HEALTH SERVICES OF VILLAGE DOCTORS UNDER CHINA’S NEW COMMUNITY HEALTH INSURANCE¹

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INTRODUCTION

Health insurance could encourage opportunistic behaviour from healthcare providers. We are interested to know if this was occurring among health workers in the village health stations following China’s implementation of a new community-based health insurance scheme for farmers in 2003. Known as the new co-operative medical scheme (hereafter NCMS), it began in 305 pilot counties in 2003 and the government hopes to extend coverage to all rural areas by 2010.

The ending of China’s agricultural communes in 1982 led to the collapse of community-funded healthcare for farmers. Market-oriented reforms of the health sector in the 1980s and 1990s led to privatization of healthcare providers (de Geyndt, Zhao and Liu 1992; Meng, Liu and Shi 2000), and government spending fell from 36.2% of total health expenditure in 1980 to 15.2% in 2002 (Centre for Health Statistics and Information Ministry of Health 2004). Now most rural residents pay out-of-pocket for medical care which is

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provided on a fee-for-service basis. As rural health is managed under a separate system from urban health, farmers cannot benefit from such improvements in health financing as the national basic medical insurance scheme for urban employees set up in 1998, and many poor farmers cannot seek medical treatment because of inability to pay (China Daily 2002).

There was an early attempt to provide financial protection for farmers when the government in 1994 piloted a rural community-based medical scheme, an insurance scheme pooled from the whole population (10,000-50,000) of the township (Carrin, Ron, Yang et al. 1999). Many of these early insurance schemes closed down mainly because of inadequate funding and dwindling political interest, although some survived to the new millennium (Jackson, Sleigh, Li et al. 2005). However, interest in community-based health financing continues because the government recently launched a new rural community-based medical scheme (NCMS) but with some important changes. The new insurance scheme draws from the larger population pool (200,000-1 million) of a whole county and is supported by financial commitments from both provincial and central governments (Drummer and Cook 2007; Sun, Jackson, Carmichael et al. 2008).

As NCMS is to be extended to the whole of rural China eventually, the question confronting Chinese policy makers is what effect has this insurance scheme on healthcare providers? Earlier works (Dong, Bogg, Rehnberg et al. 1999; Dong, Bogg, Wang et al. 1999) reported an association between health insurance and prescribing antibiotics in rural China. The studies were conducted before the introduction of NCMS and were concerned with outpatient care in the township hospitals (also called township health centres). Another study (Zhang, Feng, Zhang et al. 2003) on prescriptions was also about township hospitals, and it reported over-prescription and other malpractices. Our study also focuses on prescribing behaviour but is different in three ways. It is first concerned with village health stations, the level of healthcare delivery below the township hospitals; and village health stations are the most easily accessed by farmers because there is a one in every village. It should be noted that the rural health system comprises three levels of healthcare delivery – village health stations, township hospitals, and county hospitals (the highest level and relatively inaccessible to the poor). Second, this research conducted in 2005 in Shandong Province is perhaps the first field study to collect primary data on China’s new community-based medical scheme (NCMS); we collected first-hand information from a sample of 30 village health stations. Third, we are unaware of any previous study that reports on the effects of the new medical scheme using comparison of a county with NCMS and a non-NCMS county. Our study compares Linyi (with NCMS) and Qihe (without NCMS).
METHODS

Study setting

Linyi County (with NCMS) is a typical agricultural county in Shandong with a total population of 519,300, 81% were farmers. The average net income of farmers was 3,031 yuan in 2003 (Bureau of Statistics of Linyi County 2004). In 2003, infant mortality rate was 12.91 per 1,000 live births and maternal mortality ratio was 37.4 per 100,000 live births.

Qihe County (non-NCMS) was selected for similar geographical, cultural and socioeconomic conditions, including drug policy and administrative strategies. The total population was 609,100, 83.9% were farmers. The average net income of farmers was 3,028 yuan in 2003 (Bureau of Statistics of Qihe County 2003). The infant mortality rate and maternal mortality ratio were 13.89 per 1,000 live births and 37.5 per 100,000 live births respectively.

Sampling of village health stations

A sample of 30 village health stations (VHS) was selected through stratified sampling. All townships in both study counties were already divided by local officials into three tiers of socio-economic status (SES): high SES, middle SES and low SES townships. In both counties, one township was randomly selected from each of three SES strata. From the six selected townships five villages were randomly chosen. All village health stations in the 30 chosen villages were investigated; the total number of village health stations sampled was 30 because each village had only one village health station. Approval was obtained from the Shandong Province Bureau of Health.

Data collection in village health stations

Village doctors do not usually keep formal medical records of their patients. In order to obtain information on patient visits, a patient visit record form was designed to collect data on patients’ age, sex, NCMS membership, diagnosis, treatment and medical costs. The 30 chief village doctors were asked to record every patient visit on the form, beginning the day after they received the record forms and continuing for two consecutive weeks. These forms were distributed and collected by researchers. The field investigation lasted from the end of March 2005 to the end of April 2005.
Indicators and Data Analysis

Village doctors’ prescription behaviour was assessed in four aspects:

(1) the number of drugs prescribed per patient visit;
(2) whether the prescription included antibiotics;
(3) the method of drug administration (oral/external or injection); and
(4) total medical costs per patient visit.

We compared these indicators between the NCMS and non-NCMS village health stations to reflect the difference in prescribing behaviour. Within the NCMS villages in Linyi, NCMS members and non-NCMS members were compared to reflect the difference in prescribing behaviour for the insured and uninsured. All data were analyzed using SPSS version 12.0.1.

RESULTS

Background of new community-based medical scheme (NCMS) in Linyi County

The NCMS in Linyi began in 2003 with coverage of 93.5% and rose to 94.6% in 2004. Per capita funding of the NCMS was 23 yuan (10 yuan from individual and a total of 13 yuan from various levels of government). Of the total available NCMS funds 70% was allocated to inpatient reimbursements, and 30% to outpatient services in township hospitals and capitation payments to village health stations. Each NCMS had contractual agreements with various health facilities (e.g. village health stations) relating to payment system and delivery of health services.

NCMS benefits cover pharmaceuticals, outpatient services in village health stations, outpatients and inpatients in township hospitals and in county-level or above hospitals. Patients at village health stations receive a 20% discount for medical expenses; village doctors normally keep a record of their prescriptions showing the discounts given. The NCMS officials inspect the records and then authorize payment of the annual capitation fee of 3 yuan per insured villager.

Hospital outpatients also directly pay at prices discounted at 20%. Inpatients receive 20-75% reimbursement for medical expenses, higher reimbursement rates for higher expenses; there is a ceiling of 20,000 yuan per person per year.
Description of NCMS and non-NCMS patients at 30 village health stations

In 2005, we recorded 2,271 patient visits in two weeks at the 30 village health stations (VHSs): 1,025 at NCMS and 1,246 at non-NCMS VHSs. There were no significant differences (p>0.05) in sex distribution, visit status or age group distribution between patients in NCMS and non-NCMS villages (Table 1). Average age was 37.3 years in NCMS villages and 35.5 years in non-NCMS villages. Generally, about half were females, and 70% were first visits for the health condition treated.

Table 1 Patients at 30 village health stations in Linyi and Qihe counties, 2005

<table>
<thead>
<tr>
<th></th>
<th>Linyi county:</th>
<th>Qihe county:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NCMS village health stations</td>
<td>Non-NCMS village health stations</td>
</tr>
<tr>
<td></td>
<td>Members</td>
<td>Non-members</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>496 (52.3)</td>
<td>43 (55.8)</td>
</tr>
<tr>
<td>Female</td>
<td>452 (47.7)</td>
<td>34 (44.2)</td>
</tr>
<tr>
<td>Total</td>
<td>948 (100.0)</td>
<td>77 (100.0)</td>
</tr>
<tr>
<td>First Visit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>578 (70.1)</td>
<td>57 (74.0)</td>
</tr>
<tr>
<td>No</td>
<td>247 (29.9)</td>
<td>20 (26.0)</td>
</tr>
<tr>
<td>Total</td>
<td>825 (100.0)</td>
<td>77 (100.0)</td>
</tr>
<tr>
<td>Age Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-4</td>
<td>70 (7.6)</td>
<td>9 (12.3)</td>
</tr>
<tr>
<td>5-14</td>
<td>112 (12.1)</td>
<td>14 (19.2)</td>
</tr>
<tr>
<td>15-34</td>
<td>232 (25.1)</td>
<td>15 (20.5)</td>
</tr>
<tr>
<td>35-59</td>
<td>335 (36.3)</td>
<td>30 (41.1)</td>
</tr>
<tr>
<td>60+</td>
<td>175 (18.9)</td>
<td>5 (6.8)</td>
</tr>
<tr>
<td>Total</td>
<td>924 (100.0)</td>
<td>73 (100.0)</td>
</tr>
</tbody>
</table>

Note: Information for some patients was missing. Therefore, the total number of patients for each measured indicator varies a little.

Overall patient visits totalled 2271, 1025 in Linyi county and 1246 in Qihe county. Numbers in brackets are percentages.

As for the NCMS villages in Linyi, 92.5% of patient visits were NCMS members. There were no significant differences in sex distribution and visit status between the insured and uninsured, but age group distribution was significantly different (Table 1). Uninsured patients were generally younger than the insured, suggesting that there might be adverse selection in joining the NCMS in Linyi County.
Drug prescribing behaviour of village doctors

Number of drugs per patient visit

NCMS village health stations tended to prescribe and sell more drugs than the non-NCMS (Table 2). NCMS village doctors prescribed an average number of 4.6 drugs per patient visit, and 45.6% of patient visits had five or more kinds of drugs. Non-NCMS village doctors averaged 3.1 drugs per patient visit, and 13.5% of prescriptions contained five or more kinds of drugs. The tendency of doctors in NCMS villages to prescribe more drugs was statistically significant, whether measured as the average number of drugs per patient visit or as the proportion of patient visits given five or more drugs.

At the NCMS village health stations in Linyi, village doctors prescribed more drugs to insured patients than to the uninsured. The average number of drugs dispensed for the insured was 4.7, significantly higher than 3.9 for the uninsured. For NCMS members, 47% of patient visits resulted in five or more kinds of drugs prescribed, compared to 29.9% for non-NCMS members (Table 2).

Table 2 Prescriptions at 30 village health stations in Linyi and Qihe counties: number of drugs per patient visit, 2005

<table>
<thead>
<tr>
<th>Number of drugs per patient visit</th>
<th>Linyi county: NCMS village health stations</th>
<th>Qihe county: Non–NCMS village health stations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NCMS member</td>
<td>Non-member</td>
</tr>
<tr>
<td>0</td>
<td>0.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1</td>
<td>4.3%</td>
<td>2.6%</td>
</tr>
<tr>
<td>2</td>
<td>12.7%</td>
<td>29.9%</td>
</tr>
<tr>
<td>3</td>
<td>25.2%</td>
<td>23.4%</td>
</tr>
<tr>
<td>4</td>
<td>10.6%</td>
<td>14.3%</td>
</tr>
<tr>
<td>≥5</td>
<td>47.0%*</td>
<td>29.9%*</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Mean</td>
<td>4.7***</td>
<td>3.9***</td>
</tr>
</tbody>
</table>

Pair-wise 2-tailed tests: *p<0.05; **p<0.001, ***p<0.01, ****p<0.001

Use of antibiotics

In the NCMS village health stations, the average number of antibiotics prescribed per visit was 1.01 compared with 0.83 in non-NCMS (t = -5.173, p<0.001). For the NCMS village doctors, 72.4% of prescriptions included antibiotics (Table 3), significantly higher than 59.3%
for non-NCMS ($z = 6.515$, $p<0.001$). The difference in the proportion of prescriptions containing three or more kinds of antibiotics between the NCMS and non-NCMS village doctors (5.6% against 3.6%) was also significant at the 0.05 level ($z = 1.970$).

For the NCMS village health stations in Linyi, more than 70% of patient visits by both the insured and uninsured resulted in prescriptions with antibiotics. The average number of antibiotics prescribed was similar for the insured and uninsured (1.01 against 0.97, $t = 0.404$, $p>0.05$). The difference in the frequency of prescribing three or more antibiotics was 5.6% for the insured and 1.3% for uninsured (Table 3), but this difference was of borderline statistical significance ($z = 1.623$, $p=0.05$) owing to the small number of uninsured recorded.

### Table 3 Prescriptions at 30 village health stations in Linyi and Qihe counties: number of antibiotics per patient visit, 2005

<table>
<thead>
<tr>
<th>Number of antibiotics per patient visit</th>
<th>Linyi county: NCMS village health stations</th>
<th>Qihe county: Non-NCMS village health stations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NCMS member</td>
<td>Non–member</td>
</tr>
<tr>
<td>No antibiotics</td>
<td>27.8%</td>
<td>23.4%</td>
</tr>
<tr>
<td>With antibiotics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>72.2%</td>
<td>76.6%</td>
</tr>
<tr>
<td>2</td>
<td>49.1%</td>
<td>57.1%</td>
</tr>
<tr>
<td>≥ 3</td>
<td>17.5%</td>
<td>18.2%</td>
</tr>
</tbody>
</table>

**Method of drug administration**

The method of drug administration is an important indicator of service quality because of the problem of unsafe injections (Zhuo, Sleigh and Wang 2002). In both counties, 60.2% of patient visits resulted in injections; and overall 42.6% of patients received intravenous drug administrations.

For comparison, the method of drug administration used by NCMS and non-NCMS village doctors was significantly different (Table 4). More patients (65.1%) in NCMS village health stations received injections than patients (56.3%) in non-NCMS ($z = 4.232$, $p<0.001$). Intravenous injections were significantly more frequent in NCMS villages health stations (45.2% of patient visits) than 33.6% of patient visits in non-NCMS ($z = 5.604$, $p<0.001$).

For the NCMS village health stations in Linyi, the method of drug administration for insured and uninsured patients was different, but not statistically significant (Table 4). More
insured patients than the uninsured (65.7% against 58.4%; \( z = 1.291, \ p = 0.098 \)) were administered by injections. Prescriptions administered by intravenous injections occurred more often for the insured than the uninsured (50.4% against 40.3%; \( z = 1.703, \ p = 0.443 \)).

### Table 4 Methods of drug administration at 30 village health stations in Linyi and Qihe counties, 2005

<table>
<thead>
<tr>
<th>Method of drug administration</th>
<th>Linyi county: NCMS village health stations</th>
<th>Qihe county: Non–NCMS village health stations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NCMS member (%)</td>
<td>Non-member (%)</td>
</tr>
<tr>
<td>Oral / external</td>
<td>34.3</td>
<td>41.6</td>
</tr>
<tr>
<td>Methods with injection:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Intravenous injection only</td>
<td>65.7</td>
<td>58.4</td>
</tr>
<tr>
<td>- Muscle injection only</td>
<td>46.1</td>
<td>35.1</td>
</tr>
<tr>
<td>- Mixed methods</td>
<td>8.0</td>
<td>2.6</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Total medical costs per patient visit at village health stations**

The average total medical costs per patient visit were significantly different between NCMS and non-NCMS village health stations. In NCMS villages they averaged 18.1 yuan before the 20% discount, 3 yuan higher than the non-NCMS villages (\( t = -2.911, \ p<0.001 \)). Pre-discount drug costs in the NCMS villages averaged 16.9 yuan, 2.6 yuan higher than in the non-NCMS villages (\( t = -2.694, \ p<0.001 \)).

For the NCMS village health stations in Linyi, the average total medical costs for the insured (\( n = 879 \)) and uninsured (\( n = 76 \)) were significantly different (\( t = 5.655, \ p<0.001 \)). The insured averaged 18.7 yuan (before discount) compared to 11.3 yuan for the uninsured. The difference in average total drug costs for the insured (17.4 yuan) and uninsured (10.7 yuan) was of similar magnitude (\( t = 5.527, \ p<0.001 \)).

**DISCUSSION**

Our comparison of village health stations with and without health insurance suggests a positive relationship between health insurance and opportunistic behaviour of health providers. Our results show that the effect of NCMS was to exaggerate the problem of over-prescription and excessive injections that was already occurring in rural Shandong. The rural study by Zhang *et al.* (2003) on township hospitals conducted at the time before implementation of the
NCMS also reported over-prescription and that 68.3% of the prescriptions contained antibiotics. Irrational prescribing practices often lead to serious consequences. Multi-drug use may increase the risk of undesirable drug interaction since every drug has its own side-effects. Excessive and unnecessary prescription of drugs for medical purposes will increase the economic burden of patients and waste limited resources. Most seriously, overuse of antibiotics can lead to antimicrobial resistance and overuse of injections runs the risk of unsafe needles that can increase the transmission of AIDS, hepatitis B and C, and other blood-borne diseases (Zhuo et al. 2002; Holloway and Ivanovska 2003).

Indeed, we found malpractices in all the 30 villages. In our study of both NCMS and non-NCMS villages the average number of drugs prescribed per patient visit was 3.8. This was higher than the average of 2.2 per patient visit found in a study of 17 developing countries where the highest recorded was 3.8 found in Indonesia and Nigeria (Pavin, Nurgozhin, Hafner et al. 2003). Furthermore, in our study 65.2% of patients were prescribed antibiotics and 61.2% given injections, higher than the 43.1% and 28.7% respectively found in a study of primary care physicians in rural Uzbekistan (Pavin et al. 2003). Also, in our study about 20% of patients had two or more kinds of antibiotics. The implication is that irrational drug use is common in rural China in both the village and township levels of healthcare.

Generally, there is no recognized correct number of drugs per patient visit or pattern of drug administration since it depends on medical needs. The unnecessary prescription of drugs (particularly antibiotics) and the use of injections are widespread throughout the world (Holloway and Ivanovska 2003). Our study highlights the problem in rural China as among the world’s most severe. We even found that about 28% of all patient visits were prescribed five or more different kinds of drugs (one common definition of polypharmacy); the highest number was 15 drugs for a single patient visit.

How representative is our study? This question is relevant as each county-based NCMS is autonomously run on a variation of the NCMS model. We consider Linyi to be representative of Shandong because its economy ranks in the middle amongst Shandong’s counties. Secondly, funding resources available to Linyi’s NCMS were around the middle level for the seven Shandong pilot counties. Thirdly, the benefits package of Linyi’s NCMS was similar to most other counties not only in Shandong but also in other parts of China, covering pharmaceuticals, outpatient services in village health stations, and hospital outpatient and inpatient services.
Explaining over-prescribing behaviour of Chinese village doctors

Apart from the effects of the NCMS to be discussed later, there are important factors that could influence village doctors’ prescribing behaviour from the demand and supply side of medical care.

Demand side

Patient’s income, age, sex, occupation, insurance coverage and cultural background may influence willingness to accept a particular drug or a method of drug administration, which in turn can influence the village doctor’s prescribing behaviour. It is known that farmers often ask for injections because they believe injections help them recover sooner. Anecdotal evidence suggest that to meet to patient demand, village doctors often prescribe multiple medications for simple, self-limited illnesses (such as colds) and use intravenous antibiotics for upper respiratory tract infections.

Supply side

For China, we think that over-prescription and overuse of injections are more likely to be initiated by village doctors themselves. There are two main reasons.

First, inadequate training and medical knowledge of village doctors could lead to irrational drug use. A few doctors are former “barefoot doctors” of the early 1980s with 6-12 months’ training as paramedics (Jackson, Liu and Song 1996); but most now have 3 years’ training and more and more have schooling up to middle school (9 years’ schooling). These health workers are not formally recognized as medical professionals by the Chinese Ministry of Health. The government policy is that in future they will be replaced by formally registered medical professionals; for the present, they should be gradually retrained to become assistant doctors with accreditation. Many are keen to improve their medical knowledge and skills through in-service training. But a substantial proportion still have extremely low technical competence, lacking the medical knowledge to engage in rational prescribing and proper administration of drugs. Our results imply that village doctors urgently need more training on rational drug use.

Second, the rural health care market provides strong incentives for village health stations to sell drugs. Among China’s total 551,600 village health stations in 2004, 30.2% were privately owned (Centre for Health Statistics and Information Ministry of Health 2005). Although 59% of them were supposedly owned by village committees or jointly with village
doctors, in fact most were run as private clinics because the village committees do not normally provide any financial support.

It has been noted (Bloom, Han and Li 2000; Bloom and Fang 2003) that the private status of village health stations and the fee-for-service system provide strong incentives for health workers to induce demand for services. Without financial help from the government or the village collective, health workers are expected make a living from selling drugs and fee-for-service payments. Most village doctors can earn money from only a limited number of services such as injections, acupuncture, massage. Thus, village doctors rely heavily on selling drugs. Under China’s drug mark-up policy they can sell drugs at higher prices, marked up (about 30%) from wholesale prices, to make a profit. Whenever possible they would prescribe more drugs and expensive drugs. Our results imply that the drug mark-up policy by which village doctors sell drugs to make a living should be changed.

**Effect of NCMS on village doctors’ prescribing behaviour**

Our results from the village health stations that came under China’s newest rural health insurance support the findings of earlier studies of township hospitals (Dong, Bogg, Rehnberg et al. 1999; Dong, Bogg, Wang et al. 1999) that reported an association between health insurance and prescribing behaviour. Importantly, we found that incentives for over-prescribing did not decline with the introduction of the NCMS capitation payment to the village health stations. On the contrary, the NCMS village health stations tend to over-prescribe more often than non-NCMS.

We calculate that compared to the non-NCMS patients, the extra pre-discount cost per visit for the NCMS patients averaged 3 yuan. This was approximately equal in value to the 20% discount offered to the NCMS patients. So the insured patients paid about the same per visit as the non-NCMS patients (about 15 yuan) but received more drugs, antibiotics and injections. Apparently the NCMS doctors offset the discount by providing more services and drugs. Similar behaviour in other treatment settings in China has been noted. For example, in Henan Province TB patients given free anti-tuberculosis treatment with a value of about 500 yuan were found to have paid a similar amount for other non-TB drugs and supplements supplied by the doctors treating them (Jackson, Sleigh, Wang et al. 2006).

The theoretical and empirical literature suggest that a pro-active policy on health care purchasing could improve the quality of services from health providers (Perrot 2004). We think that the NCMS could more forcefully define its quality requirements in the contracts,
perhaps similar to those for “managed care” in the USA. Then the Chinese health providers would be forced to improve service quality to meet the contract requirements. The implication of our findings is that the NCMS could be given a more influential role on the behaviour of village doctors.

Provider payment methods can contribute to quality improvement with the right incentives for health providers but the NCMS payments to providers were too small to be influential for two reasons. First, the NCMS village health stations received a capitation payment which was a fixed amount based on the size of the population they served. At 3 yuan per person it was too low to overcome the systemic incentives to over-prescribe for higher revenues. Secondly, the NCMS patients had a high co-payment of about 80% and thus the NCMS’s financial power over health providers was relatively weak.

Even if the provider payment method is improved, it would not work without reforming the existing incentives for selling drugs across the rural health system. Excessive prescriptions and unnecessary injections can only be stopped when the undesirable incentives disappear in a radical reform of the rural health system.

CONCLUSIONS

The introduction of China’s newest health insurance scheme since 2003 had adversely influenced prescribing behaviour in the village health stations, but irrational drug prescription also occurred in those health stations without insurance. We draw two conclusions.

First, the NCMS seemed to encourage village doctors to prescribe more drugs, use more antibiotics, and they were more likely to use injections than those in non-NCMS villages. The pre-discount cost per patient visit in NCMS villages was higher than in non-NCMS; even within the NCMS village health stations there was a higher pre-discount cost for the insured. Thus, health providers under NCMS were inclined to raise the cost of medical care, through supplying more drugs, costly drugs and administration by injections. If unchecked, there would be cost escalation in NCMS areas.

Second, irrational drug prescription behaviour also occurred in village health stations without NCMS. Our evidence from village health stations with and without health insurance showed that multi-drugs were prescribed too often, and antibiotics and injections used in high proportions. The incentive to sell more drugs and expensive drugs existed because of (a)
government policy on drug sales and (b) the private ownership of village health stations which are left to run without government subsidies.

We have three policy recommendations. First, the NCMS should be designed so that it could exert a stronger financial influence over the village doctors to motivate them to improve service quality and contain costs. Second, to counter irrational drug use there should be improved medical training for village doctors. Third, the present systemic incentives for selling and over-prescribing drugs in village health stations should be removed through a radical reform of the rural health system. If this task is carried out we think the NCMS can work for the good of the rural population. Health service quality and drug safety in the rural areas should be a public concern in China.

REFERENCES


