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Quantity, Quality, and Distribution of Health Personnel by Ethnic Group in Yunnan Province: 1982-1990

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Abstract

Throughout the world, there has been a concern with how to attract health care personnel to rural, remote, and less-developed areas. Professionals prefer to locate in larger, more developed places, with better resources for their occupation, and with better social and cultural services for themselves and their families. In many countries, policies to recruit and retain health personnel in rural and remote areas have been unsuccessful. There often is a trade-off for rural, remote, and minority areas between having health personnel with a low level of training and having no health personnel at all.

It is also thought desirable to provide nationalities with health personnel who are members of that nationality, even though members of one nationality could receive health care from members of another nationality. Members of a nationality are likely to understand health-related preferences and concerns among that nationality more completely than would members of other nationalities. Also, members of minority nationalities may speak only their own native language. It is important that health personnel be available who can communicate with patients in a common language.

This paper examines the quantity, quality, and rural-urban distribution of health personnel by nationality in Yunnan Province in 1982 and 1990, based on micro-data from the 1982 and 1990 Censuses of China. Yunnan Province had the largest number of different nationalities in substantial numbers of any Chinese province. Among the findings about health personnel in Yunnan are:

- Between 1982 and 1990, although the number of health personnel increased by 19%, the number of health personnel per thousand population changed hardly at all.
- Nationalities differed greatly in the number of health personnel per thousand population.
- Differences in educational attainment of health personnel among nationalities decreased between 1982 and 1990.
- Post-secondary education among health personnel was extremely rare both in 1982 and in 1990.
- Between 1982 and 1990, the proportion of health personnel with secondary education increased enormously. By 1990, a secondary education had become almost a requirement for working in the health field.
- Health personnel tended to be located in rural areas to a greater extent than is typically true in developing countries. The more rural the residence of the population of a nationality, the more rural the residence of health personnel from that nationality. This is likely the result of Chinese population registration regulations, including the fact that only the college-educated can legally change from rural to urban household registration. Incentives for health personnel to increase their education have also been important.
- It is not clear whether future increases in privatization of health care, relaxation in the population registration system, increases in post-secondary education of health personnel, and a possible reduction of incentives for health personnel to upgrade their credentials will lead to an increase in the urban concentration of health personnel or to a decline in the credentials of health personnel in rural areas.

Data Used: 1% Sample of 1982 Census of China for Yunnan Province and 12.1% Sample of 1990 Census of China for Yunnan Province.
Throughout the world, countries are concerned with the provision of health care to the population. Governments have many aims: (1) to increase the provision of health care overall; (2) to expand the provision of health care to those groups and regions that have been relatively underserved; (3) to improve the qualifications of health personnel; (4) to limit the costs of the provision of health care. Health personnel prefer to work in larger, more developed places, with better resources for their occupation, and with better social and cultural services for themselves and their families. In many countries, policies to recruit and retain health personnel in rural and remote areas have been unsuccessful. There often is a trade-off for rural, remote, and minority areas between having health personnel with a low level of training and having no health personnel at all.

There has also been much concern in the literature with the way social institutions, such as the health system, interact with members of minority ethnic groups. These concerns center around cultural sensitivity and communication skills in light of different views of health and illness and of the value of schooling. Members of a nationality are likely to understand health-related preferences and concerns among that nationality more completely than would members of other nationalities. Also, members of minority nationalities may speak only their own native language. It is important that health personnel be available who can communicate with patients in a common language. Therefore, it also is thought desirable to provide nationalities with health personnel who are members of that nationality, even though members of one nationality could receive health care from members of another nationality.

This paper examines the quantity, quality, and distribution of health personnel by nationality in Yunnan Province in 1982 and 1990, based on micro-data from the 1982 and 1990 Censuses of China. Yunnan Province has the largest number of different nationalities in substantial numbers of any Chinese province.

Developments in China in the 1980s lead to different expectations about changes in the quality and quantity of health personnel by nationality. On the one hand, in many areas marketization increased in the 1980s. There has been a debate about the extent to which marketization inevitably results in increasing differences among areas and population subgroups in availability of services and the standard of living (Aguignier 1988; Falkenheim 1988; Linge and Forbes 1990). One might expect that market forces would increasingly dictate the location of health personnel. In many developing countries, these forces have led to concentration of health personnel in urban areas and sometimes to a decline in availability of health personnel to minority nationalities, especially if these nationalities are concentrated in rural and remote areas. On the other hand, the Chinese government has expressed a strong concern about improving social welfare of those in rural and remote areas (Chen 1981; Kane 1985; Lucas 1982; Rosenthal 1987). In the health area, there have been incentives for health personnel to upgrade their credentials.

We find that marketization has not led to a decline in the availability of indigenous health personnel

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1 The term “nationality” is used in the sense it is used in China. It is roughly equivalent to the Western use of the term "ethnic group." Nationality does not refer to citizenship in a separate country.

2 The authors used a 1% sample from individual records from the 1982 Census of China for Yunnan Province and a 12.1% sample from the individual records from the 1990 Census of China for Yunnan Province.

3 This has been a concern in former state socialist countries in Eastern Europe and the former Soviet Union, as marketization has increased and the role of the social welfare system has decreased (Zaslavskaya 1990; Zimakova 1994).
to minority nationalities in Yunnan and that the qualifications of health personnel improved during the 1980s. Among the specific findings are:

- Between 1982 and 1990, although the number of health personnel increased by 19%, the number of health personnel per ten thousand population changed hardly at all.

- Nationalities differed greatly in the availability of indigenous health personnel.

- There was little difference among nationalities in the educational attainment of health personnel. Differences among nationalities in educational attainment of health personnel decreased between 1982 and 1990.

- Post-secondary education among health personnel was rare both in 1982 and in 1990.

- Between 1982 and 1990, the proportion of health personnel with secondary education increased enormously. By 1990, a secondary education had become almost a requirement for working in the health field.

- Policies to encourage health personnel to upgrade their credentials, including financial incentives to acquire a secondary education, seem to have had a strong impact on education of health personnel in rural as well as in urban areas.

- Health personnel tended to be located in rural areas to a greater extent than is typically true in developing countries. The more rural the residence of the population of a nationality, the more rural the residence of health personnel from that nationality. This is likely the result of Chinese population registration regulations, including the fact that only the college-educated can legally change from rural to urban household registration. Financial incentives for health personnel to increase their education have also been important.

- It is not clear whether future increases in privatization of health care, relaxation in the population registration system, increases in post-secondary education of health personnel, and a possible reduction of incentives for health personnel to upgrade their credentials will lead to an increase in the urban concentration of health personnel or to a decline in the credentials of health personnel in rural areas.

### Major Nationalities in Yunnan

This paper concentrates on the eight largest nationalities in Yunnan. Figure 1 shows the number of members of each of these nationalities in Yunnan in 1990. Although the majority of the population of Yunnan in both 1982 and 1990 was comprised of Han, each of these eight nationalities numbered more than 500,000 in 1990.

Han and Hui both have Chinese as native language. The other six groups each have a language other than Chinese as native language. Thus, although Han and Hui health personnel could communicate freely with members of both nationalities in their native language, they could not do so
with members of other nationalities who only spoke their group's native language.\textsuperscript{5}

![Graph: Population of Major Nationalities in Yunnan in Thousands, 1982 and 1990]

**Figure 1. Population of Major Nationalities in Yunnan in Thousands, 1982 and 1990**

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**Recent Changes in the Health Care System in China**

The health care system in China prior to the 1980's was a multi-tiered arrangement with the commune or brigade level clinic at the base. Above these units associated with production were the commune clinics, which were feeders to the district hospitals which served 4-6 communes. Conditions requiring more sophisticated care were dealt with at the county level hospitals.

Marketization of the Chinese economy in the 1980s led to an emergent fee-for-services health care system, in which the health provider charged for both for drugs prescribed and sometimes for consultations. With the responsibility system in agriculture and the elimination of work points, local health workers obtained most of their income through buying medicines wholesale and selling them retail (Rosenthal 1987; World Bank 1990). There was also a long term decline in the number of commune clinics and a corresponding increase in the general hospitals. This was counter to public policy which had been to increase the capacity of the commune level facilities and reduce the number of referrals to the county hospitals. This development is consistent with general observations that the smaller a clinic, the less well-utilized it is (Jamison 1985).

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\textsuperscript{5} Many of these nationalities had a low educational level in 1990. For example, only 53% of Miao boys age 7-15 in 1990 had ever attended school, and only 67% of Dai boys age 7-15 in 1990 had ever attended school. Lack of schooling and lack of fluency in the Chinese language is even more common among older members of these nationalities. There were policies in Yunnan to promote knowledge of local languages by health personnel. However, many regions of Yunnan contain several different nationalities, each with their own native language.
Availability of Indigenous Health Personnel by Nationality

It is unclear what effect these various changes in the health system in China would have had on the availability of health personnel in Yunnan. The number of health personnel in Yunnan increased by 19% from 1982 to 1990. However the population increased by 13% in those eight years, with the result that there was almost no change in the number of health personnel per 10,000 population in Yunnan between 1982 and 1990. For Yunnan as a whole, there were 31 health personnel per 10,000 population in 1982 and 33 health personnel per 10,000 population in 1990.

Figure 2 shows the number of indigenous health personnel per 10,000 members of a nationality for each of the eight largest nationalities in Yunnan. Of course, health personnel from one nationality could treat patients from another nationality, but members of different nationalities would be more likely to differ in conceptions of health and the causality of disease, as well as possibly not being fluent in a common language. An extensive literature shows that in Western countries health care providers do not relate equally effectively with all segments of the population. One issue has been whether members of the same gender and/or ethnic group relate more effectively with patients.

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6 The availability of health personnel are often presented in the literature per 1,000 population rather than per 10,000 population. In this paper, we present the data per 10,000 population due to the generally low numbers and, thus, to avoid the necessity of referring to numbers with decimal points.

7 For a discussion of factors related to different models of disease causation see Fosu (1988).
In Figure 2, the value for 1982 is plotted on the horizontal axis. The value for 1990 is plotted on the vertical axis. If there were no change between 1982 and 1990, the value would lie on the diagonal of equal values in 1982 and 1990. This diagonal of equal values is shown in the figure. Values plotted above the diagonal show that the availability of indigenous health personnel increased between 1982 and 1990; values below the diagonal show that the availability of indigenous health personnel decreased between 1982 and 1990.

At both dates, there were large differences among nationalities in the number of health personnel per 10,000 population. The eight nationalities fall into three groups, the Han, Hui, and Bai, with a fairly high availability of indigenous health personnel; the Zhuang, Yi, and Dai with a moderate availability of indigenous health personnel; and the Hani and Miao with a low availability of indigenous health personnel. Five of the eight nationalities increased in the availability of indigenous health personnel between 1982 and 1990, and three groups decreased in their availability. Those that decreased included the nationality with the lowest availability of indigenous health personnel in 1982 and also included the two groups with the highest availability in 1982.

**Education of Health Personnel**

The quality of health personnel is largely a function of the way in which these personnel are prepared. The current system in China reflects at least three different approaches to the preparation of health care personnel, the stages of development through which China has passed and changes in educational policy over the past 25 years.

Under the influence of missionaries from the West, a number of medical colleges were established in the early part of this century to train physicians in the patterns of Western medicine. These institutions were located largely in urban areas, and their graduates tended to practice in those parts of the country. This meant that most of the rural communities were served by traditional Chinese physicians, who were prepared through an apprentice system.

After 1949, there was a major effort to expand the number of health personnel through an increase and redistribution of medical educational institutions. This effort also included creation of institutions for the academic preparation of traditional Chinese practitioners. There was a shift from medical education centered in universities to that which had developed in the Soviet Union, where the emphasis was on free-standing institutions, each of which trained a particular type of health care provider. During this time greater attention was also given to the preparation of middle level health care personnel, such as assistant doctors, laboratory technicians, and nurses, in specialized secondary schools. In the late 1970s efforts were undertaken to reestablish a five year training program for health personnel. There was also an expansion of secondary medical schools.

In the late 1970s and early 1980s, the Chinese government implemented a number of incentives to raise the level of qualification of health personnel. Arrangements were made to allow assistant doctors to become associate doctors after five years of experience coupled with in-service training and passage of a qualifying examination (Rosenthal 1987: 99). One decree specified that health personnel with at least secondary education would receive pay at least at the level of local school teachers (Lucas 1982: 154).

In this study, we define "health personnel" as those whose occupation in the census is reported as "doctor," "nurse," or "health technician," regardless of their educational attainment. This is different from the practice in overall official Chinese statistics, in which a more restrictive definition of health personnel is used.
personnel is employed, which excludes those with a low level of education. Table 1 shows the number of health personnel in Yunnan in 1982 and 1990. This is shown for all health personnel and also divided into the three groups of doctor, nurse, and health technician. While the number of total health personnel increased by 19%, the number of doctors increased by 56%.

Table 1. Distribution of Health Personnel by Occupation and Education in Yunnan Province, 1982 and 1990

<table>
<thead>
<tr>
<th></th>
<th>1982</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage Educational Distribution</td>
<td>Percentage Educational Distribution</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>Primary Education or Less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23%</td>
</tr>
<tr>
<td>All Health Personnel</td>
<td>102,200</td>
<td>Doctors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurses</td>
</tr>
<tr>
<td>Health Technicians</td>
<td>37,700</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>Number</th>
<th>Primary Education or Less</th>
<th>Junior High School</th>
<th>Secondary School</th>
<th>Post-Secondary School</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>121,266</td>
<td>12%</td>
<td>20%</td>
<td>56%</td>
<td>12%</td>
</tr>
<tr>
<td>All Health Personnel</td>
<td></td>
<td>Doctors</td>
<td>61,162</td>
<td>7%</td>
<td>14%</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurses</td>
<td>34,035</td>
<td>7%</td>
<td>20%</td>
<td>72%</td>
</tr>
<tr>
<td>Health Technicians</td>
<td></td>
<td></td>
<td>26,068</td>
<td>32%</td>
<td>34%</td>
<td>32%</td>
</tr>
</tbody>
</table>

Both Western and Chinese doctors are included in the doctor category, and the various kinds of health technicians are included in the health technician category. Since we used a 1% sample from the 1982 census, the numbers for 1982 are those found in that sample multiplied by 100. Since we used a 10% sample from the 1990 census, the numbers for 1990 are those in that sample multiplied by 10.
Table 1 also shows the educational distribution of all health personnel and of each of the three categories of health personnel in 1982 and in 1990. At both dates, post-secondary education of health personnel was quite rare. In 1982 only 11% of all health personnel had post-secondary education, and this had increased only to 12% in 1990. In 1982, only 26% of doctors had post-secondary education, and only 21% of doctors had post-secondary education in 1990. A larger change in education of health personnel was the increase in the percentage who had at least secondary school education. This increased from 51% in 1982 to 68% in 1990. It also increased for each category of health personnel.

### Education of Health Personnel by Nationality

Table 1 referred to the education of all health personnel in Yunnan. Figures 3a and 3b examine the educational attainment of health personnel by nationality in Yunnan. Figures 3a and 3b show the relation between the percentage of health personnel with a secondary education or higher and the number of health personnel per 10,000 population. The number of health personnel per 10,000 population is shown on the vertical axis, and the percentage of health personnel with at least secondary education is shown on the horizontal axis. Figure 3a refers to 1982 and Figure 3b refers to 1990.

There is a clear shift to the right in the location of the nationalities between Figure 3a and Figure 3b. This indicates that although in 1982, for nationalities such as Dai and Miao, the majority of health personnel had less than secondary education, by 1990, the majority of health personnel from every nationality considered in this paper had at least a secondary education. Thus, despite the lack of change in availability of health personnel per 10,000 population between 1982 and 1990, there were important changes in the education of health personnel. Thus, the increase in secondary education of all health personnel shown in Table 1 was reflected in an increase in education of health personnel for all nationalities in Yunnan, especially of those with the lowest educational attainment in 1982.

The effects of the increase in the education of health personnel between 1982 and 1990 are shown in another way in Figure 4. Figure 4 shows the relation between the number of health personnel who had at least a secondary school education per 10,000 persons from the nationality in 1982 and in 1990. A value above the diagonal indicates that there was an increase between 1982 and 1990, while a value below the diagonal indicates that there was a decrease between the two dates. For every nationality except the Bai, there was an increase. The Bai had the highest availability of indigenous health personnel with at least a secondary education at both dates. Thus, this decrease between 1982 and 1990 should not be viewed as very serious. Figure 4 shows that if possessing at least a secondary education were considered a requirement for the effective delivery of health care, then the supply of reasonably well-trained health personnel increased between 1982 and 1990.

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* Percentages do not always add to 100% due to rounding.
Figure 3a. Presence and Education of Health Personnel by Nationality, 1982

Figure 3b. Presence and Education of Health Personnel by Nationality, 1990
Health Personnel in Rural Areas

Throughout the world, there has been a concern with how to attract health care personnel to rural, remote, and less-developed areas. In both the developed and the developing world, professionals prefer to locate in larger, more developed places, with better resources for their occupation, and with better social and cultural services for themselves and their families. In market economies, incomes of health personnel in urban areas are higher than in rural areas. Although countries have implemented a wide variety of policies to try to attract and retain health personnel in rural areas, in most cases, these policies have not been very successful (United Nations 1993: 43).  

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10 There have been major problems of development of rural areas in much of the world (Lipton 1977). Attracting health personnel to rural areas has been a persistent problem in the United States, in which a variety of plans have been tried to provide rural areas and small towns with doctors. These plans have not been very successful (Norton and McManus 1989; Pathman, Konrad and Hillman 1994). Countries such as South Africa are trying to formulate policies to improve the supply and quality of health personnel in rural areas, but it is not clear how successful these policies will be (African National Congress 1994). In Peru, 66% of all doctors live in the capital, Lima, although only 27% of Peru's population lives there; 70% of the physicians in Senegal live in the Dakar-Cap Vert region, although only 30% of the population lives there (United Nations 1993: 43). In many countries, the public investment in the health system is also much higher in urban than in rural areas (World Bank 1988: 135-136). The better health facilities in urban than in rural areas also make urban places attractive to health personnel.
There often is a trade-off for rural, remote and minority areas between having health personnel with a low level of training and having no health personnel at all. Even if there is a high availability of indigenous health personnel from a nationality, this does little good for the nationality if the nationality is mainly rural but if health personnel, especially well-trained health personnel, live in urban places.11

Figure 5 shows for each nationality the percentage living in rural areas12 among the total population of that nationality in Yunnan Province, among health personnel from the nationality in Yunnan, and among health personnel with a secondary education or higher from the nationality. Figure 5 presents a different picture than that for most developing countries. The majority of every nationality lived in rural areas. Almost all Miao (93%), Zhuang (94%), Hani (99%), and Dai (95%) lived in rural areas.

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11 A related issue is the location of health facilities within rural areas. Since rural populations are often very dispersed, the measurement of the actual accessibility of health facilities to rural people is a complex issue (Hobcraft 1985; Joseph and Bantock 1982; Mbacke and van de Walle 1992; Rosero-Bixby 1993; Thouez, Bodson, and Joseph 1988). This paper does not directly address the issue of location of health facilities within the rural area.

12 In the 1982 and 1990 censuses of China, there are four levels of rural-urban designation: (1) large city, (2) small city, (3) county of city, and (4) county of prefecture. "County of prefecture" is the most rural designation. In this paper, "rural" is defined as residing in a "county of prefecture" location.
For these extremely rural nationalities health personnel were also very likely to reside in rural areas -- Miao (78%), Zhuang (89%), Hani (97%), and Dai (91%). In addition, for every nationality, health personnel with secondary education or more were almost as likely to reside in rural areas as all health personnel from the nationality. Even for the extremely rural nationalities, health personnel with at least secondary education tended to live in rural areas -- Miao (73%), Zhuang (88%), Hani (95%), and Dai (89%).

Figures 6 and 7 compare the availability of health personnel in rural areas in 1982 and in 1990. Figure 6 considers this for all health personnel. Figure 7 considers this for health personnel with at least secondary education. Figure 6 shows little change in the availability of health personnel in rural areas between 1982 and 1990. This is similar to the result shown in Figure 2 for Yunnan as a whole. However, Figure 7 shows a general increase in the availability of health personnel with at least secondary education in rural areas between 1982 and 1990. Only Bai and Hui experienced a decline in availability of health personnel with at least secondary education between 1982 and 1990 in rural areas. Those two nationalities were fairly well-supplied with health personnel in 1982.

Thus, the increase in the availability of health personnel with at least secondary school education between 1982 and 1990 affected not only urban areas of Yunnan and not just nationalities that were already fairly well-supplied with health personnel. It also affected rural areas of Yunnan and those nationalities whose availability of fairly well-trained health personnel was the lowest in 1982.

Discussion and Implications for the Future

The situation of health personnel in Yunnan is different in some important ways from that in most developing countries. Like many developing countries, there is not a high level of availability of health personnel, especially when one looks at particular nationalities. Also, very few health personnel possess post-secondary education.

However, during the 1980s the availability of reasonably well-educated health personnel has increased. More strikingly, health personnel, including those with at least secondary education, have tended to remain in rural areas. The success in retaining health personnel in rural areas is likely a combination of the effects of the population registration system and financial incentives for health personnel to raise their educational qualifications.

With marketization in China, one might have expected that the availability of health personnel, especially to highly rural, minority nationalities, would have decreased in the 1980s. There is no evidence by 1990 that this has occurred. Whether this pattern of predominant location of health personnel in rural areas and of improving qualifications of health personnel in rural areas will continue in the future is not clear. The effects of the increased pressures for marketization, the further decline in the availability of publicly-funded health insurance, and possible changes in the population registration system on the quality and quantity of health personnel are unknown. Data from the 1995 mid-Censal Survey can be used to assess whether the 1982-90 trends have continued or whether Yunnan has shifted toward a pattern of health personnel that is typical of many other developing countries.
Figure 6. Health Personnel in Rural Areas per 10,000 Members of Nationalities

Figure 7. Health Personnel with Secondary Education or More in Rural Areas per 10,000 Members of Nationalities
References


