Factors associated with the decline of the Cooperative Medical System and barefoot doctors in rural China

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The Cooperative Medical System (CMS) and its barefoot doctors have been in decline in rural China for nearly a decade. In order to explore the reasons for this, in 1987 we carried out a survey of villagers, barefoot doctors, and local administrators in Fengxian, Shanggoa, and Loaan counties, where incomes are good, fair, and low, respectively. The state of the CMS in these counties was contrasted and the situations which prevailed in 1978, 1982, and 1985, when the system was, respectively, at its peak, had begun to decline, and had declined markedly, were compared

A random sample of villages was selected and all the barefoot doctors and administrators as well as a random sample of households were surveyed. The results indicate that health status (as measured by infant mortality, immunization coverage, and rate of infectious diseases) has decreased in areas where the CMS has declined, while per capita incomes increased. Concomitantly, villager's expenditures on health care have increased Barefoot doctors and their patients were, however, reasonably happy with the system, and in its absence the doctors are no longer able to obtain ongoing training.

The CMS was fiscally sound, and did not decline to the same extent in all areas—it continues to thrive in Fengxian, which is relatively affluent. It is concluded that the system probably declined because many local administrators perceived that it no longer enjoyed the backing of the central government.

Introduction

Since 1949, when the People's Republic of China was founded, indices of health in that country have improved dramatically; for example, from 1950 to 1982, the infant mortality rate declined from 265 to 67 per 1000 live births, and life expectancy over the same period more than doubled, from 31 years to 67 years (*1*). Many factors lie behind China's success in health, including better nutrition and environmental sanitation as well as the increasing availability of clean water (*2*). However, the improvements in health were not caused by economic development alone, since reforms of the health care system in the early 1950s also played an important role, particularly in rural areas, where over three-quarters of the Chinese population live (*2, 3*).

History and organization of the CMS

The success of the rural health care system in China depended on the provision of primary health services at the brigade level[a] (the basic level of agricultural or industrial production) through barefoot doctors (*4*). In 1955, the first Cooperative Medical System (CMS) appeared in Union Commune, Henan Province, and the health auxiliaries at the brigade level were called "barefoot doctors" (*5*). The CMS and the training of

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[a] Throughout rural China, health personnel, health stations, and hospitals are generally organized on a three-tier system. At the first level is the brigade health station and its barefoot doctors, who provide both preventive and curative services. For more serious illnesses, the barefoot doctors refer patients to the second level, the commune health centres, which have 10–30 beds each and outpatient clinics. Each commune health centre serves 10 000–50 000 people (*11*), and is staffed by physician assistants. At the third level are the county hospitals, which are staffed by fully qualified physicians and serve from 200 000 to 600 000 people (*13, 14*), the anti-epidemic station, and the maternal and child health clinic.

barefoot doctors became nationwide in 1965, and the barefoot doctors were encouraged to practise both Chinese and Western medicine (*6*).

By the 1970s, the CMS had evolved into a well-developed pre-paid medical service, providing a limited pooling of health risk. Primary health care was available through cooperative medical clinics (health stations) at the brigade or occasionally the commune level. In the late 1960s, peasants could decide whether or not they wanted to join the system; however, from 1971 onwards once a brigade had voted in favour of the system, all its inhabitants automatically became members (*4*, *6*).

The services provided by the CMS included health education, family planning, immunization, communicable disease reporting, other preventive services, and basic medical care. Beneficiaries enrolled in the system were entitled to substantial reimbursable services and drugs at the brigade health station and also at high-level referral units (*7*). One barefoot doctor usually served about 1000 people. Barefoot doctors, who were selected by the members of the production brigades, based on their age, education level, and willingness to serve the people, worked mostly in brigade health stations, but also carried out some agricultural work (*8*). Their income was similar to that of other peasants in their brigade (*9*). The local service units of the CMS were run by a management group, consisting of brigade leaders, barefoot doctors, and peasants, under the leadership of the brigade management committee. The brigades became directly involved in the delivery of health care as an integral part of their socioeconomic responsibilities. In this way, they built and equipped the brigade health stations, managed the health insurance scheme, determined the appropriate number of barefoot doctors who should be employed, and supported their medical training (*10*).

Typically, the insurance fund was financed jointly through annual pre-payments by individual members of the brigade and by annual appropriations from brigade and commune funds, which contributed about two-thirds of the CMS budget. The annual payments to be made were determined from the previous year's medical expenses within the commune or brigade. Premiums were kept low by substituting locally grown herb medicines for more expensive Western drugs, and by limiting referrals to county hospitals. The annual membership fees ranged from 0.35 yuan (US$ 0.18) to 3.60 yuan (US$ 1.80) per person, equivalent to from less than 1% to nearly 3% of a family's disposable income (*11*). Except in the poorest regions, no national funds were paid directly to the CMS (*7*). Patients who are members of the CMS receive total or partial reimbursement of medical expenses if they are referred to the second or third-level health units (respectively, the commune health centre and county hospital) by the barefoot doctors, but must pay the full expenses themselves if they present directly to these units without prior referral (*15*).

After 1976, barefoot doctors followed a training course that extended over 6 months, most of which was performed at the county hospital, rather than the commune health centre. During the late 1970s the continuing education of barefoot doctors was also expanded and they began to take specialized courses in Chinese traditional and Western medicine, basic surgery, and other areas of primary health care (*6*). The CMS paid the barefoot doctors' training fees as well as their salaries (*12*). By 1986, 40% of barefoot doctors had attained the level of middle medical school graduates (physician assistants), and, upon passing a qualifying examination, were certified as village doctors (*16*). Attainment of the village doctor certificate brought the possibility of full-time government employment, promotion, and of receiving a subsidy from central government (*2*, *16*).

The CMS made the three-tier rural health network possible and played a major role in promoting health in China, as well as introducing a widely distributed, relatively inexpensive, technologically simple health service that avoided expensive hospital care (*17*). The system solved the problem of inadequate health manpower in a relatively short time. Furthermore, the barefoot doctors were local people who maintained intimate ties with the other peasants, and their modest remuneration meant that the community could afford to retrain them and enjoy easy access to their services (*18*).

Decline of the CMS

Since 1980, collective financing and popular support for the CMS have diminished. In 1975 an estimated 84.6% of the rural Chinese population was covered by the system; however, by 1985 this had fallen to 39.9% (*1*), while over the same period the rural population had increased by 13.6%, from 739.96 million to 840.95 million (*19*).

As outlined below, the decline of the CMS may have serious negative consequences for both health care providers and consumers in rural China. First, it may jeopardize the continuing education of barefoot doctors. In the 1970s the barefoot doctors' education and salaries during training were generally financed by the CMS; with the system's decline even though many barefoot doctors can still earn a living on a fee-for-service basis, they have difficulty upgrading their skills, and the quality of preventive and curative services may suffer (*20*). Second, the decline of the service has increased the financial burden of

Table 1: **Selected demographic data for Fengxian, Shanggoa, and Loaan counties, 1984**

	Fengxian	Shanggoa	Loaan
Province	South-east Shanghai	West Jiangxi	Middle Jiangxi
Topography	Plains	Plains and hills	Mountainous
Total area (km^2)	674	1350	2413
Cultivated land (km^2)	333.82	275.15	260.67
Total population	510 653	276 440	284 840
No. engaged in agriculture	431 529 (84.5%)[a]	230 756 (83.5%)[a]	242 660 (85.2%)[a]
Illiteracy rate (%)[b]	26.0	33.7	39.1
No. of physicians per 1000 population	0.74	0.37	0.33
No. of physician assistants per 1000 population	2.07	1.11	0.91
Productivity (× 1000 yuan)[c]			
Total	1 127 490	206 160	110 610
Agricultural	162 200 (14.3%)[d]	152 970 (74.2%)[d]	85 900 (77.7%)[d]
Finance (× 1000 yuan)[c]			
Total revenue	148 000	13 110	6080
Local budget			
Total	29 350	17 230	8660
Health	4862 (16.6%)[e]	1213 (7.0%)[e]	1136 (13.2%)[e]
Per capita productivity (yuan)			
1978	881	329	260
1984	2208	746	388
Increase 1984/1978	150.6%	126.7%	49.2%
Per capita income (yuan)			
1978	252	182	79
1984	713	500	275
Increase 1984/1978	182.9%	174.7%	248.1%

[a] Proportion of the total population engaged in agriculture.
[b] Expressed as the proportion of illiterate and semi-illiterate persons aged ⩾12 years in the total population. Adapted from *Statistical yearbook, 1984*, Bureau of Social Statistics of Fengxian, Shanggoa and Loaan counties.
[c] US$ 1.00 = 2 yuan in 1984
[d] Proportion of total productivity gained from agriculture.
[e] Proportion of the total financial budget represented by expenditures on health.

illness borne by peasants, and the high cost of a hospital stay may prevent some patients from seeking needed treatment (*2, 20, 21*). Third, the relative importance of preventive medicine in China may diminish. This is because preventive programmes are not as profitable on a fee-for-service basis as treatment, even though they are more cost-beneficial to the commune, since peasants may not want to spend money with no immediately tangible results. Also, the fees for preventive services do not compensate fully for the time and effort that barefoot doctors have to expend in providing such services (*2, 20*). Finally, the commune health centres and hospitals are affected since many patients need hospitalization but lack the means to pay for their care. In such circumstances the costs have to be absorbed by the centres and hospitals themselves (*20*).

Causes for the decline. Of the several explanations that have been proposed to account for the decline of the CMS, none has been tested in the field.

It has been claimed, for example, that the decline was caused by lack of availability of collective funds brought about by changes in the structure of the Chinese rural economy following introduction of the "production responsibility system" in 1980 (*2*). Under this system, each peasant cultivates a plot of the brigade's land and agrees to deliver a certain quota of the crop to the government. Whatever the peasants produce in excess of their quota can then be sold for their own profit. As a result of this change from collective to individual production, farming activities have become more lucrative to peasants, who now devote more time to farming (*2, 20*).

Alternatively, it has been claimed that, by its very nature, the usefulness of the CMS and its barefoot doctors was limited to an early period in the development of health services in the poor rural communities, when preventable diseases caused a major part of morbidity. Barefoot doctors therefore became superfluous when preventable diseases had been controlled (*24*).

A further proposal holds that the decline may have been caused by political factors. The CMS developed rapidly during the Cultural Revolution, but subsequently has been dismantled along with other aspects of that now discredited movement (*6*).

Table 2: **Distribution of the study sample in Fengxian, Shanggoa, and Loaan counties, 1986**

	Category of respondent			
	Commune	Brigade	Barefoot doctor	Household
Fengxian				
Total number	19	300	853	137 433
No. in sample	9	60	206	361
Shanggoa				
Total number	12	179	456	51 845
No. in sample	6	35	87	298
Loaan				
Total number	19	211	376	42 587
No. in sample	9	43	97	365
Total number	50	690	1685	231 865
No. in sample	24 (48)[a]	138 (20)	390 (23)	1024 (0.44)

[a] Figures in parentheses are percentages.

The present study documents the extent of the changes in the CMS between 1978 and 1985, examines the factors associated with these changes, and attempts to shed light on the reasons for the system's decline.

Methods

The CMS was studied in three counties that corresponded to high, middle, and low socioeconomic levels. We compared the situation in these counties in 1978, 1982, and 1985, respectively, when the development of the CMS was at its peak, had started to decline, and had reached a low level of participation.

Selection and sampling

All counties in China have been classified by the State Bureau of Social Statistics into three categories, according to their annual per capita income in 1984 (*25*). For the study, we chose one county in Shanghai Province with high per capita income, and one county each with a middle or low income level from Jiangxi Province. The major demographic characteristics of the three counties are summarized in Table 1.

The brigades to be studied were selected using a two-stage sampling technique. First, the communes were divided into higher- or lower-than-average income groups and each of these was assigned to one of two subgroups, according to population size. Each of the resulting four subgroups was split further into two groups, according to the distance from the commune to a central town where a main health unit is located. Finally, half of the communes from each of these eight subgroups were drawn at random. By means of these sampling procedures, 20% of the brigades in each of the three counties were selected. Once a brigade had been chosen, the health station, all the barefoot doctors, and eight households were included as respondents. Households were selected using a sampling technique similar to the survey method developed by the WHO Expanded Programme on Immunization (*26*).

Altogether, 24 of the 50 communes and 138 of the 690 brigades in the three counties were selected, and all agreed to participate in the study. A total of 390 (95.8%) of the 407 barefoot doctors in the selected brigades, corresponding to 23.2% of the total number of barefoot doctors in the three counties in 1985, responded. All the 1024 households participated. Data were collected from the following broad categories of respondents: brigade administrators, brigade health stations, barefoot doctors, households, as well as health administrators and local government leaders at the county and commune levels. There were no refusals and no survey forms were returned incomplete. The distribution of respondents in the final sample is presented in Table 2.

Results and analysis

Organization of health services in rural areas

The following types of health services exist in the rural areas studied: the CMS, which is run jointly by communes (towns) and production brigades (administrative villages); services run by brigades alone; fee-for-service health clinics run as group practices; and clinics owned by private individuals. In 1978, the CMS was available in 99.3% of the 138 brigades in the study. However, in 1980, following the introduction of the "production responsibility system" in rural areas, the CMS developed differently in the three study counties. For example, in Fengxian the entire rural population continued to be covered by the CMS, more cooperative insurance programmes run jointly by communes and brigades

Table 3. **Division of ownership of health services in the study sample, Fengxian, Shanggoa, and Loaan counties, 1978–86**

County	Type of ownership				Total
	Joint commune-brigade	Brigade alone	Group practice	Private individuals	
Fengxian					
1978	9	51	0	0	60
1982	14	46	0	0	60
1986	13	47	0	0	60
Shanggoa					
1978	15	20	0	0	35
1982	7	19	1	8	35
1986	0	2	1	32	35
Loaan					
1978	0	41	1	1	43
1982	0	7	10	26	43
1986	0	0	6	37	43

appeared, and the range of health-risk pooling expanded. In contrast, the system declined dramatically in Shanggoa and Loaan (Table 3).

Health policy opinions of brigade administrators

The brigade administrators in the three counties reported that in the early 1950s the general health policy emphasized the improvement of rural health care and the provision of health services consistent with mass population movements. During the Cultural Revolution, the number of barefoot doctors and the CMS expanded dramatically as each production brigade set up a cooperative health station. Subsequently, however, some local leaders, particularly in Shanggoa and Loaan counties, contended that the CMS was considered by the central authorities to be a product of the Cultural Revolution, and, as such, should be discarded. Initially it was intended to prevent the collapse of the CMS in these two counties, but local leaders experienced lack of support from community leaders and higher government officials. In contrast in Fengxian, the brigade administrators supported expansion of the system and to this end increased their health budget, extended the training programmes for barefoot doctors, and strengthened the coordination between health administrators and community leaders.

Further changes in health policies made by the Ministry of Public Health in 1982 encouraged the development of health services at the village level that competed with the CMS and made support of the latter by local health administrators difficult. A third of the brigade administrators interviewed in the study, predominantly in Shanggoa and Loaan counties, knew very little about the organization of health services in their area, and did not consider health care to be part of their normal duties.

The health providers

The number of barefoot doctors in the study counties decreased from 1978 to 1985, especially after 1982, although the decline is modest when expressed as the ratio of the number of health providers to the total population (Table 4). Of the 61 barefoot doctors who resigned, 30 were employed by town factories, 12 became heads of brigades or communes, 10 were hired by county or commune health institutions, and 7 left because of illness or migration or had died. Only one barefoot doctor completely gave up health work for farming.

One measure of the quality of training undertaken by the barefoot doctors is the proportion who passed the provincial examination for qualification as "Village Doctor", a standardized examination that was inaugurated in 1982 by the Department of Public Health and was offered once a year. At the end of 1985, the proportion of barefoot doctors who qualified was 14.1%, 59.8%, and 43.3%, respectively, in Fengxian, Shanggoa, and Loaan counties. Compared with the national level of 38.7 % (*27*), the proportion who qualified in Fengxian was low (Mann-Whitney U test = 7.25, $P < 0.01$) and that in Shanggoa high (Mann-Whitney U test = 4.04, $P < 0.01$).

Facilities at the brigade health stations

Brigade health stations varied both in size and in the amount of equipment they had available (Table 4). In 1978 the average area occupied by each health station in Shanggoa and Loaan was 79.3 m^2 and 57.1 m^2, respectively, significantly greater than the 48.3 m^2 in Fengxian (Fengxian versus Shanggoa: $t = 2.825$; $P < 0.01$). By 1985, however, in Shanggoa only two health stations (area, approximately 73 m^2 each) were operating under the CMS, the rest having been converted for other uses, such as storage. In the other brigades in Shanggoa and Loaan, the barefoot

Table 4. **Number of barefoot doctors and characteristics of the health stations in Fengxian, Shanggoa, and Loaan counties, 1978–85**

	No. of barefoot doctors	Characteristics of the health stations			
		% financed by CMS	Average area (m^2)	% with observation beds	% with autoclaves
Fengxian					
1978	119 (2.4)[a]	100	48.3	36.3	33 3
1982	203 (2.4)	100	42 2	21.7	38.3
1985	172 (2.0)	100	34 2	11.6	36.7
Shanggoa					
1978	107 (2.3)	100	79.3	57.1	22.9
1982	86 (2.0)	74 3	34.4	51 4	11 4
1985	72 (1.7)	5 7	4.5	5 7	2.9
Loaan					
1978	101 (2.1)	95 3	57.1	32 6	7.0
1982	81 (1.6)	16 3	36.0	18.6	4.7
1985	84 (1 6)	0	0	0	0

[a] Figures in parentheses are the number of barefoot doctors per 1000 population.

doctors, without cooperative support, did not even have a room in which to practise.

Before 1978, observation beds were set up in remote villages in the study counties for the temporary treatment of patients before their transfer to higher level institutions. Topographically, Fengxian is in a plains area, close to Shanghai City, and transportation is relatively easy; in 1985, 11.7% of the health stations in the county still had observation beds. Although Shanggoa and Loaan each used to have more observation beds than Fengxian, in part because they are located in mountainous areas with relatively poor transportation, virtually no observation beds remained in these counties in 1985.

Daily sterilization of medical equipment is generally carried out using autoclaves. These are relatively expensive in China, and their presence in a health centre provides a measure of its ability to provide satisfactory facilities. In 1985 in Fengxian, more than a third of the CMS health stations had autoclaves, while in Shanggoa and Loaan only one CMS health station had an autoclave. In contrast, none of the barefoot doctors in fee-for-service practice possessed an autoclave (Table 4).

Financial aspects of the CMS

Financially, the CMS is supported by the following sources: individual premiums, collective welfare funds, and state (local government) funds. In the study counties, state funds were distributed only in the form of subsidies for preventive services, with considerable regional differences, ranging in 1985 from 0.56 yuan to 0.79 yuan (US$ 0.28 to US$ 0.40) per capita per annum in Shanggoa and Loaan counties, respectively, to 3.20 yuan (US$ 1.60) in Fengxian. From 1978 to 1985 the collective funds and premiums amounted to approximately 6.00 yuan (US$ 3.00) per capita per annum in Fengxian and approximately 3.00 yuan (US$ 1.50) per capita per annum in Shanggoa and Loaan, with collective funds contributing about twice as much as premiums. After 1978 the contributions from the collective funds and premiums together never exceeded 2.3% of per capita income, and the proportion contributed through premiums paid by individuals decreased from 1978 to 1985 (Table 5). In the household survey, individuals were asked whether the premiums for the CMS were appropriate or a burden on their families and whether they did not want to spend money on the service. Even in Loaan county, a poor area, 84.1% of the population believed that the level of the premiums was appropriate. From 1978 to 1985, the median per capita expenses on health care were 2.50 yuan, 7.50 yuan, and 2.50 yuan, respectively, in Fengxian, Shanggoa, and Loaan, amounts which are inversely related to per capita income.

The financial balance forms for the 137 health stations in the study areas where CMS was available showed that from 1978 to 1985 nowhere had the service incurred a deficit. The balance forms at the brigade level provided data on the salaries paid to the barefoot doctors who worked in the CMS and also on the income of those barefoot doctors who were practising on a fee-for-service basis. The information thus obtained was validated by that provided in the barefoot doctors' questionnaires. The results indicate that before 1982 in Loaan the barefoot doctors' incomes were lower than those of the brigade leaders but exceeded the latter after they left the CMS and engaged in other forms of medical practice. In contrast, in Fengxian, the barefoot

Table 5. **Per capita source of revenue of the Cooperative Medical System and the individual financial load in Fengxian, Shanggoa, and Loaan counties, 1978–85**

	Source of revenue and amounts (yuan)[a]					
	State funds	Collective welfare funds	Individual premiums	Total funds	Per capita annual income (yuan)[a]	Individual financial load[b]
Fengxian						
1978	1.16	3 27	1 86	6.29	438.46	1 2%
1982	2.49	4 35	2 18	9.02	665.31	1 0%
1985	3 20	3 97	1.98	9 15	1124.28	0 5%
Shanggoa						
1978	0.67	2.33	1 17	4 72	198 86	1.8%
1982	0.69	2.49	1.24	4 42	351 88	1 1%
1985	0.56	1 75	0 88	3 19	657 50	0 4%
Loaan						
1978	0.64	1 94	0 97	3 55	124.89	2.3%
1982	0.72	2 64	1 23	4 95	170.48	2.3%
1985	0.79	N.A.[c]	N.A	N.A.	235 00	N.A.

[a] US$ 1 00 = 2 yuan in 1984.
[b] Expressed as: (Collective welfare grants + individual premiums) — Per capita annual income
[c] N.A. = not available.

doctor's salaries remained lower than that of the brigade leaders.

Use of health services in the study areas

The effort expended by barefoots doctors in providing health services was estimated by calculating their daily working hours, the distribution of their working time over the year, and the annual number of patients visited. The cooperative health stations all had regular working hours during which barefoot doctors were available for consultation. In both 1978 and 1985, barefoot doctors in Fengxian spent 90% of their time on health services, with preventive and family planning services accounting for about 22% of this. In Shanggoa, the proportion of their time that barefoot doctors devoted to health services decreased from 86.3% in 1978 to 46.8% in 1985, when they devoted only 14% to preventive and family planning services. In 1978 barefoot doctors in Loaan devoted 86.3% of their time to health work but this had fallen to 46.6% in 1985 when they spent only 10.1% on preventive and family planning services.

A breakdown of the pattern of use of barefoot doctors' services in the study counties from 1978 to 1985 is shown in Table 6. The average number of annual patient visits per barefoot doctor increased in Fengxian from 1766 in 1978 to 1816 in 1982, and reached 1830 in 1985. In contrast, in Shanggoa the corresponding levels decreased from 1902 in 1978 to 1689 in 1985, an 11.2% reduction. Finally in Loaan the number of patient visits per barefoot doctor dropped from 2380 in 1978 to 1322 in 1985, a 45% reduction. Changes in the average number of visits per person per annum also differed in the three counties. In Fengxian these varied from 4.3 in 1978 to 3.6 in 1985, but declined more markedly from 4.4 to 2.8 in Shanggoa and from 5.0 to 2.1 in Loaan, respectively.

Comparison of the consumers' perception of the availability of barefoot doctors indicated that in Shanggoa and Loaan, 24% of health care users surveyed perceived that such doctors were less available in 1985 than in 1980. In contrast, in Fengxian, only 12.5% of respondents had such views ($\chi^2 = 30.9$; $P < 0.01$).

In Fengxian, the annual number of patient visits to brigade health stations and commune health centres increased from an average of 4.6 per person in 1978 to 5 1 in 1985. The average number of visits per person to the higher level commune health centres was 1.61 in 1978 and 2.31 in 1985. Before 1982, when the CMS insurance scheme was still in operation, the use of CMS health services in Shanggoa and Loaan was similar to that in Fengxian. In parallel with the decline of the CMS, the average number of visits per person to the brigade level health stations dropped in 1985 to an average of 2.8 per annum in Loaan, whereas those to the commune health centres increased slightly from 1.7 to 2.0.

Acceptability of the CMS

The acceptability of the CMS was determined as outlined below.

First, the health providers were asked about their perception of the services they offered. Second, we documented the providers' preferences for a rural health care system. Third, consumers were asked to state the benefits they received under the CMS and to specify their choice of a rural health care system.

Table 6: **Analysis of the use of barefoot doctor's services in health stations in Fengxian, Shanggoa, and Loaan counties, 1978–85**

	Total population	No. of patient visits per annum	No. of visits per person per annum[a]	No. of barefoot doctors	Average number of visits per barefoot doctor per annum[b]
Fengxian					
1978	81744	351869	4.3	199	1766
1982	84346	368638	4.4	203	1816 (+2.8)[c]
1985	86290	314709	3.6	172	1830 (+3.6)
Shanggoa					
1978	45945	203535	4.4	107	1902
1982	43144	169323	3.9	86	2228 (+17.1)
1985	44107	123291	2.8	73	1689 (−11.2)
Loaan					
1978	47871	240428	5.0	101	2380
1982	49678	141242	2.8	81	1744 (−26.8)
1985	51755	111020	2.1	84	1322 (−44.5)

[a] Expressed as: No. of patient visits per annum — Total population.
[b] Expressed as: No. of patient visits per annum — No. of barefoot doctors.
[c] Figures in parentheses represent the % changes in the average number of visits per barefoot doctor per annum relative to the level in 1978.

Also, we asked the barefoot doctors what they felt had been the three most difficult problems in their medical practice in the past year and to rank these choices in order. The prime concern of the doctors in Shanggoa and Loaan was lack of opportunity to upgrade their knowledge and skills, while in Fengxian low income was the main consideration. The second concern of the doctors in all three counties was their lack of medical knowledge. In Shanggoa and Loaan, the third concern was the burden of agricultural responsibilities, while in Fengxian there was concern that the village leaders did not pay enough attention to health services.

The results of the survey of the providers' choice of rural health system showed that 100% of the barefoot doctors in Fengxian preferred the CMS rather than the fee-for-service approach, whereas in Shanggoa and Loaan 56% preferred the fee-for-service approach. Consumers in all three counties expressed a great preference for the CMS, and of the 1024 households surveyed, 82.7% felt that the CMS had benefited them, while 89.4% expressed a strong desire to retain the service.

Effectiveness of the CMS

The effectiveness of any system of health care is determined by its outcome, and for the CMS this can be estimated from the disease rate, the death rate, and by the levels of disability, discomfort, and dissatisfaction with the service. For this purpose, disease rate was measured by the total rate of infectious diseases, death rate by the infant mortality rate, disability level by the child immunization rate, and discomfort level by the distance travelled to see a doctor. The population's dissatisfaction with the barefoot doctors' attitudes to the health services was determined by carrying a questionnaire survey.

In Fengxian the total rate of infectious diseases dropped from 1101.2 per 100000 in 1980 to 684.6 per 100000 in 1985, a 37.8% decrease. In Shanggoa the rate decreased by 54.6% from 1928.5 per 100000 in 1980 to 874.9 per 100000 in 1985. However, in Loaan, the rate almost doubled from 2478.7 per 100000 in 1980 to 4714 per 100000 in 1985.

The infant mortality rate in Fengxian decreased by 30.4% from 22.45 per 1000 live births in 1980 to 15.63 per 1000 in 1985. However, over the same period in Shanggoa, the rate increased by 8.7% from 51.11 per 1000 to 55.56 per 1000, while in Loaan it jumped from 62.01 per 1000 in 1980 to 77.60 per 1000 in 1985, a 25.1% increase.

The child immunization rate in the three counties was not available for 1985 because of deficiencies in the register system; however, in order to provide some indication of trends, respondents were asked whether or not their family members had been immunized in 1985. In Fengxian, 9.9% stated that no immunization service had been available for their eligible children, while in Shanggoa and Loaan the comparable levels were 7.7% and 21.9%, respectively. The level in Loaan was statistically significantly greater than that in the other two counties ($P < 0.01$).

In 1986, only 5.3% of the population in Fengxian had to travel more than 8 km to see a doctor, compared with 22.1% in Shanggoa, and 30.1% in Loaan. Finally, when asked to state the perception of their satisfaction with the barefoot doctors' attitudes to the health services, 10.5%, 10.0%, and 13.5% of the consumers who responded in Fengxian,

Shanggoa, and Loaan, respectively, indicated that they were dissatisfied; the differences were, however, not significant.

Conclusions

Reasons for the decline of CMS in the study areas

In the past, the CMS was the mainstay of medical care and public health in rural China, but there are signs that it is deteriorating. From 1978 to 1986 the per capita income, living standards, and nutrition improved dramatically, while per capita expenditures on health increased; however, various indicators of health status deteriorated during this period. Without the CMS, the barefoot doctors have little chance to update their medical knowledge and skills, no means to buy equipment such as autoclaves, and minimal office space in which to practise. Furthermore, they now spend more time on farming and less on health work (unpublished data, Bureau of Public Health, Fengxian, Shanggoa and Loaan counties, 1986).

From the results of the study the conclusions shown below can be drawn.

- The decline of the CMS cannot be attributed solely to changes in the rural economic structure. Economic reforms occurred everywhere in China after 1980; however, the changes in the CMS were not uniform, and in Fengxian, rather than weaken the collective insurance scheme, they consolidated it.
- Poor economic development does not explain the decline. For example, in Loaan and Shanggoa, the CMS worked well when the annual per capita income levels were low, and the decline occurred from 1978 to 1985 when income levels increased threefold.
- There is no evidence that the deterioration of the CMS was brought about by increases in personal income that, in turn, stimulated demand for more sophisticated health services. Of the three counties studied, the health services were used to the greatest extent in Fengxian; over the study period the number of annual visits per person to barefoot doctors increased and 99.7% of its population preferred the CMS to other health services. On the other hand, in Shanggoa and Loaan the use of higher level health services did not expand greatly with increases in income: however, the use of barefoot doctors decreased markedly.
- The decline cannot be attributed to any financial deficiencies in the system itself, since no cooperative health station had a financial deficit, and the vast majority of the households surveyed felt that the premiums charged were in keeping with their ability to pay.
- The decline was not associated with inadequate facilities or equipment in the health centres, since the space available to barefoot doctors and the number of autoclaves for their use were better than those currently available to fee-for-service local practitioners in Shanggoa and Loaan.
- There is no evidence to suggest that the decline can be attributed to inadequately trained barefoot doctors. The pass rate for the qualifying examination was lowest in Fengxian, where the CMS functions essentially unchanged. Also, the general trend in the years preceding the major decrease in the CMS coverage was for pass rates to increase.
- The barefoot doctors who were interviewed felt that they were badly paid under the CMS, and indeed their income was less than that of brigade leaders. As a result, several doctors left to pursue more lucrative occupations. Nevertheless, barefoot doctors still strongly support the system, and low income alone does not appear to be the major reason for its decline.

The data in this study do not conclusively establish what caused the decline of the CMS and its barefoot doctors in rural China. The decline does not appear to be associated with poor medical or fiscal performance, lack of accessibility, or inadequate facilities within the CMS. Dissatisfaction with the system by barefoot doctors or their patients has also not been common. In recent years, rural economic development may have given many peasants increased incomes with which to pay for higher-level medical services than those provided by the barefoot doctors, however, the decline in the use of barefoot doctors occurred without concomitant increases in the use of higher-level facilities.

The per capita cost of the CMS was minimal, and in the 1970s most local administrative leaders considered promotion of its development to be government policy. The costs of the CMS continue to be low, but individuals in rural China, like those in other countries, may not wish to pay for preventive services unless encouraged to do so by the government. Local community leaders now feel that the government has stopped actively promoting the CMS and its barefoot doctors, and this may be the major reason for its decline. This is in accord with the report of a WHO Study Group on Community Health Workers, which concluded, *inter alia*, that "political will, national commitment, and community involvement are necessary preconditions of effective Community Health Worker programmes .." (*28*).

Ways should nevertheless be found to retain the best aspects of the CMS, while at the same time allowing a broader range of economic self-determination for the rural inhabitants in China.

Résumé

Facteurs associés au déclin du système des coopératives médicales et des médecins aux pieds nus dans la Chine rurale

Le Système des coopératives médicales (SCM) et de ses médecins aux pieds est en déclin dans la Chine rurale depuis près d'une dizaine d'années. Pour élucider les raisons de cerecul, nous avons mené en 1987 une enquête auprès des villageois, des médecins aux pieds nus et des administrateurs locaux dans les comtés de Fengxian, Shanggoa et Loaan où les habitants jouissent de revenus respectivement satisfaisants, moyens et faibles. On a mis en regard la situation du SCM telle qu'elle se présentait dans ces trois comtés et celle qui régnait en 1978, 1982 et 1985, années durant lesquelles le système atteint son maximum d'efficacité, puis a commencé à décliner et, finalement, sést trouvé très affaibli.

Pour l'enquête, on s'est servi d'une méthode de sondage à deux échelons, qui a permis de choisir un échantillon aléatoire de villages dans lesquels on a interrogé l'ensemble du personnel des postes sanitaires, des médecins aux pieds nus et des administrateurs, ainsi qu'un échantillon aléatoire de ménages. Des données ont été rassemblées sur les opinions des administrateurs locaux concernant le SCM, sur le degré de satisfaction professionnelle des médecins aux pieds nus, sur leur formation, sur la façon dont ces médecins comptabilisaient leur temps et sur l'adéquation des ressources mises à la disposition des postes sanitaires.

L'état de santé, mesuré par la mortalité infantile, par la couverture vaccinale et par les taux de morbidité infectieuse a marqué un déclin dans les trois comtés enquêtés, alors que le revenu par habitant augmentait. Les dépenses consenties pour les soins de santé ont également augmenté du fait que les villageois doivent maintenant payer eux-mêmes leurs soins médicaux, ceux-ci n'étant plus pris en charge par un système d'assurance à pré-paiement. Les médecins aux pieds nus et leurs patients étaient raisonnablement satisfaits du SCM, lequel s'est révélé financièrement sain dans toutes les zones enquêtées. Cependant, les médecins ause pieds nus n'ont plus accès désormais à une formation continue et, dans les régions où le système a cessé de fonctionner, beaucoup ont abandonné les activités médicales pour s'adonner à l'agriculture ou entrer dans l'administration locale.

Le SCM continue d'être très actif dans certaines régions, en particulier le comté de Fengxian qui est relativement prospère. Son déclin ne paraît pas lié directement à des difficultés financières, à l'incapacité de susciter des améliorations de la situation sanitaire ou à un mécontentement de la part des villageois ou des médecins aux pieds nus. Le déclin est plutôt à associer au fait que nombre d'administrateurs locaux s'aperçoivent que le système ne bénéficie plus du soutien des autorités centrales.

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