinicians and the main factors that impact the career decisions of clinicians.

**Findings** – Turnover of China's village doctors, while not trivial (about 25 percent of village doctors exited their field between 2005 and 2012), is still not overly high. Only five out of 101 villages did not have village clinicians in 2012. Of those that lost village doctors between 2005 and 2012, nearly all of them still had a village doctor in 2012 (either taken over by another local clinician or the position was taken by a newcomer). The authors find that three main sets of factors are correlated with the career decisions of village clinicians: village clinicians' opportunity cost, the profitability of running a village clinic, and commitment to the field of medicine. In general, clinicians who left the village faced a much higher opportunity cost, had been running a clinic that was not profitable, and had fewer ties to the field of medicine. Newcomers over the same period had higher levels of education, went to higher profit clinics between 2005 and 2012, and had a stronger commitment to the field.

**Originality/value** – This study makes use of a data set with a large and nationally representative sample to provide a new perspective to better understand clinician turnover at village clinics, the career decisions of clinicians, and the implied trends for the quality and access to rural health care services in the future.

**Keywords** Rural China, Career choice, Village clinicians

**Paper type** Research paper

## 1. Introduction

In rural China's three-tiered health system, village clinicians are the grassroots workers. They provide basic treatment for villagers with common illnesses, while also acting as front-line providers of preventative care (General Office of the State Council of the People's Republic of China, 2015). Village clinicians are almost always the sole source of medical care in remote villages and are therefore particularly important for both the poorest residents of rural China (Babiarz *et al.*, 2010; Li *et al.*, 2013a, b; Ren, 2011) and the rural elderly who often have a harder time traveling to upper-tier health centers located outside of their own villages (Babiarz *et al.*, 2013; Zhang *et al.*, 2010).



Given the expansion of the rural health system through the emergence of the rural health insurance program (NCMS) and the concomitant rise in demand for health services, the role of village clinicians may become even more important in the future. In the long run, village clinicians may be asked to serve as gatekeepers to the upper tiers of the system (Babiarz *et al.*, 2013; Yip *et al.*, 2012; Yip and Hsiao, 2009). In particular, the goal of China's current policy reform efforts is to encourage all rural residents who become sick to first seek treatment in village clinics. After seeing the village clinician, patients with more serious diseases are supposed to be referred to higher levels of medical care (General Office of the State Council of the People's Republic of China, 2009, 2011). In recent years, the rural insurance system has also been changed to encourage patients to see their village clinician for treatment for certain basic health conditions.

Although policymakers appear to have big plans for village clinicians, many scholars have voiced concerns about the current state of village clinics. Sylvia *et al.* (2015) used standardized patients to demonstrate the low quality of health care delivered by village clinicians, focusing on three measures of health care quality: the quality of the diagnostic and treatment process, the share of the time that clinicians gave the correct diagnoses, and the share of the time that clinicians gave the correct treatments. Other scholars have shown that the knowledge of village clinicians is often out of date; many village clinicians lack the necessary medical education and skills – knowledge and skills that they are not picking up in the limited training sessions made available to them (Babiarz *et al.*, 2010; Fang *et al.*, 2009; Han and Luo, 2007; Tian *et al.*, 2012). Researchers have also observed that there is sometimes limited access to care inside China's rural villages (Dai *et al.*, 2011). Specifically, while there is little systematic empirical work, it has been observed that in some (many) of China's villages, there are no village clinics due to an absence of clinicians.

Given these concerns, is China's rural health care system prepared to meet the challenge that the future will demand of it? What is the nature of access to rural health care in China's rural villages? What is the quality of the clinicians who are providing services? In short, who will staff China's village clinics and how good of a job can we expect them to do?

Recent studies show that there may be several factors that influence the career decisions of village clinicians. First, with China's transition economy, there are more opportunities to work outside of the village (Li *et al.*, 2013a, b). In fact, as the off-farm wage rate rises, there is reason to believe that clinicians face higher opportunity costs than they did a decade ago (Li *et al.*, 2012). The decision to leave a village practice for alternative work elsewhere might also be affected by the clinician's educational attainment (Zhang *et al.*, 2002; Shi and Xu, 2007; Zhao, 2005).

Second, the level of profitability of running a village clinic will also matter. On the one hand, with the aging of China's population proceeding at an unprecedented rate (United Nations Department of Economic and Social Affairs, 2015), it is possible that there will be more demand (and higher profits) for village clinicians. The emergence of China's rural health insurance system and the passing of recent rules to allow villagers to use NCMS to cover expenses incurred in the village clinic may also raise the demand for the health services of village clinicians.

On the other hand, with increasing numbers of rural residents leaving the villages to become migrant workers in urban areas (Luo *et al.*, 2011), there is naturally going to be a reduced demand for health care coming from the relatively smaller population still living in villages. Moreover, traveling from villages to towns and counties is becoming

easier as China's government has been making large investments into the construction of rural roads (Deng *et al.*, 2011). As a result, villagers are beginning to have better access to health care provided by township health centers and county hospitals, health organizations that are higher in the hierarchy of rural China's health care system. This rising access to alternative health services might be expected to lead to increased competition between village clinics and township and county hospitals (Tu, 2010). In other words, factors may be coming together in a way such that rural clinicians might be expected to make lower profits than they did a decade ago (Fang *et al.*, 2009; Tian *et al.*, 2010).

Given these facts, the willingness of village clinicians to continue providing health services in China's villages is unclear. Therefore, our primary goal is to provide quantitative evidence on the individual characteristics of rural village clinicians in the period from 2005 to 2012. In doing so, we hope to identify the characteristics of village clinicians that are correlated with new entrance into and sustained work in the field of rural health care. To meet this goal, we have two specific objectives. First, we document the rate of village clinician turnover over the past decade and describe the characteristics of village doctors who leave the village and those who stay or (newly) enter the village. We seek to see if there are differences (between those who leave and those who stay) in terms of personal characteristics, such as age, gender, education, and training. Second, we analyze the factors that appear to be influencing the career decisions of village clinicians.

The rest of the paper is organized as follows. We describe our sampling method and data in Section 2. We present our results in Section 3. We do so both by drawing on quantitative data collected by the authors and by reporting the results of a set of qualitative interviews. In the final section, we discuss our findings and consider ways to improve the quality of village clinicians and the future of China's village-based health care system.

## 2. Sampling method and data collection

### 2.1 Sampling method

We use two waves of data collected by the authors in 2005 and 2012. The timing of the surveys allows us to study the current state of the village health care system in rural China, along with any trends that have emerged as the system has changed over the past decade. Additionally, in order to gain a deeper understanding of the career decisions of village clinicians and the quality of the care that they are able to provide, we conducted qualitative interviews with village clinicians in 2014. By bringing together our quantitative and qualitative findings, we create a framework to help explain the quality of village-based health care and the career decisions of village clinicians.

To ensure that our sample was nationally representative, in 2005, we used a randomly selected sample of village clinicians from 101 rural villages, across five provinces – Jiangsu, Sichuan, Shaanxi, Jilin, and Hebei. The five provinces were chosen to represent each of China's major agricultural and ecological zones. From each province, five counties were selected: one county from each of five strata of gross value of industrial output (GVIO) per capita, which Rozelle (1996) has shown to be a better predictor of living standards and development potential than rural income per capita.

After selecting our sample counties, we proceeded to choose the rest of the sample. We randomly sampled two townships from each county and two villages from each township. Note that one township in our sample has three villages rather than two

---

because one village was divided into two villages between the first and second rounds of data collection. Both the sample townships and villages were chosen using the same sampling procedure: we picked one township and one village from the top and bottom halves of the GVIO distribution. Then, for each village that had at least one village clinic, we randomly selected one clinician.

Seven years later, in 2012, we returned to the same sample villages again and administered the same survey as in 2005. As part of this effort, we set out to track the original clinicians from the 2005 survey. If the previous village clinician no longer practiced in the village, and provided that there was another clinician in the village, we randomly selected a new clinician to be part of our sample. In the final sample of 101 villages, we surveyed 91 clinicians in 2005 and 96 clinicians in 2012. The “missing” clinicians in the sample are a result of some villages not having any village clinicians (ten villages in 2005 and five villages in 2012).

## 2.2 Main variables

Using our data, we created a set of variables that we use in the analysis. Based on the two survey waves, we are able to define five types of village clinicians. If a village clinician was surveyed by enumerators during both waves of the survey, he/she is labeled a sustainer. If a village clinician was in the 2005 survey but had left the village by 2012, he/she is labeled a dropout. If a village clinician was not in the village in 2005 but was practicing in the village in 2012, he/she is called a newcomer. There was also a subset of villages in which there were (at least) two village clinicians in 2005, and in which the originally surveyed village clinician (from 2005) was a dropout. In these cases, we randomly selected another village clinician to survey in 2012. These village clinicians were practicing in the village in both 2005 and 2012, but we only have data on them for 2012. We call these clinicians alternates, and they are included as a part of the sustainer group for the purpose of our quantitative analysis[1]. Finally, there is a set of villages we call villages without clinics. Our analysis is based on three groups: sustainers, dropouts, and newcomers.

## 2.3 Factors influencing village clinicians' career decisions

We consider two main sets of factors that might influence the career decisions of village clinicians: village clinician's opportunity cost and profitability of running a village clinic. In addition, we create a third set of variables that measure commitment to the field of medicine.

*2.3.1 Opportunity cost.* The age, gender, and education levels of our sample clinicians are hypothesized to affect their opportunity cost. We measure education as a variable that takes on one of three levels: junior high school or below, senior high school or secondary school, and college or above. These variables are all measured using data from surveys of the village clinicians themselves.

*2.3.2 Profitability.* We measure three main factors that may impact the profitability of running a village clinic. We measure distance to township health center by asking the village leader for the distance in kilometers between the village clinic and the township health center. The idea is that the profitability of village clinics will be lower in villages that are close to township health centers because of increased competition: villagers have the choice of seeking care in either the village clinic or the township health center. Village account records were used to obtain the village size. Conditional on controlling for the number of clinics in the village, we believe that the more

households in the village, the more profitable the village clinic will be. Finally, we asked the village leader to tell us the number of clinics in the village. With more clinics in the village, the overall profitability of each clinic will likely be lower due to competition.

*2.3.3 Commitment to the field.* We believe three factors are related to a village clinician's intrinsic commitment to the field. First, we documented the levels of formal medical education and training received by the village clinician. We included these variables in our analysis because if a village clinician received formal medical education and/or training, he/she either had an intrinsic interest in medicine and/or had a set of skills that committed the clinician to practicing medicine (holding profitability and opportunity cost constant). Commitment to the field is also measured by whether the village clinician owns his/her own clinic. If the clinic belonged to the village (or town), then it was considered not to be owned by the clinician. Finally, we asked the village clinician if there was a family legacy of working as a village clinician. If either of the parents of a village clinician had practiced as a village clinician (or other type of doctor), the village clinician was deemed to have a family legacy. Detailed definitions for each explanatory variable are listed in Table AI.

#### *2.4 Qualitative data collection*

As part of our efforts to better understand the career decision making of village clinicians, in 2014, we conducted interviews with a randomly selected subset of clinicians from our 2012 quantitative data. We obtained informed consent from each clinician we interviewed. Each interview was conducted one on one, recorded, and transcribed. The interview protocol varied depending on whether the interviewee was a sustainer, a dropout, or a newcomer. Every interview started with the basic characteristics of the interviewee's village and family background. In addition, we asked about the opportunity costs and profitability of being a village clinician as well as about each interviewee's commitment, attitudes, and expectations about the position. Finally, we asked why they wanted to be a village clinician or, in the case of dropouts, why they left the village clinic.

The interview protocol served as the primary guide, and it was ensured that all sections were covered. Some flexibility was utilized in following up on interviewees' statements with additional probes and questions. Participants in the study were not paid monetarily, but each household surveyed was given a small gift of household laundry detergent (valued at around 2 USD) in gratitude for their participation.

### **3. Results**

#### *3.1 Turnover among village clinicians*

We find that most of our 101 sample villages had clinics. Indeed, in 2005, there were only ten villages without clinics. In 2012, there were only five without clinics.

Of the villages with clinics, clinician turnover was not negligible, but it was also not exceedingly high (Table I). Of the 91 villages that had clinics in 2005, only 67 clinicians in the village clinics were still working in 2012 (sustainers); 24 of the original clinicians had dropped out (dropouts), and 12 newcomers had taken their place.

#### *3.2 The correlates of each group of clinicians*

We make two main kinds of comparisons across the different clinician groups. One of them is to compare dropouts with sustainers in order to identify possible reasons for why village clinicians leave. We also compare newcomers and sustainers to examine

|     | Year                     | 2005 | 2012 |
|-----|--------------------------|------|------|
| (1) | Total number of villages | 101  | 101  |
| (2) | Villages without clinics | 10   | 5    |
| (3) | Villages with clinics    | 91   | 96   |
| (4) | Sample clinicians        | 91   | 96   |
| (5) | Sustainers               | 67   | 67   |
| (6) | Dropouts                 | 24   | –    |
| (7) | Newcomers                | –    | 12   |
| (8) | Alternates               | –    | 17   |

**Notes:** In 2005, row (1) equals the sum of rows (2) and (3). In addition, row (3) equals rows (5) plus (6). In 2012, row (1) equals the sum of rows (2) and (3). In addition, row (3) equals rows (5) plus (7) plus (8)  
**Source:** Authors' data

**Table I.**  
Village clinician  
turnover

what characteristics are typical among people who have recently become village clinicians as compared with those that have been in the position for a longer amount of time. Both of these comparisons will be divided into three parts according to the factors mentioned above: opportunity cost, profitability, and commitment to the field.

*3.2.1 Dropouts versus sustainers.* In total, there were 24 dropouts between 2005 and 2012 and 67 sustainers (Table II). We find that none of the factors that influence profit are significantly different between the two groups, suggesting that profitability is not a major factor in the decision to drop out.

The average age of village clinicians in both the dropout and sustainer groups is similar, at around 45 years. Around 80 percent of both samples are male. We find that clinicians with higher levels of education are more likely to be dropouts: of the village clinicians who had attended college or above in 2005 – nearly 20 percent of our sample – all dropped out by 2012. This may be due to higher opportunity costs, perhaps because they could get better jobs elsewhere while less educated clinicians could not.

When comparing the commitment of clinicians to the field of medicine/health care, we find that clinicians with less medical training are more likely to be dropouts. Clinic ownership is also significantly linked with clinicians' career decisions. Clinicians whose clinic buildings are publicly owned (by the village) rather than privately owned are more likely to drop out. Private ownership of the clinic building may suggest a greater commitment to staying as a village clinician, since the costs of leaving are higher.

Since both young and old doctors dropped out of our sample, we were curious as to whether there were any heterogeneous effects in terms of why they chose to drop out. Following the practice of other researchers looking at this issue (Li *et al.*, 2011; Xu *et al.*, 2014), we divided our dropout sample into two groups: those over the age of 50 years (older doctors) and those under the age of 50 years (younger doctors – Table III). We find that younger dropouts face a significantly higher opportunity cost (higher level of education) and are less committed to the field (less likely to own the clinic building) compared with older doctors, despite their potential for higher profitability (located in villages further from the township health center and with a larger number of households).

In summary, we find that village clinicians who are more highly educated, have more medical training, and whose clinic building is publicly owned are more likely to leave the village. One possible reason for this might be that these clinicians face higher opportunity costs and have less commitment to the field of medicine than do other village clinicians.

| Characteristics                                | Year = 2005                                   |   |   | Year = 2012                                   |  |   |
|--|---|---|---|---|--|---|
|  | Sustainers<br>( <i>n</i> = 67)<br>Mean<br>(1) | Dropouts<br>( <i>n</i> = 24)<br>Mean<br>(2) | Dropouts vs<br>sustainers<br>Mean (SE)<br>(3) = (2)-(1) | Sustainers<br>( <i>n</i> = 84)<br>Mean<br>(4) | Newcomers<br>( <i>n</i> = 12)<br>Mean<br>(5) | Dropouts vs<br>sustainers<br>Mean (SE)<br>(6) = (5)-(4) |
| <i>Opportunity cost</i>                        |   |   |   |   |  |   |
| Age (year)                                     | 44.66   | 46.96                                       | 2.30 (3.051)  | 50.60   | 37.67  | -12.93 (3.309)***                                       |
| Male (%)                                       | 0.82  | 0.83  | 0.01 (0.092)  | 0.81  | 0.58   | -0.23 (0.127)*  |
| Junior high school or below                    | 0.58  | 0.42  | -0.16 (0.119)   | 0.50  | 0.00   | -0.50 (0.146)***  |
| Senior high school or secondary school         | 0.42  | 0.42  | 0.00 (0.000)  | 0.46  | 0.83   | 0.37 (0.151)  |
| College or above                               | 0.00  | 0.17  | 0.17 (0.046)***   | 0.04  | 0.17   | 0.13 (0.068)  |
| <i>Profitability</i>                           |   |   |   |   |  |   |
| Distance to township health center (kilometer) | 4.45  | 4.97  | 0.52 (0.874)  | 4.77  | 3.67   | -1.10 (1.107)   |
| Village size (households)                      | 376.61  | 448.75                                      | 72.14 (853.097)   | 403.11  | 479.75                                       | 76.64 (70.932)  |
| Number of clinics in village                   | 1.75  | 1.67  | -0.08 (0.272)   | 1.61  | 1.08   | -0.53 (0.297)*  |
| <i>Commitment to the field</i>                 |   |   |   |   |  |   |
| Medical education                              | 0.22  | 0.29  | 0.07 (0.103)  | 0.29  | 0.67   | 0.38 (0.142)***   |
| Medical training                               | 0.33  | 0.13  | -0.20 (0.105)*  | 0.57  | 0.25   | -0.32 (0.152)**   |
| No medical education or training               | 0.45  | 0.58  | 0.13 (0.119)  | 0.14  | 0.08   | -0.06 (0.107)   |
| Own clinic                                     | 0.76  | 0.50  | -0.26 (0.107)**   | 0.76  | 0.75   | -0.01 (0.133)   |

**Notes:** The *p*-value of *t*-statistics is reported; \*, \*\*, \*\*\*Significant at 10, 5 and 1 percent levels, respectively

**Source:** Authors' own survey

**Table II.** Differences between sustainers, dropouts and newcomers

3.2.2 *Newcomers versus sustainers.* In this section, we compare newcomers with sustainers (Table II). Looking at our opportunity cost variables, we find the average age of newcomers is 37.7 years, 13 years younger than the average age of sustainers. In addition, a higher fraction of newcomer clinicians is female (40 vs 20 percent). At the same time, we find that newcomers are based in villages that have fewer clinics on average than do villages in which sustainers are based. In other words, newcomers are more likely to move into villages with fewer clinics. This may be because clinicians can expect to make higher profits in villages with fewer clinics, due to less competition. Importantly, we find that the general education level and medical education level of newcomers is higher than that of sustainers.

| Characteristics                                | Sustainers<br>(n = 67)<br>Mean<br>(1) | Younger<br>doctors<br>(n = 13)<br>Mean<br>(2) | Younger doctors<br>vs sustainers<br>Mean (SE)<br>(3) = (2)-(1) | Older<br>doctors<br>(n = 11)<br>Mean<br>(4) | Older doctors vs<br>sustainers<br>Mean (SE)<br>(5) = (4)-(1) |
|--|---------------------------------------|---|--|---|--|
| <i>Opportunity cost</i>                        |                                       |   |  |   |  |
| Age (year)                                     | 44.66                                 | 34.08   | -10.58 (3.296)***  | 62.18                                       | 17.52 (3.660)***   |
| Male (%)                                       | 0.82                                  | 0.77  | -0.05 (0.000)  | 0.91  | 0.15 (0.122)   |
| Junior high school or below                    | 0.58                                  | 0.15  | -0.43 (0.146)***   | 0.73  | 0.15 (0.160)   |
| Senior high school or secondary school         | 0.42                                  | 0.54  | 0.12 (0.152)   | 0.27  | -0.15 (0.160)  |
| College or above                               | 0.00                                  | 0.31  | 0.31 (0.057)***  | 0.00  | 0.00 (0.000)   |
| <i>Profitability</i>                           |                                       |   |  |   |  |
| Distance to township health center (kilometer) | 4.45                                  | 6.40  | 1.95 (1.143)*  | 3.27  | -1.18 (1.090)  |
| Village size (households)                      | 376.61                                | 486.62  | 110.01 (65.012)*   | 404.00                                      | 27.39 (70.578)   |
| Number of clinics in village                   | 1.75                                  | 1.54  | -0.21 (0.346)  | 1.82  | 0.07 (0.392)   |
| <i>Commitment to the field</i>                 |                                       |   |  |   |  |
| Medical education                              | 0.22                                  | 0.46  | 0.24 (0.132)*  | 0.09  | -0.13 (0.132)  |
| Medical training                               | 0.33                                  | 0.15  | -0.18 (0.139)  | 0.09  | -0.24 (0.148)  |
| No medical education or training               | 0.45                                  | 0.39  | -0.06 (0.152)  | 0.82  | 0.37 (0.159)**   |
| Own clinic                                     | 0.76                                  | 0.46  | -0.3 (0.135)**   | 0.55  | -0.21 (0.144)  |

**Notes:** The *p*-value of *t*-statistics is reported; \*, \*\*, \*\*\*Significant at 10, 5 and 1 percent levels, respectively

**Source:** Authors' data

**Table III.**  
Differences between  
younger/elder  
dropouts and  
sustainers

Overall then, newcomer clinicians are likely to be both younger than average and female, with higher levels of education and better medical training than their long-serving contemporaries. They are also more likely to base themselves in villages with fewer clinics.

### 3.2.3 Multivariate analysis of the determinants of being a village clinician.

Our regression results (Table IV) are consistent with the descriptive comparisons discussed above for both sets of comparisons. In the case of dropouts, the point estimates are mostly the same as those reported above in the descriptive analysis. The coefficients measuring the determinants of dropping out are statistically significant for both age and education level.

In the case of newcomers, we again find that the multivariate analysis supports most of the findings from the descriptive statistics (reported above). Village clinicians who have entered the field in the past decade tend to be younger and more educated than sustainers. Newcomers also are more likely to base themselves in villages with fewer village clinics.

## 4. Qualitative findings and mixed methods analysis

We interviewed a total of 31 village clinicians (Table V), of which 22 were sustainers, five were dropouts, and four were newcomers. The characteristics of the clinicians we

| Probit regression                              |  | Dropouts = 1<br>(sustainers = 0)<br>(1) | Newcomers = 1<br>(sustainers = 0)<br>(2) |
|--|--|---|--|
| Age (year)                                     |  | 0.006 (0.004)                           | -0.016 (0.003)***                        |
| Male (%)                                       |  | -0.007 (0.105)                          | -0.064 (0.051)                           |
| Junior high school or below                    |  | -1.706 (0.204)***                       | - <sup>a</sup>                           |
| Senior high school or secondary school         |  | -1.530 (0.168)***                       | 0.592 (0.094)***                         |
| College or above                               |  | - <sup>b</sup>                          | 0.627 (0.101)***                         |
| Distance to township health center (kilometer) |  | 0.008 (0.010)                           | -0.022 (0.012)*                          |
| Village size (households)                      |  | 0.000 (0.000)                           | 0.000 (0.000)                            |
| Number of clinics in village                   |  | -0.033 (0.033)                          | -0.118 (0.033)***                        |
| Medical education (%)                          |  | -0.115 (0.118)                          | -0.118 (0.109)                           |
| Medical training (%)                           |  | -0.159 (0.095)*                         | -0.123 (0.104)                           |
| Own clinic                                     |  | -0.175 (0.080)**                        | -0.146 (0.107)                           |
| Observations                                   |  | 91                                      | 96                                       |
| Pseudo R <sup>2</sup>                          |  | 0.261                                   | 0.564                                    |

**Table IV.**  
Factors that influence the career decision of rural clinicians

**Notes:** <sup>a</sup>There are no newcomers whose education level is junior high school or below; <sup>b</sup>there are no sustainers whose education level is college or above  
**Source:** Authors' data

|                      | Number of clinicians in qualitative data | Number of clinicians in quantitative data | Sustainers | Dropouts | Newcomers |
|----------------------|--|---|------------|----------|-----------|
| <i>Age</i>           |  |   |            |          |           |
| Age ≥ 50             | 10 (32%)                                 | 49 (47%)                                  | 37 (55%)   | 11 (46%) | 1 (8%)    |
| Age < 50             | 21 (68%)                                 | 54 (53%)                                  | 30 (45%)   | 13 (54%) | 11 (92%)  |
| <i>Gender</i>        |  |   |            |          |           |
| Male                 | 26 (81%)                                 | 82 (80%)                                  | 55 (82%)   | 20 (83%) | 7 (58%)   |
| Female               | 5 (19%)                                  | 21 (20%)                                  | 12 (18%)   | 4 (17%)  | 5 (42%)   |
| <i>Career choice</i> |  |   |            |          |           |
| Sustainers           | 22 (71%)                                 | 67 (65%)                                  | 67         | -        | -         |
| Dropouts             | 5 (16%)                                  | 24 (23%)                                  | -          | 24       | -         |
| Newcomers            | 4 (13%)                                  | 12 (12%)                                  | -          | -        | 12        |
| <i>Total</i>         | 31                                       | 103                                       | 67         | 24       | 12        |

**Table V.**  
Interviewed rural clinicians' characteristics

**Note:** n = 31  
**Source:** Authors' data

interviewed, such as age, gender, and career decisions, were proportionally similar to those of the clinicians we surveyed in our quantitative study. The basic characteristics of the interviewees are listed in Table AII.

*4.1 Dropouts: why have clinicians left the villages?*

When we interviewed clinicians it became clear that profits are an important factor in their thinking:

My profits are falling (Clinician 20211, Sustainer, Age 35).

It's hard to be a village clinician because you don't make much money anymore. Sometimes I think about dropping out (Clinician 20913, Newcomer, Age 41).

---

Our quantitative findings also demonstrated that clinicians with higher opportunity costs – that is, those with higher level of education and more medical training – are more likely to drop out. This may be because they have a better chance of finding employment elsewhere. Our interviews supported this finding:

I left because I knew I could make more money as a private clinician in the county seat (Clinician 22012, Dropout, Age 35).

I thought about leaving because I got offered a job [...] I finally left (Clinician 21812, Dropout, Age 32).

Commitment to the field is also a factor that influences whether a clinician decides to drop out. From our quantitative data, we find that clinicians who own their clinic building are less likely to leave. There are also (perhaps) a surprising number of village clinicians who are unafraid to say that their job is simply something that they enjoy doing. Our interviews illustrate some of these ways of thinking:

I want to go do something else where I can make more money, but I love helping people (Clinician 20421, Sustainer, Age 56).

Sometimes it's hard, but I am a clinician. This is what I do. My villagers need me (Clinician 21711, Sustainer, Age 58).

I own my clinic. I was in medical school for years. How can I just give that up? (Clinician 21421, Sustainer, Age 37).

#### 4.2 *Newcomers: who becomes a new village clinician?*

Profits have a considerable impact on the decisions of clinicians to set up practice in a village. Through our quantitative findings we demonstrate that villages where clinicians can expect to make greater profits – such as villages located farther from township health centers and those with fewer clinics – are more attractive. In these villages, clinicians can make more money with higher demand and less competition than in other villages. Our qualitative results seem to support this notion:

This is a big village, so many residents need health care delivered by village clinicians when they are ill (Clinician 20713, Newcomer, Age 46).

I came here because the old clinician retired and there were no other clinicians. If there were one or two clinicians already in the village, I would not have come here (Clinician 32213, Newcomer, Age 28).

Although the opportunity cost for newcomers to become village clinicians is high, in some cases, our interviews show that it may be offset by their commitment to the field. From our quantitative results, although the point estimate is not statistically significant, we know that newcomers are more likely to work in places where the clinic is publicly owned. This may be because of lower barriers to entry: they do not need to invest as much to purchase a new clinic building. This idea was supported by the qualitative results:

Actually I was not very willing to become the village clinician because I needed a clinic building where I could store medicine and treat patients. But I agreed to it when our village leader offered me three rooms for a clinic building (Clinician 11223, Newcomer, Age 43).

I've been a doctor since 2001, but I used to have my own practice outside of the village. My father was a village doctor though, so when he retired, I took over his practice. He already owned the clinic building and everything (Clinician 20913, Newcomer, Age 41).

The qualitative interviews also showed that commitment to the field especially for family reasons also affects clinicians' career decisions. For some clinicians, their fathers or even grandfathers were village clinicians, so they think it is their duty to become a village clinician as well. For other clinicians, they have to stay in the village because of dependents – either young children or ageing parents so they become village clinicians.

My dad was a clinician. Of course I will be a clinician too (Clinician 32213, Newcomer, Age 28).

My dad was a clinician. When I graduated from Junior high school, I work as an assistant. When my dad was too old to work, I operated the village clinic on my own. Now I have worked as a village clinician for more than 30 years (Clinician 20422, Sustainer, Age 56).

My father was a village clinician and he was too old to work. So I went back to the village to take care of him and my young child. When my child grows up, I plan to leave the village and find a better job (Clinician 21311, Sustainer, Age 40).

## 5. Conclusion and discussion

Using two waves of quantitative data from 2005 and 2012, combined with qualitative interview data from 2014, we describe the turnover of village clinicians over the past decade and compare the key characteristics of sustainers, dropouts, and newcomers.

We find three main sets of factors that correlate with the career decisions of clinicians. The opportunity cost of being a clinician, the profitability of running a village clinic, and commitment to the field of medicine all matter. These results are robust to both the descriptive analysis and the regression results.

Overall, we find that doctors who left the village (dropouts) did so because they faced a much higher opportunity cost of continuing to work in the village, since their higher levels of education could afford them greater opportunities elsewhere. Dropouts also tended to hail from villages where the clinics were less profitable, so they may have been more highly motivated to seek a better job outside of the village. We also find that dropouts had fewer ties to the field of medicine (less commitment to the field), so they may have been more willing to change occupations.

We find that newcomer doctors (who entered the field between 2005 and 2012) also had high levels of education relative to their sustaining peers, which were found to be more highly correlated with leaving rather than remaining in a village clinician position in the period between 2005 and 2012. However, it is likely that this correlation may be offset by the higher profitability of their clinics (typically located in villages with less competition) and a stronger commitment to the field. Results from our qualitative interviews also suggest that newcomers have more commitment to the field, largely through a family connection to the profession.

### 5.1 Strengths and limitations

This study represents the first time a mixed methods approach has been used to describe rural China's village clinicians and their turnover over the past decade. Strengths of the study include its nationally representative sampling strategy and its innovative approach to describing the individual characteristics of village clinicians that may be related to their labor force decisions.

As with other studies, our study faces a number of limitations. First, while our quantitative sample is nationally representative, because our data are analyzed at the village level, our effective sample size is relatively small. Also, it is the case that our qualitative sample is geographically constrained. We made every attempt to randomly

sample villages that varied in terms of population size, household income, and distance from the county seat; however, we cannot claim that the resulting sample is representative of all village clinics throughout rural China. Additionally, the nature of our analysis is such that we can identify factors correlated with clinicians' behavior, but we cannot prove causality. Further work is required to more thoroughly explore the factors that cause individuals to leave, stay, or begin practice as a village clinician.

Our results give an indication of what village health care providers will look like in the next decade. The fact that the best educated clinicians are leaving the villages does not bode well for the future quality of health care. To stem this problem, we suggest that policymakers implement new policies to encourage or incentivize younger and better educated doctors to become (and/or remain) village clinicians. Most importantly, policymakers should explore different approaches to keep qualified doctors in the village for the long term and prevent them from becoming dropouts in the near future.

### Note

1. We compared the alternates with the sustainers and found them to be statistically identical (results not shown). As a result, for the rest of this paper, the alternates are grouped together with the sustainers and considered to be a single group.

### References

- Babiarz, K.S., Yi, H. and Luo, R. (2013), "Meeting the health-care needs of the rural elderly: the unique role of village doctors", *China World Economy*, Vol. 21 No. 3, pp. 44-60.
- Babiarz, M.G., Yi, H., Zhang, L. and Rozelle, S. (2010), "New evidence on the impact of China's new rural cooperative medical scheme and its implications for rural primary healthcare: multivariate difference-in-difference analysis", *British Medical Journal*, Vol. 341, October, pp. c5617-c5617, doi: 10.1136/bmj.c5617.
- Dai, B., Zhou, J., Mei, Y.J., Wu, B. and Mao, Z. (2011), "Can the new cooperative medical scheme promote rural elders' access to health-care services?: elders' access to health-care service", *Geriatrics & Gerontology International*, Vol. 11 No. 3, pp. 239-245, doi: 10.1111/j.1447-0594.2011.00702.x.
- Deng, M., Luo, R. and Zhang, L. (2011), "Road infrastructure and non-agricultural employment of rural labor – based on 2000 households survey in 5 provinces", *Journal of Agrotech Economics*, No. 2, pp. 4-11.
- Fang, P., Wu, S., Fu, X., Chen, J. and Gao, H. (2009), "The status and countermeasure for village doctors in poor rural area in China", *Chinese Health Economics*, Vol. 28 No. 10, pp. 49-51 (in Chinese).
- General Office of the State Council of the People's Republic of China (2009), "Deepening the Health Care Reform", (in Chinese) available at: [www.gov.cn/jrzq/2009-04/06/content\\_1278721.htm](http://www.gov.cn/jrzq/2009-04/06/content_1278721.htm)
- General Office of the State Council of the People's Republic of China (2011), "State Council on the guide of further strengthening rural clinicians team", No. 31 (in Chinese), available at: [www.gov.cn/zwqk/2011-07/14/content\\_1906244.htm](http://www.gov.cn/zwqk/2011-07/14/content_1906244.htm)
- General Office of the State Council of the People's Republic of China (2015), "State Council on the implement of further strengthening rural clinicians team", No. 13 (in Chinese), available at: [www.gov.cn/zhengce/content/2015-03/23/content\\_9546.htm](http://www.gov.cn/zhengce/content/2015-03/23/content_9546.htm)
- Han, J. and Luo, D. (2007), *China Rural Health Survey*, Far East Press, Shanghai (in Chinese).
- Li, F., Gao, L., Leng, Y., Han, D., Chen, G., Wu, Q. and Chen, L. (2011), "2009 village doctor basic condition survey in Shandong province", *Preventive Medicine Tribune*, Vol. 17 No. 12, pp. 1084-1087.

- Li, H., Li, L., Wu, B. and Xiong, Y. (2012), "The end of cheap Chinese labor", *Journal of Economic Perspectives*, Vol. 26 No. 4, pp. 57-74, doi: 10.1257/jep.26.4.57.
- Li, Q., Huang, J., Luo, R. and Liu, C. (2013a), "China's labor transition and the future of China's rural wages and employment", *China & World Economy*, Vol. 21 No. 3, pp. 4-24.
- Li, X., Liu, J., Huang, J., Qian, Y. and Che, L. (2013b), "An analysis of the current educational status and future training needs of China's rural doctors in 2011", *Postgraduate Medical Journal*, Vol. 89 No. 1050, pp. 202-208, doi: 10.1136/postgradmedj-2012-131094.
- Luo, R., Zhang, L. and Rozelle, S. (2011), "China's rural labor force transition and challenges", *Issues on Agriculture Economics*, No. 9, pp. 18-24, 110 (in Chinese).
- Ren, R. (2011), "The development and the role of village doctors in rural China", *Chinese Rural Health Services Administration*, Vol. 31 No. 5, pp. 443-445 (in Chinese).
- Rozelle, S. (1996), "Stagnation without equity: patterns of growth and inequality in China's Rural economy", *The China Journal*, No. 35, pp. 63-92, doi: 10.2307/2950276.
- Shi, Q. and Xu, C. (2007), "Career choices and influence factor analysis of rural households – based on 15 villages from Yangtze River Delta", *Management World*, No. 7, pp. 75-83.
- Sylvia, S., Shi, Y., Xue, H., Tian, X., Wang, H., Liu, Q., Medina, A. and Rozelle, S. (2015), "Survey using incognito standardized patients shows poor quality care in China's rural clinics", *Health Policy Planning*, Vol. 30 No. 3, pp. 322-333, doi: 10.1093/heapol/czu014.
- Tian, J., Zhang, G. and Ren, R. (2010), "Analysis on improving the income level and social security of village doctors under the background of new healthcare system reform", *Chinese Journal of Health Policy*, Vol. 3 No. 2, pp. 33-36 (in Chinese).
- Tian, J., Zhang, G., Ren, R. and li, X. (2012), "Discussing the status and development of village doctors in China", *Chinese Health Service Management*, Vol. 3 No. 12, pp. 127-129, 157 (in Chinese).
- Tu, J. (2010), "Privatisation of Health Care in Transitional China: a study of private clinics at the county level", p. 70, available at: [www.diva-portal.org/smash/get/diva2:325266/FULLTEXT01.pdf](http://www.diva-portal.org/smash/get/diva2:325266/FULLTEXT01.pdf)
- United Nations Department of Economic and Social Affairs (2015), "World population prospects: the 2015 revision", available at: [www.un.org/en/development/desa/population/events/other/10/index.shtml](http://www.un.org/en/development/desa/population/events/other/10/index.shtml) (accessed November 14, 2015).
- Xu, H., Zhang, W., Gu, L., Qu, Z., Sa, Z., Zhang, X. and Tian, D. (2014), "Aging village doctors in five counties in rural China: situation and implications", *Human Resources for Health*, Vol. 12, p. 36.
- Yip, W. and Hsiao, W. (2009), "China's health care reform: a tentative assessment", *China Economic Review*, Vol. 20 No. 4, pp. 613-619, doi: 10.1016/j.chieco.2009.08.003.
- Yip, W.C.-M., Hsiao, W.C., Chen, W., Hu, S., Ma, J. and Maynard, A. (2012), "Early appraisal of China's huge and complex health-care reforms", *Lancet*, Vol. 379 No. 9818, pp. 833-842, doi: 10.1016/S0140-6736(11)61880-1.
- Zhang, L., Huang, J. and Rozelle, S. (2002), "Employment, emerging labor markets, and the role of education in rural China", *China Economic Review*, Vol. 13 No. 2, pp. 313-328, doi: 10.1016/S1043-951X(02)00075-5.
- Zhang, X., Yao, Z., Wang, X., Peng, Y. and Peng, W. (2010), "Rural doctors in village culture circumstances – the case study on the field survey of villages of H district in Beijing", *Chinese Medical Ethics*, Vol. 23 No. 3, pp. 60-62 (in Chinese).
- Zhao, Z. (2005), "Migration, labor market flexibility, and wage determination in China: a review", *The Developing Economies*, Vol. 43 No. 2, pp. 285-312, doi: 10.1111/j.1746-1049.2005.tb00263.x.

---

**Appendix 1****Who are rural  
China's village  
clinicians?****675**

---

| Variables                                      | Description  |
|--|--|
| Age (year)                                     | Age (unit: years)  |
| Male (%)                                       | 0 = female; 1 = male   |
| Junior high school or below                    | Education level, junior high school or lower: 0 = not; 1 = yes                         |
| Senior high school or secondary school         | Education level, senior high school or secondary school: 0 = not; 1 = yes              |
| College or above                               | Education level, college or upper: 0 = not; 1 = yes                                    |
| Distance to township health center (kilometer) | The distance from village clinics to township health center(unit: kilometers)          |
| Village size (households)                      | The total number of households in a village  |
| Number of clinics in village                   | The number of village clinics in a village   |
| Medical education                              | Receive formal medical education in medical schools: 0 = not; 1 = yes                  |
| Medical training                               | Receive medical training to learn basic medical knowledge and skills: 0 = not; 1 = yes |
| No medical education or training               | Do not receive any medical education or training: 0 = no; 1 = yes                      |
| Own clinic                                     | Village clinician has the private ownership of clinic building: 0 = no 1 = yes         |

**Source:** Authors' data**Table AI.**  
Definitions of  
explanatory  
variables

---

**676**

| ID number | County | Village | Interviewee | Age | Gender |
|-----------|--------|---------|-------------|-----|--------|
| 10111     | 1      | 1       | Sustainer   | 36  | Male   |
| 10511     | 1      | 5       | Sustainer   | 36  | Male   |
| 10621     | 1      | 6       | Sustainer   | 36  | Male   |
| 10622     | 1      | 6       | Sustainer   | 41  | Female |
| 11011     | 1      | 10      | Sustainer   | 68  | Male   |
| 11222     | 1      | 12      | Dropout     | 72  | Male   |
| 11223     | 1      | 12      | Newcomer    | 43  | Male   |
| 11611     | 1      | 16      | Sustainer   | 61  | Male   |
| 20211     | 2      | 2       | Sustainer   | 35  | Male   |
| 20311     | 2      | 3       | Sustainer   | 46  | Male   |
| 20421     | 2      | 4       | Sustainer   | 56  | Male   |
| 20422     | 2      | 4       | Sustainer   | 38  | Male   |
| 20713     | 2      | 7       | Newcomer    | 46  | Male   |
| 20913     | 2      | 9       | Newcomer    | 41  | Male   |
| 21311     | 2      | 13      | Sustainer   | 40  | Male   |
| 21421     | 2      | 14      | Sustainer   | 37  | Female |
| 21422     | 2      | 14      | Sustainer   | 37  | Male   |
| 21511     | 2      | 15      | Sustainer   | 39  | Male   |
| 21711     | 2      | 17      | Sustainer   | 58  | Male   |
| 21812     | 2      | 18      | Dropout     | 32  | Female |
| 21912     | 2      | 19      | Dropout     | 38  | Male   |
| 22012     | 2      | 20      | Dropout     | 35  | Female |
| 22112     | 2      | 21      | Dropout     | 24  | Male   |
| 30821     | 3      | 8       | Sustainer   | 54  | Male   |
| 30822     | 3      | 8       | Sustainer   | 52  | Female |
| 31121     | 3      | 11      | Sustainer   | 72  | Male   |
| 31122     | 3      | 11      | Sustainer   | 76  | Male   |
| 32213     | 3      | 22      | Newcomer    | 28  | Male   |
| 32311     | 3      | 23      | Sustainer   | 48  | Male   |
| 32411     | 3      | 24      | Sustainer   | 63  | Male   |
| 32511     | 3      | 25      | Sustainer   | 45  | Female |

**Table AII.**  
Interviewees' basic  
information

**Note:**  $n = 31$   
**Source:** Authors' data

**Corresponding author**

Yaojiang Shi can be contacted at: shiyaojiang7@gmail.com

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgroupublishing.com/licensing/reprints.htm](http://www.emeraldgroupublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.