

HEALTH FINANCING POLICIES

Providers' Opinions and Prescribing Behavior in Rural China

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Abstract

Objectives: To describe effects of health financing on providers' opinions and prescribing behavior in rural China.

Methods: A multi-stage sampling procedure was used to select county, township, and village health care facilities. A total of 1,064 health care providers in county, township, and village health care facilities in six counties in central China were randomly selected and surveyed during one week by written questionnaire.

Results: Patient's health financing systems (insurance or out-of-pocket payment), financing methods for health facilities (general budget or fee for service), and payment methods for providers (salary or bonus) influenced provider prescribing. Bonuses could improve the quality of health care, but could also be an incentive to prescribe more drugs or more expensive drugs and other services. The providers were of the view that patients' health financing and ability to pay were the main determinants of the type of treatment. Insured patients could have more access to expensive drugs, referred to specialized health care facilities, and have a higher cure rate (according to the doctor's opinion) for tuberculosis. Most of the clinical doctors said that they prescribed more expensive antibiotics for insured patients and changed prescriptions according to patients' demands, financial ability, and health financing systems in the treatment of some diseases, such as chronic bronchitis, tuberculosis, and hypertension.

Conclusion: The empirical data suggest that the main factor influencing provider prescribing behavior is the economic incentives in relation to health care financing for both health care providers and consumers.

Keywords: Health financing, Prescribing behavior, Provider, China

Health care providers act as gatekeepers of health care (21). Their actions have consequences for costs and quality of care and may have a considerable effect on

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rational drug use, drug costs for individual patients, and health care as a whole. Their prescription decisions should ideally be made according to the disease, scientific evidence about safety and efficacy of drugs, and the seriousness of the patient's condition. However, their prescribing behavior is also influenced by many other factors, including patient demands, the sociocultural context, provider training and experience, knowledge concerning costs, marketing promotion information on drugs, and economic incentives (3;4;8;13;14;18;22;25;26). All illnesses occur within a cultural context that may shape perceptions of doctors and patients as to whether drugs are needed. Patients have specific ideas about what illnesses will benefit from what form of drug therapy (4;25). Information from drug companies about their products and sales commissions or gifts to prescribers can also influence provider behavior by shaping perceptions of physicians' knowledge and providing an economic incentive (4). As a result of direct consumer advertising in the media and the resulting consumer demand, some prescribers are influenced to write prescriptions they would not otherwise issue (22).

Health financing systems for health care providers and patients could be one important factor influencing prescribing behavior, particularly in a transitional society such as China. As far as we know, only a few studies have been reported about effects of health financing on provider prescribing behavior in developing countries (7). Fee for service, one type of cost-recovery method for health care facilities, may make providers interested in providing more services, particularly curative services, than necessary, due to economic incentives. Health insurance, one kind of health financing system for patients, may also make providers provide more services than necessary because of the economic incentives of coverage. Health service utilization is also influenced by other factors, such as availability of services (drugs), level and type of charge, and patients' income and demographic characteristics. Experiences from Kenya, Nepal, Zimbabwe, and Niger showed that some types of health financing may limit the use of services because of willingness and ability to pay (7). Compared with a fee-per-case system (charge according to disease case), fee per item (charge according to drug item) resulted in an incentive to use fewer drugs and reduce the total cost per outpatient visit. Our earlier study based on the analysis of aggregate health care expenditure in two Chinese counties showed that fee-for-service-based insurance will lead to higher curative health care expenditures and higher drug costs (6).

Following the Chinese economic reform and the country opening up to the world in 1978, the Chinese health care sector has gradually changed. Since 1980, health care spending, especially for drugs, has grown rapidly. Some increase can be attributed to changing disease patterns and a higher proportion of older people in the population. From 1978 to 1985, the annual expenditure of the government and labor insurance growth rate adjusted for inflation was about 8.2% (16). From 1986 to 1993, the annual medical expenditure growth rate adjusted for inflation was about 15%, which was higher than the annual national financial income (state income) growth rate of 10% and the resident income (individual income) growth rate of 6%. In China, over 70% of outpatient medical expenditures and over 55% of inpatient medical expenditures are for drugs (20).

The system of reimbursement from the Chinese government budget to rural health facilities has been reformed based on the principles of financial decentralization and fee-for-service cost recovery. Previously, the government financed the whole budget of the county and township health care facilities, including salaries, supplies, and equipment. Currently, the government finances only 60% of salaries. The remainder of the salaries, cost of equipment, and supplies are to be funded

from fee-for-service revenue, including drug sales. One report showed that in 1992 fee-for-service revenue contributed from 85–90% of the total health services' funding in two relatively well-off Chinese counties (5). The payment method for health care providers has also been changed. Previously, providers received only monthly salaries, nothing more. Now they can earn their salaries and receive bonuses as well. The salary level is set according to their professional titles and years of experience, while the bonus level is determined according to their workload, especially in relation to the revenue from their prescriptions. In addition to the salary and the bonus, they usually have other sources of income, such as drug sales commissions. The fee-for-service and bonus revenue is obviously one of the factors behind the rise of the cost of services and the overuse of drugs (15).

For health care consumers, the principle of copayment is applied with a view to control the cost of health care. In 1986 the Chinese government introduced a copayment mechanism and reduced the coverage of drugs in its main health insurance schemes (government insurance and labor insurance). The government insurance is financed from the general budget and covers all staff in central or local government facilities. Prior to 1986, it covered all medical costs including drugs, except registration. Since then it has increased the copayment (10–20%) and reduced the coverage of drugs. Now it covers about 1,400 types of drugs and preparations. The labor insurance financed by the central or local government enterprises covers personnel working in central or local government companies. Prior to 1986, it covered all medical costs, including drugs and registration. Since then the coverage has been reduced to 50–90% of the cost, according to the enterprise's profits. The dependents of those covered by the government or the labor insurance can have a coverage of 50% of medical costs, including drugs.

Besides the health insurance plans mentioned above, in rural China there is another system called rural cooperative insurance. The insurance is financed by the village committee or township government and the participants. The participants pay part of the medical costs. After the collapse of the collective economy in the early 1980s due to rural economic reform, the population covered by such insurance has been reduced from 90% to 5%. Currently, the overwhelming majority of the rural population (86%) has to pay out of pocket for 100% of their medical services. A small number of rural inhabitants (9%) enjoys coverage under government insurance, labor insurance, and private health insurance.

The aim of this study is to describe and compare the effects of health care financing systems on providers' opinions and prescribing behavior by examining their views of health care and their prescribing behavior on some specific drugs and diseases. The term "providers" in this paper means health care workers in county, township, and village curative and preventive health care facilities. The health care financing systems refer to health insurance for patients, reimbursement methods for health care facilities, and payment mechanisms for providers.

METHODS

Sampling and Sample Size

A multistage sampling procedure was used to select county, township, and village health care facilities. First, three provinces (Jiangsu, Anhui, and Jiangxi) in central China were purposely chosen. The provinces were selected on the grounds of having different economic parameters: Jiangsu, a higher level; Anhui, middle level, and Jiangxi, a lower level. Second, two counties in each province (Jurong and Jintan

in Jiangsu, Tongling and Fanchang in Anhui, and Yugan and Duchang in Jiangxi) were purposely chosen according to their gross product and health status. Two counties in each province were selected on the grounds of having as similar socioeconomic parameters as possible. In 1994 the average population in the six counties was 550,000 (range from 340,000 to 790,000), gross product per capita was 3,100 yuan, and the reported infant mortality rate (IMR) per 1,000 live births was 25.4. The gross product per capita and IMR per 1,000 live births at Jurong were 5,272 and 12.7; Jintan, 6,313 and 16.2; Tongling, 2,897 and 32.3; Fanchang, 2,001 and 17.3; Yugan, 1,278 and 16.4; and Duchang, 855 and 48.3, respectively. Third, one town and four townships in each county were chosen. At this stage, we randomly selected one middle income town, divided townships into two groups according to their income levels (above or under medium level), and randomly selected two townships in each group. Before sampling, all towns and townships were listed according to their income levels. Fourth, we randomly selected five villages in each township. Before sampling, all villages were listed as well.

Systematic sampling (the starting point was chosen at random) was used to choose providers at the selected county, township, and village health care facilities according to the sample sizes decided beforehand, which were 100 at county level (50 from hospitals and 50 from preventive facilities), 40 at township level, and all providers at village health stations (usually 1–2 doctors at a station) at each selected county. Before sampling, all providers at the selected facilities, including county western medicine hospitals, Chinese traditional medicine hospitals, maternal and child health (MCH) centers, anti-epidemic centers, anti-schistosomiasis centers, and township hospitals, were listed.

Provider Interview

A questionnaire was developed that providers at county and township facilities completed. Initially we planned to interview providers at village health stations face-to-face, and four interviewers were trained by research assistants from Shanghai Medical University (SMU), China. However, in the end the village providers were asked to fill in the questionnaires themselves because it was more convenient and easy to get valid responses to the questions. For all providers questions were asked about their age, sex, education, work unit, work department, years of work experience and professional title; opinions of the financing systems for the facilities, bonuses for health care workers, and determinants of prescribing; and general prescribing behavior for insured or uninsured patients. For providers working in clinical departments, more questions were asked about some commonly used drugs, common and costly diseases, family planning, and MCH services. First, they were asked whether they prescribed iron tablets or antibiotics, and whether they treated tuberculosis, hypertension, or chronic bronchitis. If they responded affirmatively, more questions were posed about their prescribing behavior for each drug or disease in relation to the patient's health financing systems and financial ability. The data on family planning and MCH services will be presented elsewhere. The interview was completed during one week in 1995. Two research assistants from SMU in each county were responsible for the data reliability and validity. If the questionnaires had not been completed according to the request, they were returned and completed again; about 5% of them were subject to this procedure.

Analysis Methods and Indicators

Chi-square test was used for testing differences in proportions. Providers' opinions on methods of financing health facilities determined factors for types of treatment,

including pharmacotherapy, and effects of bonus on the quality of care and drug prescription were analyzed. Provider behavior in relation to prescribing iron tablets, antibiotics, and treatment of cases with tuberculosis, chronic bronchitis, or hypertension were analyzed in relation to the patient's health financing systems. In this paper, "insured patients" refers to patients covered by government or labor health insurance.

RESULTS

General Information

A total of 1,064 health care providers were surveyed, of whom 600 worked at the county level, 273 at the township level, and 191 at the village level. More than half (55.4%) were male. One-fifth (20.0%) were college graduates or had higher education, 76.7% had middle and high school, and 3.3% had primary school education. Almost two-fifths (39.8%) were doctors; 16.5%, nurses; 10.5%, technicians; 6.6%, administrators; 4.3%, pharmacists; 16.1%, village health workers; and 6.1%, other. Most of the providers (65.8%) worked in clinical departments, e.g., internal medicine or surgery. The average age was 37.4 years (39.5 for male and 34.8 for female), and the average length of working experience was 17.5 years (19.3 for male and 15.2 for female).

Opinions on Health Care Financing

Table 1 shows the opinions of providers regarding health care financing. For methods of financing health care facilities, most providers (63.8%) thought that a mix of general budget and fee for service was better than only general budget or fee for service. There were differences in the responses to the methods between providers in clinical departments and in other departments, i.e., preventive or supplies departments. More providers in clinical departments (66.5%) than in other departments (58.4%) thought the mix method was better, but fewer (20.7% vs. 34.9%) thought the general budget was better. The providers in clinical departments (prescription decision makers, including village doctors), compared with other groups of staff, preferred the fee-for-service method.

Most of the providers (91.1%) were of the view that the important determinants of prescribing were the patient's ability to pay and the doctor's suggestions. There was a difference in the response between clinical providers and others. More clinical doctors (42.8%) than others (34.8%) were of the view that the doctor had the last say in making the decision about patient treatment, but fewer (49.1% vs. 54.7%) thought that the important factor is the patient's ability to pay. Over one-third (37.8%) thought that the patient's health financing system influenced the choice of treatment for drugs, equipment, and access to referral health services, e.g., to more specialized health care facilities (Table 1). Compared with uninsured patients, insured patients could be prescribed more expensive drugs and were more often referred to more specialized health care facilities (Table 2).

Bonuses have been a main part of the providers' income and are directly linked with the revenue from drugs or other prescriptions. Most of the providers (73.9%) thought that a bonus could improve the quality of care but could also give doctors an incentive to prescribe more or expensive services and drugs due to the linkage between prescription and bonus. There was no significant difference in the response to bonus and quality between the clinical and nonclinical providers. However, in the clinical departments, there was a significant difference in the response between

Table 1. Providers' Opinions of Financing Methods for Health Care Facilities and Health Workers^a

Department (n)	Clinical (%)			Subtotal (674)	Nonclinical (%) (390)	Total (%) (1,064)
	Doctor (479)	Other (195)				
<i>Better financial system for health care facilities</i>						
General budget	89 (18.9)	49 (25.2)		138 (20.7)	120 (34.9)	<i>p</i> < .01
Fee for service	68 (14.4)	17 (8.8)		85 (12.8)	23 (6.8)	258 (25.5)
Mix of both	315 (66.7)	128 (66.0)		443 (66.5) ^b	201 (58.4)	108 (10.7)
<i>Determinants of prescribing</i>						
Doctor's suggestion	194 (41.0)	90 (47.1)		284 (42.8)	119 (34.8)	<i>p</i> = .01
Patient's demand	40 (8.5)	8 (4.2)		48 (7.2)	26 (7.6)	403 (40.1)
Patient's ability to pay	234 (49.5)	92 (48.2)		326 (49.1)	187 (54.7)	74 (7.3)
Others	5 (1.0)	1 (0.5)		6 (0.9) ^c	10 (2.9)	513 (51.0)
<i>Are patient financing systems related to the choice of treatment?</i>						
Yes	174 (36.8)	54 (28.6)		228 (34.4)	152 (44.3)	<i>p</i> < .01
No	183 (38.7)	80 (42.3)		263 (39.7)	87 (25.4)	380 (37.8)
Don't know	116 (24.5)	55 (29.1)		171 (25.8) ^d	104 (30.3)	350 (34.8)
<i>Can bonus improve quality of care?</i>						
Very likely	46 (9.8)	23 (12.0)		69 (10.4)	34 (9.9)	<i>p</i> = .37
Likely	303 (64.4)	116 (60.7)		419 (63.4)	222 (64.3)	103 (10.2)
Less likely	40 (8.5)	22 (11.5)		62 (9.4)	30 (8.7)	641 (63.7)
Not likely	28 (6.0)	20 (10.5)		48 (7.3)	35 (10.1)	92 (9.1)
Don't know	53 (11.3)	10 (5.2)		63 (9.5) ^b	24 (7.0)	83 (8.3)
<i>Can bonus encourage overuse of expensive drugs?</i>						
Very likely	34 (7.3)	13 (6.7)		47 (7.1)	48 (13.9)	<i>p</i> < .01
Likely	233 (50.1)	94 (48.7)		327 (49.7)	182 (52.8)	95 (9.5)
Less likely	81 (17.4)	39 (20.2)		120 (18.2)	43 (12.5)	509 (50.7)
Not likely	56 (12.1)	32 (16.6)		88 (13.4)	38 (11.0)	163 (16.3)
Don't know	61 (13.1)	15 (7.8)		76 (11.6) ^d	34 (9.9)	126 (12.6)

^a χ^2 test is used for each clinical and nonclinical group, and the test result is shown by *p* value.

^b χ^2 test for doctor and other groups in clinical department, and *p* < .05.

^c χ^2 test for doctor and other groups in clinical department, and *p* value is not valid.

^d χ^2 test for doctor and other groups in clinical department, and *p* > .05.

the doctors and the other staff, with more doctors responding that a bonus could improve the quality of care (Table 1). A bonus could, together with patient demands, result in prescribing more drugs than necessary. One-fourth of the providers (23.2%) said that overprescribing was directly related to bonuses. Two-thirds (63.4%) thought that overprescription was the result of patient demands (Table 2). About 16% of the clinical providers said they could get extra pay from prescriptions. Most of the extra income was paid for by the hospital, and some came straight from drug retailers or companies. There was a difference in the sources for obtaining extra pay between the levels of health care facilities. More doctors at county and township levels than those at village level obtained extra pay from hospitals.

Prescribing Behavior for Commonly Used Drugs

Nearly all physicians prescribed iron tablets to patients with iron-deficiency anemia. The prescription of iron tablets was not influenced by the patients' health financing systems. But two-thirds of doctors (67.4%) said they prescribed different antibiotics for insured patients, indicating that the prescription of antibiotics was influenced by the systems. More doctors in township and village health care facilities (75.0% and 73.6%) than in county hospitals (58.3%) prescribed different antibiotics for insured patients (Table 3), and the difference was statistically significant ($p < .01$).

Prescribing Behavior for Common (or Chronic) Diseases

For tuberculosis, about 20% of all doctors and 24.4% at county hospitals changed their drug prescriptions according to the patient's health financing system. Over half (60.4%) changed drug prescriptions because of patients' demands, and 60.1% due to patients' financial ability. Between the levels of health care facilities, there was a significant difference in the reasons for changing drug prescriptions. From county to village, the proportion of doctors changing their prescriptions because of patients' demands increased gradually; however, the proportion of doctors changing prescriptions due to patients' financial ability decreased gradually. About 85% of the clinical doctors thought that uninsured patients with tuberculosis could not complete a full course of treatment. More than a third (36.6%) were of the view that the cure rate of tuberculosis between insured and uninsured patients was different (Table 4). The uninsured were thought to have a lower cure rate because of their lower ability to finance the full course of tuberculosis treatment.

For hypertension, about 20% of all doctors and 25% at the county hospitals said that they changed drug prescriptions due to patients' health financing systems. Over half (54.7%) of all doctors and 25% at the village health stations changed drug prescriptions according to patients' financial ability. From county to village, the proportion of doctors changing their drug prescriptions because of patients' health financing systems or financial ability decreased gradually. The difference in changing prescriptions due to financial ability between the levels of health care facilities was statistically significant (Table 5).

For chronic bronchitis, about 20% of all doctors and 30% at the county hospitals said that they changed their drug prescriptions due to patients' health financing systems. Over half (56.0%) of all doctors and 66.4% at the county hospitals changed their prescriptions due to patients' financial ability. As for the prescribing behavior for hypertension, from county to village the proportion of doctors changing their drug prescriptions because of patients' health financing systems or financial ability decreased gradually. The difference between the levels of health care facilities was also statistically significant (Table 5).

Table 2. Providers' Opinions of Prescribing Behavior^a

Department (n)	Clinical (%)			Subtotal (674)	Nonclinical (%) (390)	Total (%) (1,064)
	Doctor (479)	Other (195)				
<i>Does provider overprescribe drugs?</i>						
Never	209 (44.2)	60 (31.6)	269 (40.6)	132 (38.3)	<i>p</i> < .01	401 (39.8)
Sometimes	229 (48.4)	103 (54.2)	332 (50.1)	145 (42.0)		477 (47.3)
Often	19 (4.0)	8 (4.2)	27 (4.1)	17 (4.9)		44 (4.4)
Don't know	16 (3.4)	19 (10.0)	35 (5.2) ^b	51 (14.8)		86 (8.5)
<i>Reasons for overprescription</i>						
<i>Drug sales' promotion</i>						
Yes	21 (9.0)	10 (9.0)	31 (9.0)	18 (11.1)	<i>p</i> = .45	49 (9.7)
No	213 (91.0)	101 (91.0)	314 (91.0) ^c	144 (88.9)		458 (90.3)
<i>Poor training</i>						
Yes	23 (9.7)	6 (5.4)	29 (8.4)	16 (9.9)	<i>p</i> = .57	45 (8.8)
No	213 (90.3)	105 (94.6)	318 (91.6) ^c	146 (90.1)		464 (91.2)
<i>Bonus due to drug sales</i>						
Yes	45 (19.2)	28 (25.0)	73 (21.1)	45 (27.8)	<i>p</i> = .09	118 (23.2)
No	189 (80.8)	84 (75.0)	273 (78.9) ^c	117 (72.2)		390 (76.8)
<i>Patient's demand</i>						
Yes	163 (68.5)	72 (64.9)	235 (67.3)	91 (55.2)	<i>p</i> = .01	326 (63.4)
No	75 (31.5)	39 (35.1)	114 (32.7) ^c	74 (44.8)		188 (36.6)
<i>Does provider prescribe expensive drugs for insured patients?</i>						
Never	142 (31.4)	44 (24.3)	186 (29.3)	76 (22.5)	<i>p</i> < .01	262 (27.0)
Sometimes	285 (62.9)	126 (69.6)	411 (64.8)	220 (65.1)		631 (64.9)
Often	26 (5.7)	11 (6.1)	37 (5.8) ^c	442 (12.4)		79 (8.1)
<i>Can insured patients be referred to higher level hospitals?</i>						
Never	109 (23.9)	43 (22.8)	152 (23.6)	54 (15.7)	<i>p</i> = .01	206 (20.9)
Sometimes	280 (61.4)	125 (66.1)	405 (62.8)	240 (70.0)		645 (65.3)
Often	67 (14.7)	21 (11.1)	88 (13.6) ^c	49 (14.3)		137 (13.8)

^a χ^2 test is used for each clinical and nonclinical group, and the test result is shown by *p* value.

^b χ^2 test for doctor and other groups in clinical department, and *p* < .05.

^c χ^2 test for doctor and other groups in clinical department, and *p* > .05.

Table 3. Clinical Doctor Behavior for Prescribing Iron and Antibiotics by Level of Health Facilities^a

	County (%)	Township (%)	Village (%)	Total (%)
<i>Do you (clinical providers) prescribe different iron tablets for insured or uninsured patients?</i>				
				<i>p</i> = .03 ^b
n	137	73	60	270
Yes	7 (5.1)	0 (0.0)	6 (10.2)	13 (4.9)
No	129 (94.9)	72 (100)	53 (89.8)	254 (95.1)
<i>Do you (clinical providers) prescribe different antibiotics for insured or uninsured patients?</i>				
				<i>p</i> < .01
n	201	121	149	471
Yes	116 (58.3)	90 (75.0)	106 (73.6)	312 (67.4)
No	83 (41.7)	30 (25.0)	38 (26.4)	151 (32.6)

^a χ^2 test is used for each clinical and nonclinical group, and the test result is shown by *p* value.

^b The cells of expected frequency that is less than 5 are > 20%.

DISCUSSION

The main findings in the study were that providers' opinions and prescribing behavior were influenced not only by financing methods for health care facilities and payment methods for health providers, but also by patients' health financing systems, demands, and financial ability. Due to economic incentives, fee-for-service payments, and bonuses based on revenue from prescriptions, the providers stated that they may overprescribe (15), but they find this behavior is to some extent influenced by the patient's ability to pay. Thus, providers change their drug prescriptions depending on patients' financial ability. As mentioned earlier, the African countries' experience with fee per item or fee per case shows a similar result (7). In this study,

Table 4. Clinical Doctor Prescribing Behavior and Opinions for Tuberculosis by Level of Health Care Facilities^a

	County (%) (n = 132)	Township (%) (n = 62)	Village (%) (n = 43)	Total (%) (n = 237)
<i>Do you (clinical providers) change prescription for uninsured patients?</i>				
				<i>p</i> = .06
Yes	30 (24.4)	6 (10.3)	6 (14.6)	42 (18.9)
No	93 (75.6)	52 (89.7)	35 (85.4)	180 (81.1)
<i>Do you (clinical providers) change prescription because of patient's opinion?</i>				
				<i>p</i> = .42 ^b
Yes	20 (55.6)	7 (63.6)	5 (83.3)	32 (60.4)
No	16 (44.4)	5 (36.4)	1 (16.7)	21 (39.6)
<i>Do you (clinical providers) change prescription because of patient's financial ability?</i>				
				<i>p</i> = .01
Yes	82 (67.8)	32 (56.1)	17 (42.5)	131 (60.1)
No	39 (32.2)	25 (43.9)	23 (57.5)	87 (39.9)
<i>Is there any difference in the cure rate for insured or uninsured patients?</i>				
				<i>p</i> = .13
Yes	39 (31.2)	29 (48.3)	14 (35.9)	82 (36.6)
No	40 (32.0)	13 (21.7)	15 (38.5)	68 (30.4)
Not much	46 (36.8)	18 (30.0)	10 (25.6)	74 (33.0)
<i>Do uninsured tuberculosis patients complete the full treatment course?</i>				
				<i>p</i> = .03
Never	13 (10.5)	10 (17.2)	11 (26.8)	34 (15.2)
Sometimes	80 (64.5)	42 (72.4)	22 (53.7)	144 (64.6)
Often	31 (25.0)	6 (10.4)	8 (19.5)	45 (20.2)

^a χ^2 test is used for each clinical and nonclinical group, and the test result is shown by *p* value.

^b The cells of expected frequency that is less than 5 are > 20%.

Table 5. Clinical Doctor Prescribing Behavior for Hypertension and Chronic Bronchitis by Level of Health Care Facilities^a

	County (%)	Township (%)	Village (%)	Total (%)
<i>Hypertension</i>	(n = 126)	(n = 78)	(n = 66)	(n = 270)
Do you (clinical providers) change prescription for uninsured patients?				p = .11
Yes	30 (25.0)	13 (16.7)	8 (12.9)	51 (19.6)
No	90 (75.0)	65 (83.3)	54 (87.1)	209 (80.4)
Do you (clinical providers) change prescription because of patient's financial ability?				p < .01
Yes	84 (70.0)	41 (53.2)	15 (25.4)	140 (54.7)
No	36 (30.0)	36 (46.8)	44 (74.6)	116 (45.3)
<i>Chronic bronchitis</i>	(n = 132)	(n = 75)	(n = 96)	(n = 303)
Do you (clinical providers) change prescription for uninsured patients?				p < .01
Yes	38 (30.6)	8 (11.4)	13 (14.6)	59 (20.8)
No	86 (69.4)	62 (88.6)	76 (85.4)	224 (79.2)
Do you (clinical providers) change prescription because of patient's financial ability?				p = .01
Yes	83 (66.4)	36 (51.4)	40 (44.9)	159 (56.0)
No	42 (33.6)	34 (48.6)	49 (55.1)	125 (44.0)

^a χ^2 test is used for each clinical and nonclinical group, and the test result is shown by *p* value.

questions regarding the influence of patients' health financing were put directly to the providers, and thus the answers reflected their opinions. Only a few studies have used this method (3). Other studies used prescription data to describe providers' prescribing behavior (1;7;11;17;24;27).

The results also showed that most providers in both clinical and nonclinical departments preferred the mixed financial reimbursement method of general budget and fee for service for health care facilities. They also believed that bonuses could improve the quality of health care but that they also give incentives to use more expensive prescriptions. General budget financing can guarantee providers' salaries, while fee for service can make it possible to earn more income. Providers, particularly doctors in clinical departments, can earn even more extra income via a fee-for-service mechanism (personal communication, Tongling and Fanchang County Health Bureaus, 1995). This could explain why more clinical providers, particularly doctors, than others supported the fee-for-service method and the mixed method. The purpose of bonuses is to improve the quality and quantity of health care. However, nowadays in China, bonuses are directly related to the revenue from services, particularly from drugs. Together with patient demands, this can result in more and unnecessary prescriptions and tests, and in supply-induced demand for health services.

It was found that most physicians were of the view that patients' health financing systems and ability to pay were the main determinants for the type of treatment prescribed. Insured patients are prescribed more expensive drugs and are usually referred to more specialized health facilities. Patients' health financing systems are related to their ability to pay for medical services because of the financial and social functions of insurance (2). The social function is to remove financial barriers to obtaining health care at the time of illness for the vulnerable groups, and the financial function is to provide a pool of funds to cover all or part of the health care cost for those contributing to the pool. This means that insured people have greater access to health care than the uninsured because their cost of health care

can be covered by insurance. Generally speaking, the more insurance coverage, the higher ability to pay for medical services. This could explain why patients' health financing systems and ability to pay were the main factors influencing the type of treatment. More and expensive (usually high quality) services need more money.

Most of the clinical doctors admitted that they prescribed more expensive antibiotics for insured patients, often changed their prescriptions according to patient demands and financial ability, and sometimes changed prescriptions according to patients' health financing systems in the treatment of some diseases, e.g., chronic bronchitis, tuberculosis, and hypertension. This finding implies that uninsured patients with chronic diseases, particularly with some complications, may not be able to obtain a full course of treatment and receive poor quality of care.

We found there were differences in the prescribing behavior between levels of health facilities. The reasons for these differences are unclear. It may be related to the differences in the patient mix, availability of expensive drugs and services, or the facility's regulations. For example, from county to village, patients' health conditions are usually less serious and drugs are cheaper (9;10), so fewer providers changed their prescriptions in the treatment of some chronic diseases due to the patients' financial ability.

The economic incentives for providers are one of the main factors behind the supply-induced demand (15). In order to earn more income, providers can prescribe more or expensive drugs than necessary because of fee for service and bonus incentives. This may be one reason why provider prescribing behavior was so strongly influenced by patients' ability to pay. The results showed that not many providers changed prescriptions according to patients' financing systems, but they stated that they changed prescriptions according to patients' financial ability. Insured patients have a greater ability to receive care than uninsured patients. Given this, the supply-induced demand for insured or well-off patients may be higher than for uninsured patients.

Some evidence is available for how financial incentives influence pharmacists' prescriptions. In the 590 community pharmacies' study, Miller and Ortmeier (19) found that financial incentives were the most important motivating factor in providing pharmacy services, followed by professional reward and legal/contractual requirements of third-party payment programs. In another study, Raisch (23) found that the reason pharmacists counseled capitation patients less frequently might be attributable to financial incentives or to pharmacists' perception that these patients did not need to be counseled. These results strongly support our finding that financial incentives are one of the main factors influencing provider prescribing behavior.

In the study, the data were collected from health care providers to reflect their opinions and prescribing behavior in relation to health care financing systems. Data were also collected from outpatients in the same health care facilities to reflect provider prescribing behavior by examining prescriptions. The outpatient interview data have been presented elsewhere (9;10). It was found that insured patients received more expensive drugs and higher drug and medical costs per visit than uninsured patients. These results are consistent with what we found from provider interviews. Provider prescribing behavior, particularly in irrational prescribing, is a sensitive topic. This paper may not reflect the actual situation, possibly underestimating it. It describes provider prescribing behavior only in general due to the limitations of the survey. In order to obtain information on provider prescribing behavior and reasons for their behavior in more detail, in-depth interviews on specific topics are needed in further studies.

From the health evaluators' point of view, rational prescribing behavior is ideal. But the empirical data from this study suggest that the provider prescribing behavior was strongly influenced by economic incentives in relation to health financing of both providers and consumers. This influence could result in irrational prescribing. Drug utilization review (DUR) may be one way to improve prescribing behavior. Guo and co-workers (12) found that the prescribers' behavior changed significantly after the Alabama Medicaid DUR letter intervention program, resulting in a reduction of the average drug reimbursement and average days of drug therapy.

CONCLUSION

Providers' opinions and prescribing behavior were influenced not only by financing methods for health care facilities and payment methods for health providers, but also by patients' health financing systems, demands, and financial ability. The factors influencing patients can also influence prescribers directly or indirectly. Economic incentives encourage providers to prescribe more and expensive drugs, and more and expensive tests, but the behavior can also be controlled by patients' willingness and ability to pay. The result showed that providers usually prescribed more and expensive drugs and tests for insured patients, and that financial incentives linked patients' health financing systems with prescribing behavior, because providers' bonuses or extra income were directly related to the revenue from prescriptions and fee-for-service financing mechanisms. The results also imply that well-off and insured patients have higher health care costs, including drugs, than uninsured patients because insurance systems have a higher incentive to produce supply-induced demand and the well-off people have a greater ability to pay.

We suggest that the Chinese government needs to change its bonus system and fee-for-service system. Bonuses could be decided on the basis of providers' workload, work quality, and efficiency, not directly related to the revenue from prescriptions. The coverage of the fee-for-service system can be reduced, and other financial reimbursement methods can be used. Of course, more studies related to financing reimbursement methods need to be done to obtain recommendations.

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