

Considerable advances have been made in the development of health human resources in China over the past four decades. The principal focus of health manpower policy has been on increasing the quantity of available health personnel to ensure that the rural population has access to basic health care services. This goal has largely been achieved, as indicated by recent surveys that show the majority of rural inhabitants see a health worker when they are ill (Tang *et al.* 1994; Henderson *et al.* 1994). These quantitative gains are documented in Section 1.

Section 2 presents evidence which suggests that the quality of doctors in rural health facilities is variable. An examination of the training backgrounds of doctors reveals that many types of health personnel with differing educational backgrounds and competencies have the title 'doctor'. Some have not undergone formal training at all, yet are permitted to engage in specialist technical work. In some areas there is a shortage of qualified personnel. The final section suggests policies to ensure that health personnel of an adequate quality are available in rural health facilities.

1 Quantitative Analysis of Human Resources

1.1 Availability of health personnel

In 1949, there were about half a million technical health personnel in China, three-quarters of whom were doctors (MoPH 1989). This includes traditional Chinese medicine (TCM) doctors, Western-trained senior doctors and assistant doctors. In 1952, the majority of senior doctors worked in urban areas, while almost three-quarters of Western-trained assistant doctors worked in rural areas. Four-fifths of doctors in rural areas were TCM doctors (MoPH 1989). The availability of doctors in rural and urban areas was already high, even in comparison to other countries today (Zhou 1995). However, the quality of doctors included in these estimates is not known: the estimate of the numbers of TCM doctors probably includes personnel 'ranging from poorly educated pill peddlers to well-trained and experienced practitioners' (Sidel and Sidel 1982: 27).

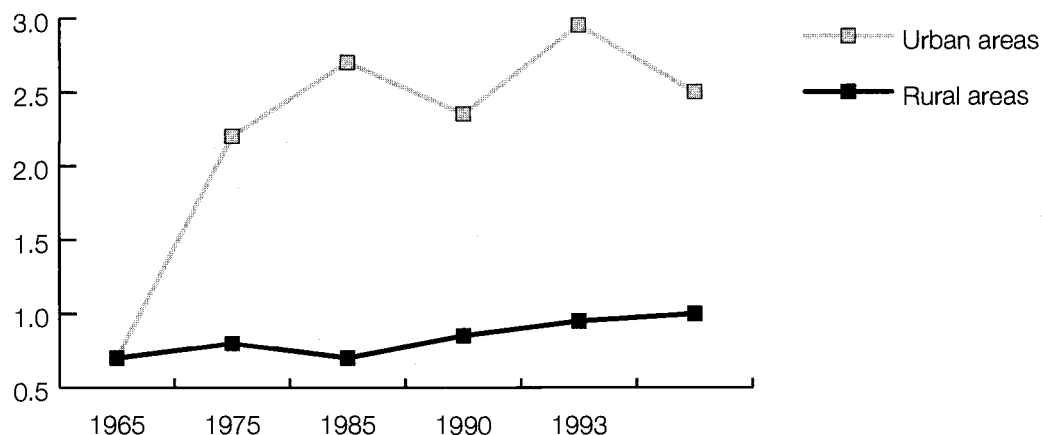
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Health Human Resources in Rural China

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Figure 1 Doctors per thousand population in rural and urban China (1949-1993)



Source: Zhou (1995)

Figure 1 shows the progress that has been made in the past 47 years in increasing the numbers of doctors per thousand population in urban and rural areas of China.² During this period, the number of doctors per thousand increased 2.4 times. The increase in the numbers of doctors was due largely to increases in the numbers of Western-trained doctors and assistant doctors. In 1949, TCM doctors accounted for three-quarters of all doctors, but by 1988 the proportion had decreased to one fifth.

The increase in the number of doctors per thousand population was faster in urban areas than rural areas until the late 1970s. The distribution of doctors between rural and urban areas remains unequal, but the differential has steadily narrowed over the 1980s and early 1990s. In 1993 there were 1.02 doctors per thousand population in rural areas. This figure includes senior doctors, who should have three or more years of formal medical training, and assistant doctors, who should have two or three years secondary medical school education. If only senior doctors are considered, the figure is 0.65 per thousand (Zhou 1995). The availability of doctors is significantly higher in China than in rural areas of many other developing countries, such as India (0.08), the Philippines (0.24) and Thailand (0.05) (Zhou 1995). It is close to the ratio for the United States (0.64).³ By these

indicators, it appears that there is no shortage of doctors in rural China. However, many doctors in China have not received the same training as those in other countries.

The situation is different in rich and poor areas (Table 1), although the gap is not large. The availability of health personnel and doctors in poor areas of China is relatively high in comparison to the averages for some other developing countries. However, Section 2 shows that despite the definitions of senior doctors and assistant doctors in terms of varying training backgrounds given above, many personnel in both categories have received less formal training than implied by their title. There is a shortage of qualified personnel in some localities. This highlights the difficulties of making international comparisons, since definitions of what constitutes a doctor differ.

1.2 Workloads

Workers in the public health system were previously guaranteed jobs for life, though at low wage levels. Competition through a labour market was not permitted and managers were not allowed to dismiss excess staff. Health facilities have not been encouraged to limit staff numbers, since government subsidies have been calculated on the basis of

² Although they make important contributions to health care delivery in China, village health workers are not considered in this article.

³ Definitions of 'rural' and 'urban' vary. The U.S. figure refers to towns of less than 500,000 population. Many large towns which are considered 'rural' in China, would be categorised as 'urban' in other countries.

Table 1 Socioeconomic and health personnel indicators in rural areas (1992)

	Rural average	Wealthy	Well-off	Sustainable	Poor
No. of counties surveyed	65	16	20	21	8
Av. population per county	495,754	438,670	628,116	442,793	229,298
Av. per capita income (Yuan)	747	1018	755	633	501
Health personnel per thousand	2.1	2.9	2.0	2.1	1.5
Doctors per thousand	0.9 ^a	1.2	0.9	0.9	0.5

Note: ^aThe difference with the ratio reported in Zhou (1995) is probably due to the sample surveyed.
Source: MoPH (1994)

staff size, without relating staffing needs to demand for services or staff performance.

In recent years the increase in personnel has been more rapid than the rise in use of outpatient and inpatient services. For example, between 1984 and 1992, the number of outpatient and inpatient visits to township health centres decreased by almost 17 per cent. Between 1985 and 1992, the number of doctors in township health centres increased by around 15 per cent (MoPH 1990; MoPH 1993). This suggests that the productivity of health personnel is declining. A calculation on the basis of data from a national survey (MoPH 1994) reveals that in 1992 the total number of clinic visits⁴ per doctor per day averaged around 12 in county hospitals and 12.5 in township health centres. These figures suggest that doctors in rural areas have low workloads.

The increase in the availability of health personnel in rural areas was essential to the success of the three-tier health system. However, in many areas, the increase in numbers of personnel needs to be limited in order to increase the productivity of staff and the efficiency of resource use within hospitals and health centres. The importance of these issues has been recognised by the Minister for Health, Chen Minzhang (Chen 1993). A shift in priorities from quantity to the quality of health care services is occurring in China, as elsewhere (Tipping *et al.* 1995; Hornby 1992). The quality of human resources has become a key concern.

⁴ This includes inpatient and outpatient visits, where it is assumed as a rule of thumb that one occupied bed day is equal to 2.5 outpatient visits. Both qualified doctors and assistant doctors are included.

2 Qualitative Analysis of HHR in Rural Areas

Summary information on the availability of doctors indicates little about their quality. As in other countries, better qualified personnel are unwilling to serve in rural areas and at lower level facilities. In addition, factors peculiar to China have meant that many types of health personnel with differing educational backgrounds and competencies have the title 'doctor'. This section examines the pre-service training backgrounds of various types of doctor in county hospitals and township health centres. County hospitals primarily provide curative services while township health centres have both curative and preventive functions within the rural health care system (Tang 1997). This analysis is used to assess the implications of past quantitative gains for the quality of human resources and of the health services to which rural populations have access.

2.1 Relationship between title and training

Statistics on doctors, such as those presented in Section 1, include graduates of different levels of training institution. In the 1950s and early 1960s, the government expanded the number of medical training institutes. In addition to medical universities, intermediate level medical schools were established to train assistant doctors, modelled on Soviet feldshers. More recently, post-secondary medical colleges have trained fully qualified doctors on accelerated courses.

Table 2 describes the training provided by institutions which supply different types of personnel.⁵ The duration of training and entry criteria differ

Table 2 Levels of medical training institute and qualifications

Level	Training institute	Duration of training	Title obtained	Enrolment prerequisite
1. National, province and municipality	Medical university or college	5 years plus post-graduate training	Qualified doctor	Senior high school graduate (12 years general education)
2. Province, city and prefecture	Post-secondary medical college	3 years	Qualified doctor	Senior high school graduate (12 years general education)
3. Prefecture or city	Secondary medical school	2-3 years	Assistant doctor (includes nurses, midwives, MCH doctors, public health doctors, technicians)	Junior high school graduate (9 years general education)
4. County	County health school	less than 2 years	Village doctor	High school or less

Source: compiled by author

between the various types of doctor. 'Qualified doctors' are graduates of medical universities or post-secondary medical colleges who have received at least three years' formal training after graduation from senior high school.⁶ 'Assistant doctors' are graduates of secondary medical school with two or three years of formal vocational training after graduation from junior high school.

There are a number of ways in which differences between titles become less distinct. Within a hospital or health centre there is little differentiation between doctors with different training in terms of the functions they perform. All qualified doctors and assistant doctors have the right to prescribe drugs. Assistant doctors and qualified doctors receive similar basic wages, but there are significant differences between the wages of staff bearing the same title, since payments increase with years of service.

In addition to the titles of new graduates described above, technical health personnel are divided into three different ranks. Senior personnel including

titled doctors, chief doctors, and deputy and medical directors have training, supervisory and managerial roles. Intermediate ranks include assistant doctors, and junior ranks include nursing auxiliaries. Each titled doctor is in charge of a certain number of beds within a ward, and is assisted by assistant doctors. The work of several titled doctors is supervised by a chief doctor, who is answerable to the deputy directors and medical director.

One route to titled positions is the education system, described above. Another route is through promotion. In the past, an assistant doctor could be promoted to the position of 'titled doctor', or even 'chief doctor', after serving for a number of years. People promoted to such positions may only have a high school education without any pre-service medical training. Most have many years of practical experience, having achieved their promotion through long service, and some may have received in-service training (e.g. correspondence or TV programme training course).⁷ This promotion system does not systematically ensure that promoted personnel possess the knowledge and skills appropri-

³ Training institutes are government run but training courses are not standardised. The quality of training institutions is not assessed in this article.

⁶ The three-year courses offered by post-secondary medical colleges cover roughly the same material as the five-year curricula of medical universities, but place more emphasis on clinical subjects and less on basic sciences.

Table 3 Percentage of titled doctors and assistant doctors with various training backgrounds at county and township levels

	Titled doctors		Assistant doctors	
	Rural average	Poor	Rural average	Poor
County Hospitals				
medical university or college	16.5	17.6	-	-
post secondary medical college	19.2	19.1	2.3	1.5
secondary medical school	48.9	54.8	57.2	73.0
senior high school	7.0	1.6	23.1	13.6
junior high school	8.4	6.9	17.4	11.9
Township Health Centres				
medical university or college	3.9	0.0	-	-
post secondary medical college	15.5	18.5	1.0	0
secondary medical school	40.3	48.2	57.0	71.1
senior high school	14.3	14.8	19.0	11.1
junior high school	26.0	18.5	25.0	17.8

Source: MoPH (1994)

ate to the technical tasks they are permitted to perform. The following two subsections examine the extent of this problem.

2.2 Levels of training among titled doctors

Table 3 presents data from a national survey on the training backgrounds of titled doctors. This is defined to include qualified doctors, as well as personnel who have been promoted. In county hospitals, one third of titled doctors are qualified doctors with medical university or post-secondary medical college training backgrounds; half were promoted from the position of assistant doctor, as indicated by their secondary medical school education; and a sixth have not received any formal pre-service medical training.

The proportion of titled doctors in township health centres with medical university or college education is less than that at county level facilities. A very small proportion of titled doctors in township

⁷ In-service training and informal education have been important in China's health sector, but no data are available.

health centres are university graduates, and many health centres in poor counties have none at all. A third of titled doctors at the township level have had no pre-service medical training.

2.3 Levels of training among assistant doctors

Assistant doctors constitute a significant proportion of health personnel in county and township level health facilities. Table 3 shows that at both the county and township level, over 40 per cent of assistant doctors have not received formal medical training. In poor areas, a higher proportion of assistant doctors are appropriately trained.

2.4 Distribution of doctors by rank

Senior personnel have training and supervisory roles. Table 3 shows that senior personnel (such as titled doctors) are not necessarily better trained than their subordinates, although they have generally been promoted on the basis of experience and competence. The national survey data show that in 1992 at the county level, four per cent of doctors were senior doctors. The proportion was less than three per cent in poor counties. At the township level there were

Table 4 Loss rates among better qualified health personnel in poor counties

Location	No. of Counties	Year	Type of Personnel	Loss Rate (%)
Sichuan ^a	11	1980-90	qualified doctors	84.7
Hubei ^a	1	1970-90	qualified doctors	90.0
Xizang ^a	10	1981-85	qualified doctors chief doctors	77.8 91.3
National Survey ^b	20	1986-87	qualified doctors at township level	90.0
Guangxi ^a	1	1980-93	qualified doctors and assistant doctors	80.3
Shanxi ^a	10	1978-91	qualified doctors and assistant doctors	82.4
Guizhou ^c	1	1970-90	qualified doctors	91.0
Guangxi ^c	1	1980-94	qualified doctors at township level	100.0

Sources: ^a Nong (1995), Jiang (1994), Wang (1989), Shan (1994), Yu (1992); ^b MoPH (1991);
^c IDS-SMU case studies

few senior doctors at all. In urban hospitals almost nine per cent of doctors were senior doctors.

This distribution can partly be explained by the role of county hospitals as the major providers of curative care within the rural three-tier health network. County hospitals receive referrals of more complicated or serious cases from township health centres and undertake more complex technical procedures. However, the lack of experienced doctors in poor areas and at the township level may have an impact on the quality of services provided by junior staff.

2.5 Attrition among skilled personnel in poor rural areas

Part of the explanation for this distribution of personnel lies in the recent development of a labour market for health personnel. Since the early 1980s, the policy of allocating jobs by the state has been relaxed. Staff remuneration is composed of a basic salary as well as a bonus related to an institution's self-generated revenues. Higher level facilities are better able to generate incomes from the provision of specialised services. More experienced and better

trained staff therefore prefer to seek better paid positions in county or urban hospitals.

Table 4 presents the loss rates among skilled personnel during the 1980s for selected poor counties. More than 80 per cent of qualified doctors have been lost to poor counties over the last 15 years, and in some counties the loss rate has reached 90 per cent. One response to the loss of better qualified staff has been to promote a large number of middle-level and non-professionally trained personnel to senior positions.

In the past, students in post-secondary medical colleges were drawn from rural areas and were assigned posts in rural areas after graduation. Most colleges have now been upgraded to universities and no longer maintain their rural orientation. New university graduates, who are often of urban origin, are unwilling to work in rural areas. The loss of skilled personnel and the inability to attract well-qualified recruits has resulted in a lack of senior personnel in rural areas. In poor areas, a higher proportion of assistant doctors are appropriately trained (Table 3), but many work relatively unsupervised owing to a lack of senior staff.

2.6 Discussion

This section has identified three features peculiar to China's corps of technical health personnel. A large proportion of health personnel have lower levels of professional medical training than implied by their rank and title. Many health personnel have not had any formal training at all, yet these non-professional personnel are permitted to engage in specialist technical work. Senior ranking and better qualified personnel are distributed unevenly between county and township facilities, and between richer and poor rural areas.

The weak link between training backgrounds and titled positions has been made possible by the promotion system in which experience has been used as a criterion for promotion. The adoption of this promotion system was a response to the shortage of trained personnel and to broader political factors. During the Cultural Revolution (1966-1976) there was widespread political opposition to elitism. Ranking by titles was opposed and promotion of any kind stopped for over 10 years. Senior staff were given the same duties as junior staff and untrained staff were put in supervisory positions. In 1978 the promotion system was revived, but because large numbers of personnel had not been promoted for many years the criteria for promotion were relaxed.

With the development of a labour market for health personnel during the 1980s, many skilled personnel have left rural areas while new university graduates are unwilling to serve in rural areas. To compensate for the resulting shortage of senior personnel, rural health facilities often promoted personnel with secondary medical school education or experienced personnel with no pre-service training. This personnel management strategy has neither stemmed the outflow of better qualified health personnel, nor raised the quality of health care services provided.

3 Summary and Policy Suggestions

Past approaches to human resource development were a response to the need to provide access to basic health services. However, these strategies and more recent economic and health sector reforms have left a legacy of a number of problems in rural areas, particularly in poorer areas. Little attention

has been paid to the quality of personnel or the efficiency of human resource utilisation. Related issues in human resource management, such as remuneration, staff motivation, career development, continuing training and supervision have also been neglected. This section discusses current policies which are intended to address these issues and suggests a number of additional policies.

3.1 Health human resources management

A key problem which China's health human resources strategy must address is the need to ensure the supply of personnel of an adequate standard to rural facilities. Employment and promotion policies must be redesigned to ensure the deployment and retention of well-trained personnel in rural areas.

Placing trained health personnel in rural areas.

Higher level training institutes should have a rural orientation, enrolling students from rural areas, providing courses appropriate to rural health needs, and assigning graduates to positions in rural areas. Experiments have recently begun with a variant of this rural orientation policy in prefectural secondary medical and county medical schools which train assistant doctors. Newly enrolled students sign agreements with the school that they will serve in rural areas for at least eight years. In return the school does not charge for tuition and provides a maintenance grant. The government should subsidise schools implementing this form of rural orientation, and such schemes should be implemented widely and extended to higher level training institutes. To ensure that graduates of higher level training institutes serve in rural areas, the placement of new graduates in rural areas for fixed periods would be a beneficial policy. Completion of rural service should be a prerequisite for full graduation or promotion.

Preventing further loss of well-trained personnel.

In the current situation, providing incentives through the remuneration system to enable medical university graduates to be deployed in rural areas and to be retained there to become experienced doctors, is difficult to envisage. Many health facilities in poor areas find it difficult to finance wage increases (Shu *et al.* 1997; Chen 1997), and local governments have limited capacity to provide financial support for increasing the salaries of senior personnel (Zuo 1997).

Regulation of employment and promotion. Most hospitals and health care facilities have ceased promoting personnel to titled positions for which they are unqualified, and no longer employ personnel with no pre-service medical training in jobs involving technical procedures. Legal regulation of employment and promotion has been identified as one means for ensuring that health care services are provided by personnel with appropriate skills and training backgrounds.

A new Physician's Law is being reviewed by the Standing Committee of the National People's Congress, and should be passed in 1997. This law will establish procedures governing manpower planning, training and management. Its major contents will include: first, a licensing system for physicians, in which possession of a licence based on examination is a prerequisite for employment. In the coming years, the numbers of privately practising doctors is likely to increase, and licensing will be a basic measure for managing the private health sector. Second, the title 'titled doctor' will be reserved for those who have completed formal medical training for three or more years at a medical university or post-secondary medical college. Others will have the title 'assistant', and assistant doctors will not be allowed to become titled doctors. Those who have not received formal medical training, regardless of how long they have practised medicine or the length of in-service training received, will not be eligible for promotion to the position of 'doctor'.

Although the law's contents are not finalised, some points should be noted. First, the law will regulate training prerequisites for employment and promotion, but will not regulate the functions performed by doctors once they are employed. There is a need to develop the regulation of functions in the future. Second, the law will probably apply only to new employees. Personnel who are currently employed as doctors or assistant doctors will most probably be granted licences automatically. It will therefore be necessary for those whose knowledge and skills do not meet the requirements of their position to be trained. After certification they could return to their position, or failing certification leave their position.

Raising productivity. In the former 'fixed employment' system, government subsidies were calculated on the basis of numbers of staff, so hospital

directors had no incentive to limit staff numbers. In the future, health facility directors must raise the quality and productivity of staff. The calculation of subsidies should be based on a system which relates staffing needs to workloads, and which specifies the duties of each person according to their position. Those facilities which are successful in decreasing staff numbers without any change in the services provided could therefore increase the wages and bonuses of the remaining staff.

In other sectors of the economy, large-scale redundancies have been difficult to implement, despite the obvious efficiency benefits for individual units. Alternative strategies include reducing the bonuses of departments with excess staff and low productivity while maintaining basic salaries, sending personnel on full-time and part-time training courses, and relocating excess staff from some units to others with insufficient staff.

3.2 Human resource planning and training

Pre-service training. In 1992 the Health Education Department of the Ministry of Health proposed guidelines for the employment of new personnel in health care facilities at each level according to their training backgrounds. The intention is to raise the educational backgrounds of health personnel to the target levels by the year 2000. The guidelines state that a majority of new staff in county hospitals should be university and post-secondary medical college graduates, and a significant proportion of doctors should be senior ranking personnel. In township health centres, the majority of new staff should be post-secondary medical college graduates with some secondary medical school graduates. The challenge this presents can be seen from the data presented in this article. For example, in 1992 in wealthy areas 38 per cent of county hospital doctors were university or post-secondary medical college graduates, compared to a target of 50 per cent to be met by 2000.

These guidelines and targets have yet to be translated into detailed plans for enrolment requirements and the supply of new personnel. While this brief discussion draws attention to the need to integrate human resource planning with training, it should also be recognised that without appropriate personnel management policies, the desired

improvement in the quality of rural health personnel will neither be achieved nor sustained. This article has also drawn attention to the need to relate staffing mixes to workloads in order to raise productivity. Translating this conclusion into practice will require further research into staff workloads and the demand for health services in order to make the composition and structure of personnel appropriate and raise the efficiency of human resource utilisation (see Hornby 1992).

In-service training. For the large numbers of personnel already employed in positions for which their

educational background is insufficient, planning of in-service training will be required. The national health services survey suggests that among currently employed personnel, 70,000 hospital doctors, 220,000 township health centre doctors and 730,000 village doctors require in-service training. Faced with a problem on this scale, a national training plan should be established which sets out the guiding principles for training and its requirements. Such a large-scale effort will require the allocation of substantial financial resources, so the integration of this training strategy with wider health planning activities will also be essential.

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