

The Barefoot Doctors: China's Rural Health Care Revolution,  
1968-1981

by

Cedric Howshan Bien  
Class of 2008

A thesis submitted to the  
faculty of Wesleyan University  
in partial fulfillment of the requirements for the  
Degree of Bachelor of Arts  
with Departmental Honors in the East Asian Studies Program

## Table of Contents

<i>Introduction</i> .....	5
<i>Chapter 1: Characteristics of Rural Health Care in China, 1950-1981</i> .....	13
1.1 Patriotic Health Campaigns, 1950-1968	
1.2 China's Rural Health Care System, 1968-1981	
1.3 Characteristics of the Barefoot Doctor Model, 1968-1981	
1.4 Responsibilities and Interventions of the Barefoot Doctor	
<i>Chapter 2: Barefoot Doctors, Human Development and Health Outcomes</i> .....	36
2.1 Processes, Functions, and Agency	
2.2 Evaluating Basic Health Care Provision and Early-Age Mortality	
2.3 Quality of Infant Mortality Data, 1955-1995	
2.4 Chief Determinants of Infant Mortality Trends, 1955-1995	
2.5 Health Personnel and Infant Mortality: A Thirteen-Province Study	
2.6 Efficacy of Specific Interventions	
<i>Chapter 3: Determinants of the Barefoot Doctors Program</i> .....	65
3.1 Emulation of Foreign Models	
3.2 Yan'an and the Formation of Maoist Ideology	
3.3 Local Self-Sufficiency: The Cooperative Medical System and Chinese Medicine	
3.4 Egalitarianism, Labor Surplus, and Incentives	
3.5 Gender Equality, Female Empowerment, and Female Barefoot Doctors	
3.6 Limits of Political and Ideological Determinants: The Great Leap Forward, 1958-1960	
3.7 Political Determinants and the Cultural Revolution	
<i>Concluding Remarks</i> .....	101
Notes.....	106
Bibliography.....	118

## Figures and Tables

Figure 1.1	Progress in GDP Growth and Infant Mortality Decline, 1960-2000.....	8
Figure 1.2	The Rural Cooperative Medical System in China.....	18
Figure 2.1	Total Fertility Rates, 1950-1981.....	62
Figure 3.1	Origins and Determinants of the Barefoot Doctors Program.....	66
Table 2.1	Infant Mortality Rates in China by Source, 1960-1995.....	45
Table 2.2	Infant Mortality Rates in China by Sex, 1970-1984.....	47
Table 2.3	Infant mortality, Output per Capita, and Health Personnel in Thirteen Select Provinces, 1973-1981.....	56
Table 2.4	Statistical Effect of Health Personnel on Infant Mortality, Controlling for Provincial Output per Capita, Thirteen Chinese Provinces, 1973-1981.....	57

### *Acknowledgements*

I have been very fortunate to have worked with Jim McGuire, who gave endless hours of support and encouragement, and provided valuable commentary on numerous drafts. I am also grateful to the entire East Asian Studies Program faculty and staff, who helped spark my interest in the area. Zhu Xiaomiao provided moral support since my very first days at Wesleyan. Many thanks to Steve Angle, whose willingness to help me on a number of fronts spanned three years and two continents. I have also been privileged to have worked with Vera Schwarcz, whose encouragement to interview my mother about her experiences in China provided the initial impetus for this project, and more importantly, led to a greater curiosity of modern China. Annalisa Bolin has continued to help me improve my writing, and has given me confidence in my many pursuits. Finally, I am deeply indebted to my mother, who shared with me her many experiences as a barefoot doctor and assisted me in translating countless articles, emails, and letters.

Chinese problems, even if they affected no one outside China, would be of vast importance, since the Chinese are estimated to constitute about a quarter of the human race. In fact, however, all the world will be vitally affected by the development of Chinese affairs, which may well prove a decisive factor, for good or evil, during the next two centuries. This makes it important, to Europe and America almost as much as to Asia, that there should be an intelligent understanding of the questions raised by China, even if, as yet, definite answers are hard to give.

Bertrand Russell, *The Problem of China*, 1922

## **Introduction**

Between 1968 and 1981, the Chinese Communist Party (CCP) implemented an effective rural health care program using an army of paramedics called “barefoot doctors.” The barefoot doctors program was the first system since the establishment of the People’s Republic of China in 1949 to provide basic health care to the rural population. Despite low economic growth, political chaos, and the destructive effects of the Cultural Revolution during the 1960s and 1970s, the program successfully contributed to rapid reductions in premature mortality and preventable morbidity. By the time broad economic and social reforms began in 1978, the life expectancy of China’s population rivaled that of much wealthier countries.

The barefoot doctors model has been recognized as a paradigm for basic health care provision. The model emphasizes preventative care, community-based interventions, and mass health education of rural residents who often had attained only a basic level of literacy. China’s barefoot doctors served as a model and inspiration for the famous Alma-Ata Declaration on primary health care delivery in 1978, the result of an international conference sponsored by the World Health Organization and UNICEF.

The effectiveness of the barefoot doctors in improving health outcomes is impressive in its own right, but is even more remarkable given China’s social context during the 1960s and 1970s. In 1965, the Cultural Revolution inaugurated a period of enormous social upheaval that saw the closure of many medical institutions, the punishment of millions of Party officials and intellectuals, and the forcing of more than ten million urban residents into the countryside. Despite these challenges, the

barefoot doctors program managed to provide basic health care to millions of rural Chinese.

*China's Health in Developmental Perspective*

By 1949 China appeared to have reached a historical nadir. It was in that year that the Chinese Communist Party, led by Mao Zedong, established the People's Republic of China, finally wresting control of mainland China from the Nationalist Party (henceforth referred to by its Chinese name, the Guomindang) after two decades of civil war. Factional struggles had followed the collapse of China's last dynasty, the Qing, in 1912. When the Party took power in 1949, the Chinese population had already suffered years of disease, premature mortality, weak governance, civil war, and war with the Japanese. After nearly a century of internal fighting and humiliation at the hands of foreigners, Mao declared, "The Chinese people have stood up."

Since 1949, China has experienced a number of extensive transformations in its social, economic and human development. Internal turmoil and stunted socioeconomic development largely obscured impressive health improvements between 1949 and 1978. Chairman Mao launched several catastrophic campaigns during this period, including two that had particularly devastating consequences. A major blight on modern China's history and on the otherwise impressive health improvements under Mao was the Great Leap Forward movement between 1958 and 1960, which caused a famine resulting in as many as 30 million deaths. The second major campaign was the Cultural Revolution, which affected millions of Chinese who

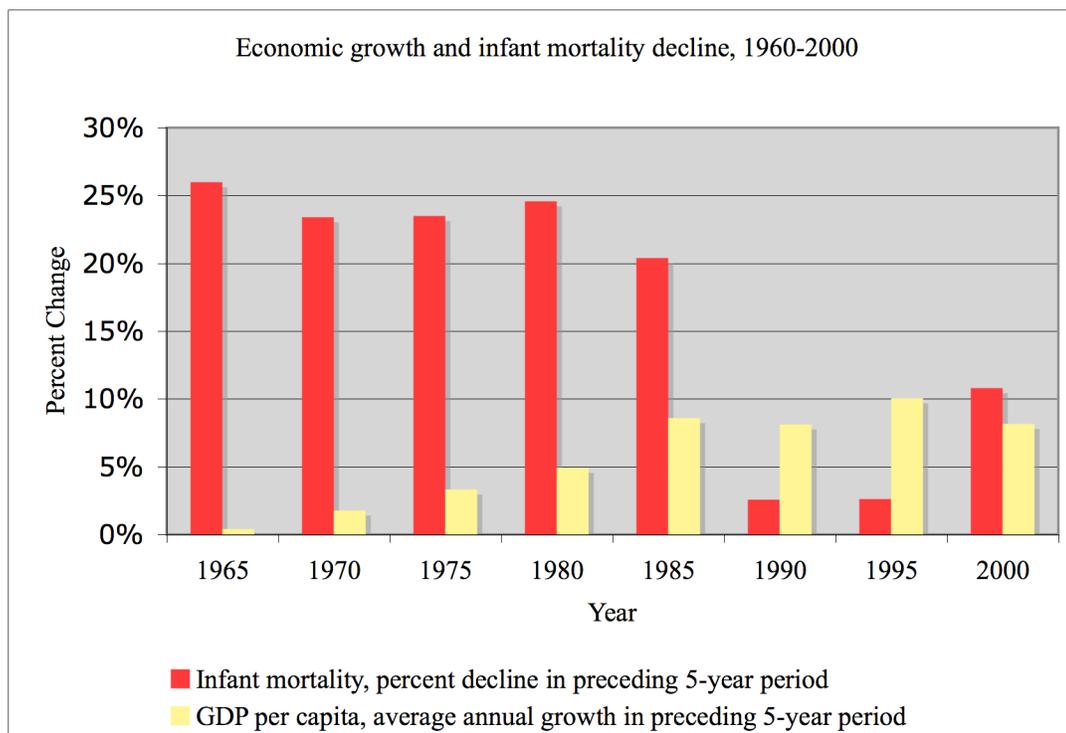
were harassed, humiliated, and in some cases, killed or driven to suicide by “Red Guards,” students who supposedly carried on the spirit of Maoist revolution. Furthermore, despite attempts at industrialization and agricultural mobilization, China’s economy grew at a glacial pace. It is therefore not surprising that China remained at a low level of affluence when economic reforms began in 1978.

Nearly sixty years after the establishment of the People’s Republic, China’s meteoric rise on the global stage is palpable to even the most casual of observers. China has received much of this attention only in the past thirty years, when, in 1978, the first crack of Deng Xiaoping’s “Open Door” reforms finally began to shed light on China’s enormous potential. China’s rapid economic growth since 1978 has astounded many scholars who have witnessed China’s sociopolitical transformation and economic expansion. China’s key role in today’s global politics and foreign trade are perhaps the most obvious manifestations of China’s growing influence in world affairs.

For many Chinese citizens, however, greater wealth has not led to better health. A rise in living standards has not led to commensurate reductions in preventable mortality. After the collapse of the barefoot doctors program, millions of rural Chinese no longer had basic health care. Since the early 1980s the rate of infant mortality decline, a good indicator of progress at reducing premature deaths, has slackened and by some accounts actually reversed. Figure 1.1 compares progress at economic growth and infant mortality decline across eight five-year periods from 1960 to 2000. Between 1960 and 1980, economic growth was relatively slow but infant mortality decline rapid. The trend reversed after the mid-1980s, when the pace

of infant mortality declines slackened and the rate of economic growth increased noticeably.

*Figure 1.1* Progress in GDP per Capita Growth and Infant Mortality Decline, 1960-2000.



*Sources:* Infant mortality data calculated from World Bank, *World Development Indicators*, 2007. GDP per capita calculated from Heston, Summers and Aten, *Penn World Tables*, 2006.

If, in fact, a connection were to be made between GDP growth and infant mortality decline, the most plausible association would be that health improvements before the 1978 reforms contributed to the economic growth after reforms. The reductions in premature mortality and gains in educational attainment between 1949 and 1978 helped to create broad, healthy, and literate base of human capital that contributed significantly to China's economic development.<sup>1</sup>

Rather than add to an extensive literature examining China's economic growth since social and economic reforms, this thesis will instead focus on the characteristics, consequences, and causes of the barefoot doctors, who contributed to the laudable health improvements between 1968 and 1981. The effective implementation of this program during a period of low economic development, and in the wake of destructive policies presents a confounding puzzle well worth tackling.

*Principle Questions, Current Approaches, and Limitations*

The initial impetus for this research arose after discovering that my mother had, in fact, been a barefoot doctor. Through conversations with my mother, I gained valuable insight into the *characteristics* of the barefoot doctors program, and also became interested in answering broader questions: What were the *consequences* of the program, and how effective was it in improving health outcomes? What were the *causes* of the program, and why was it implemented during the Cultural Revolution? These questions provided the basic framework for examining the barefoot doctors program.

Despite the important lessons that the barefoot doctors program may hold for other countries and for contemporary China, remarkably few studies have attempted to identify the determinants of the program, or explained why it was implemented during the Cultural Revolution. Previous studies that have addressed China's rural health care have largely failed to answer these critical questions. Although there was a proliferation of literature on the barefoot doctors during the 1970s, including a few studies examining the politics of China's health care, since the program's collapse

there has been a near total absence of literature on this subject.<sup>2</sup> One significant body of literature on health care reform in China has attempted to explain why the barefoot doctors program collapsed after reforms in 1978, or why disappointing health outcomes have persisted despite post-1978 attempts to improve insurance schemes.<sup>3</sup> A general consensus exists that the collapse of collective production, which provided the basis for collective insurance, caused the failure of the barefoot doctors system. This literature has not addressed, however, the more crucial and puzzling question of why the barefoot doctors system was implemented in the first place, particularly during a period of social and political turmoil.

A second body of literature on Chinese health care has focused on China's demographic trends and China's rural health care system. This literature has produced increasingly accurate and detailed data on population and demography in China.<sup>4</sup> A somewhat sparser literature describing the characteristics of the barefoot doctors also provides a basis for the task at hand.<sup>5</sup> What is severely lacking, however, is a more systematic analysis of the relationship between the implementation and characteristics of the barefoot doctors program on the one hand, and the demographic and epidemiological trends on the other.

### *Characteristics, Consequences and Causes*

Identification of the barefoot doctors program's key characteristics is the primary task of the first chapter. The chapter focuses on rural health services between 1950 and 1981, which included the patriotic health campaigns during the 1950s, and the barefoot doctors program, from roughly 1968 to 1981. Two original contributions

are worth highlighting. The first effort is a synthesis of existing literature on the barefoot doctors model. This review includes a basic examination of the rural cooperative medical system, which provided the framework for the barefoot doctors program, and the interventions made by the barefoot doctors. The second is the integration of the experiences of my mother, which provides valuable contextual evidence of the characteristics and responsibilities of the barefoot doctors.

The second chapter aims to evaluate the barefoot doctors program through two main approaches. The first approach focuses on the procedures involved in the implementation of the barefoot doctors program, an analysis that finds that the program relied on highly destructive policies. A second, more conventional approach evaluates the effectiveness of the barefoot doctors in improving health outcomes, and contributes further evidence that the program was efficacious in improving health outcomes as measured by infant mortality reduction. Three analyses each provide supportive evidence of the barefoot doctors' efficacy in improving health outcomes. First, a temporal coincidence of the program's implementation and tempo of infant mortality decline is established. A second quantitative analysis of thirteen Chinese provinces measures an association between the density of health care personnel and provincial infant mortality levels in 1981. A final analysis describes particular interventions and responsibilities of the barefoot doctors, which, on the basis of experiences of other countries, can be assumed to have contributed to mortality decline. Given sparse data on the barefoot doctors, no causal relation between the barefoot doctors program and mortality decline can be established conclusively; the main goal of the analyses performed here is to provide incentive for further research.

The central goal of this thesis is taken up in the third chapter, perhaps the most ambitious of the three, which identifies and assesses the causal pathways that led to the implementation of the barefoot doctors program. Once again, given the lack of literature on this topic, this chapter aims to enliven the puzzling question of why the barefoot doctors were implemented during the Cultural Revolution. Determinants of the program fit into three categories. The chapter hypothesizes that emulating foreign model provided the basic structural template for the program, Maoist ideological principles of self-sufficiency, egalitarianism, and gender equality contributed to the facilitating conditions of the program, and that political motives of the Cultural Revolution led to the program's implementation in 1968. It is thus argued that the barefoot doctors program was successfully implemented from 1968 to 1981 because, rather than in spite, of Cultural Revolution policies.

A more thorough understanding of China's barefoot doctors program, it is again worth stressing, has significant implications for health care delivery in contemporary China and around the world. Indeed, the barefoot doctors program deserves far greater attention than it has thus far been afforded. This thesis represents an effort to raise and address important questions of the barefoot doctors that have thus far gone unexamined, particularly those questions relating to the efficacy and determinants of the program. If conclusive answers are to be given, as Bertrand Russell so aptly pointed out, we must at least endeavor to ask critical questions.

## **Chapter 1: Characteristics of Rural Health Care in China, 1950-1981**

At the time of the establishment of the People's Republic of China in 1949, there were few, if any, rural health services. Rural areas were strewn with local healers, shamans, and other traditional practitioners, but these healers did not constitute a systematic attempt to provide broad health care to the masses. In 1952, a series of vertical health campaigns began to address some of the most basic causes of illness and death, such as unsanitary waste disposal and unclean water supplies. These vertical campaigns, called patriotic health campaigns, were essentially the only broad rural health initiatives between 1950 and 1968. Between the years 1968 and 1981, China's rural health care system matured under the barefoot doctors. During this time, the barefoot doctors provided the vast majority of rural Chinese with basic health care services, which were previously nonexistent. Although the barefoot doctors continued to perform the same interventions as the patriotic health campaigns, the characteristics and responsibilities of the barefoot doctors were radically different. The barefoot doctors provided sustained primary health care, rather than short-term interventions aimed at a specific disease or condition.

The focus of this chapter is to explore the chief characteristics and functions of rural health care programs in Maoist China, from roughly 1950 to 1981. It focuses on the two main health initiatives during this time period, the patriotic health campaigns and the barefoot doctors, with an emphasis on the latter. The chapter begins by summarizing the work of the patriotic health campaigns in improving basic rural living conditions (Section 1.1). The second task is to review the basic features of

the barefoot doctors program, which explores the rural health system during the barefoot doctors program (1.2), the training and demographic characteristics of the barefoot doctors (1.3), and their responsibilities (1.4).

### *1.1 Patriotic Health Campaigns, 1950-1968*

The patriotic health campaigns introduced basic environmental sanitation and hygiene services into the countryside in 1952. These campaigns continued on and off for roughly fifteen years, when the barefoot doctors program finally introduced primary health care to the rural population. Despite the absence of primary health care programs until 1968, the patriotic health campaigns were effective in improving basic rural living conditions.

The campaigns worked to fight and prevent specific infectious diseases, as well as the environmental conditions that led to disease. Stamping out one plague at a time, patriotic health campaigns were highly effective in reducing many of the risk factors that led to disease, which led in turn to poor health outcomes. The campaigns mobilized local village members and educated them in the relevant issues of the particular campaign. Each of these short-term interventions required the mass mobilization of the peasantry, and as a result, the campaigns were effective in reaching the majority of the rural population. Although they were often guided more by politics than by medical science, the campaigns managed to reduce many diseases that plagued rural China in the 1950s and 1960s.

Patriotic health campaigns were usually carried out twice a year, lasting for a week at a time. The first such campaign was inaugurated in 1952, targeting

environmental conditions that led to disease. Rural inhabitants could limit the transmission of diseases through simple measures such as improving human waste disposal and cleaning up rubbish. The state declared war against the “four pests”—mosquitoes, flies, rats, and sparrows.<sup>6</sup> Efforts were made to improve water supplies, a major environment for many infectious agents. From an epidemiological perspective, these campaigns worked to eliminate two of the three components of the epidemiological triad—the disease agent and the environment—while the third, the human hosts, would be addressed during the barefoot doctors program. By eliminating or reducing transmission vectors and decreasing environmental exposure to health hazards, patriotic health campaigns were effective in reducing the transmission of infectious disease in the Chinese countryside.

The Patriotic Health Campaign Committee, a national committee of the Party, disseminated campaigns to local political committees that then carried them out.<sup>7</sup> Health campaigns also aimed to increase the “health literacy” of the rural population. For instance, large numbers of traditional midwives were trained in modern delivery procedures beginning in the early 1950s. These interventions undoubtedly contributed to improvements in infant, child, and maternal survival rates during this time. Some campaigns, however, simply aimed at inducing compliance with public health measures among rural inhabitants, without educating them in the social or epidemiological determinants of disease.<sup>8</sup>

Mass health campaigns also targeted venereal diseases. Aside from practical concerns, venereal diseases were also considered a social disease of capitalism, a scourge that had to be eradicated in order to move forward into communism.<sup>9</sup>

Commune health care workers took weeklong courses on syphilis diagnosis and treatment by penicillin, before administering a questionnaire and a possible blood test to rural populations.<sup>10</sup> China began producing penicillin in 1951, but continued using imports until 1954.<sup>11</sup> The Party claimed it was successful in virtually eliminating syphilis and other venereal diseases by the mid-1960s.<sup>12</sup>

One by one, these campaigns conquered various diseases. Smallpox vaccinations had reportedly been given to 512 million of a population of 580 million by 1952, and the last smallpox outbreak was recorded in the border province of Yunnan in 1960.<sup>13</sup> Epidemic control centers rose in number from 61 in 1950 to 1,420 in 1958, and specialized centers that fought diseases such as malaria, plague, and schistosomiasis went up from 30 to 667 in the same period.<sup>14</sup> Campaigns also combated schistosomiasis, cholera, malaria, and tuberculosis, but treatment remained relatively rare in the countryside, and these campaigns were later taken up by the barefoot doctors.<sup>15</sup> Patriotic health campaigns stressed disease prevention and control over more expensive treatment interventions, particularly in rural areas.

Patriotic health campaigns introduced basic preventative interventions to the Chinese countryside for the first two decades of the People's Republic. These campaigns focused on specific diseases and environmental conditions, and were highly effective in reducing preventable morbidity. On the other hand, the programs were rarely sustained for more than a month, and diseases not addressed by the campaigns were simply neglected. These campaigns did not attempt to provide primary health care, which was not available in most rural areas until the introduction of the barefoot doctors program.

### *1.2 China's Rural Health Care System, 1968-1981*

The barefoot doctors began training en masse in 1968, two years after the Cultural Revolution began. China's rural health care system was a colossal network designed to reach all parts of the country, a major task given the country's geographical vastness. Significant regional variation contributed to difficulties in ensuring uniform services, and remote areas did not receive the same care as suburban and urban areas. Although directives came from the central government, village-based production brigades and teams had significant autonomy in implementing the barefoot doctors program.

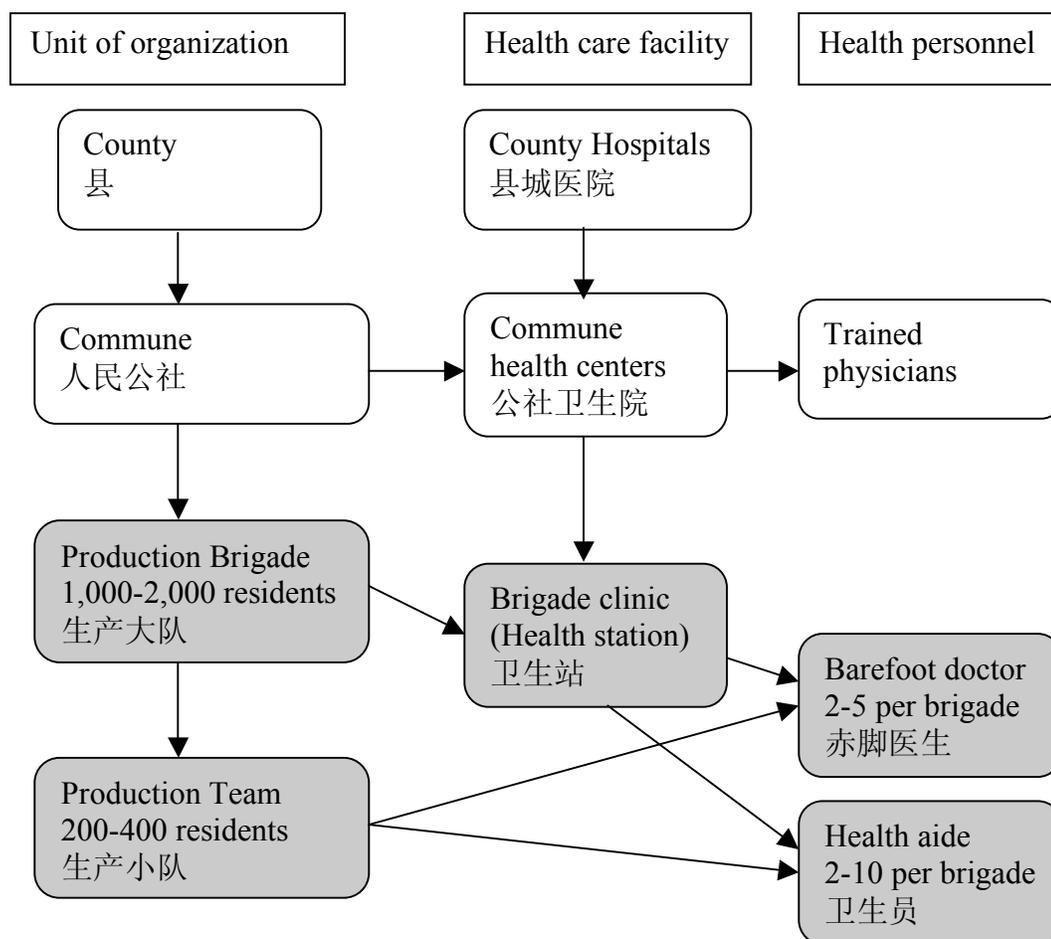
The number of barefoot doctors fluctuated during the period between 1968 and 1981. There were approximately one million barefoot doctors between 1968 and 1970, when barefoot doctors were first trained en masse. This number increased to 1.3 million in 1973, peaking at around 1.76 million in 1977, and declining to 1.575 million in 1979 and 1.46 million in 1981.<sup>16</sup> These statistics should be considered approximations, but show a trend in the rise and fall in the number of barefoot doctors. Beginning in 1979, all barefoot doctors were required to take a test in order to continue practicing. If they failed, they would be demoted to the status of "health aides," which was part of an effort led by Deng Xiaoping to upgrade the status of barefoot doctors. In 1981, the term "barefoot doctors" was replaced by "village doctors," which reflected a broad economic shift occurring from collective to household production.

The number of barefoot doctors varied among China's provinces and roughly 740,000 villages, as wealthier and more suburban brigades could afford to support

more barefoot doctors.<sup>17</sup> Fluctuations in rural economic conditions could also affect health care provision. There were reportedly brigades that terminated health programs in Shandong and Guangdong provinces because of economic reasons, but the cadres who terminated the programs were publicly denounced and likely punished.<sup>18</sup>

Barefoot doctors were organized into the Cooperative Medical System, the basic organizing structure of rural health care. The system divided health care into a three tiers, which provided primary, secondary and tertiary level care.<sup>19</sup> The barefoot doctors were responsible to brigade clinics, and would refer patients to the second tier, or the commune health centers. In more serious cases, patients would then be referred to the third tier, which composed of either county or city hospitals.<sup>20</sup>

*Figure 1.2* The Rural Cooperative Medical System in China.



Production brigades were the main rural administrative unit after the Great Leap Forward. Brigades represented the large villages and towns of rural China, which usually consisted of about 1,000 to 2,000 residents. All collective-produced goods and grains went to the production brigade, which then sold them to the government. Production brigades were responsible for providing basic public services, such as primary schools, a health clinic, and perhaps a small factory or a shop.<sup>21</sup> One wealthy production brigade in Guangdong employed six barefoot doctors, which included a midwife, a Chinese medical physician and a “sent-down” physician from the city. The brigade also had a small fishing net factory, which provided additional brigade funds.<sup>22</sup> Production brigades usually employed at least two barefoot doctors drawn from its production teams.

Production teams were a smaller organizational unit that usually consisted of a village hamlet or neighborhood, which was usually composed of about 200 to 400 residents. Production teams were the most basic rural structure of social interaction and agricultural production. The team leader acted as a manager for production, who was often elected by team members or the village elite.<sup>23</sup> These teams usually supplied one or two members for employment at the brigade level, either at the health clinic or in one of the other public facilities. The team also meted out work points, the main mode of economic exchange, which ranged from one to ten. After the Great Leap Forward in 1962, rural residents were allowed to cultivate small plots of land and raise livestock to sell on the market.<sup>24</sup> This private sector provided between twenty to thirty-five percent of the total cash income to rural residents.<sup>25</sup>

The rural Cooperative Medical System, a sort of insurance scheme utilized by the barefoot doctors program, provided most of the funding for the program. This system was financed through three main sources: a collective fund established by production brigades and teams, a premium deducted from resident salaries, and subsidies from the central government.<sup>26</sup> The government provided varying subsidies to brigades depending on their wealth and agricultural output.<sup>27</sup> Most brigades, however, were responsible for the bulk of health care costs and supporting the barefoot doctors.<sup>28</sup> As a result, poor production brigades would likely have fewer barefoot doctors and less medical services and medicines.<sup>29</sup>

The Cooperative Medical System did not provide complete coverage to all villages, but came close. A study in 1969 found that roughly 18,000 members of a commune of 22,000 were enrolled in cooperative medical insurance.<sup>30</sup> The excess 4,000 members without cooperative medical insurance are unexplained; it is possible that uninsured members were still able to access basic health care within the commune, although they may have been charged more for outpatient visits. Estimates suggest that around 90 percent of all villages had a Cooperative Medical System between 1976 and 1979, rising from 46 percent in 1962 and 80 percent in 1968.<sup>31</sup> However, villages with collectively financed health care dropped to 58 percent in 1981, and only 5.4 percent in 1987, as many villages began abandoning collectives.

Brigade members without cooperative medical insurance could still access China's de facto "universal" health care, which was often provided free or for a nominal fee.<sup>32</sup> Beginning in 1971, brigade members were automatically enrolled in the cooperative medical system once their brigade had voted in favor of the

system.<sup>33</sup> Ideally, if production brigades could not afford to subsidize barefoot doctors, then the commune or provincial government would provide the extra cash. Under the barefoot doctors system, almost all Chinese had free, or nearly free, health care services.

Aside from barefoot doctors, the rural health care system included formal and informal networks of health workers. Physicians with greater expertise at times served as barefoot doctors, often including village healers and physicians who had training in Chinese medicine.<sup>34</sup> Physicians were also sent down to the countryside as a punitive measure. In one Guangdong village, a former Guomintang physician was sent down to the village in the late 1960s for ideological re-education.<sup>35</sup> Nevertheless, these experienced physicians with formal training were often highly respected within the village.<sup>36</sup> The Guomintang physician consistently received ten work points, the maximum allotted to any individual.

Trained physicians also served in brigade clinics as supervisors to barefoot doctors. A formal epidemic prevention supervisor was usually in charge of commune health centers, which relayed directives to brigade clinics.<sup>37</sup> If they did not go directly to communes or brigades, physicians were still forced to serve in rural county hospitals for political re-education.<sup>38</sup> At a county hospital and adjoining medical college in Hubei province, all teachers, administrators and medical staff were forced to go to the countryside in 1969.<sup>39</sup> These physicians, who practiced both Western and Chinese medicine, provided an influx of trained medical personnel into underserved areas.

Trained physicians played a crucial role as advisors and educators to the barefoot doctors.<sup>40</sup> Because Western physicians were considered intellectuals and profiteers of the old capitalist society, they were often among the worst enemies of the Red Guard and the Cultural Revolution. This group was thus sent down to the countryside to “learn from the peasants” and participate in ideological re-education. Although some of these physicians were forced into hard labor, many were utilized more efficiently as physicians. Ironically, despite their low social status, these physicians were often responsible for educating, advising, and overseeing the work of the minimally trained barefoot doctors.

Health aides also played an important role in delivering health care in the Chinese countryside. Health aides had lower positions than barefoot doctors, and often working part time or as volunteers without the formal status of barefoot doctors. Nevertheless, health aides and barefoot doctors were often responsible for similar tasks, such as disease screening and inoculations, and the distinction between health aides and barefoot doctors was sometimes blurred.<sup>41</sup> Health aides added an additional 3.7 million health workers to China’s rural health care system in 1970, although this number declined to roughly two million by 1981.<sup>42</sup>

The status of rural health care workers was thus poorly defined. Health aides, physicians trained extensively in Western and Chinese medicine, and barefoot doctors were often amalgamated into one general group as barefoot doctors. Many barefoot doctor classifications do not include health aides or retrained midwives, although they often performed similar or complementary roles to the barefoot doctors.<sup>43</sup> The

definition of barefoot doctors used here is necessarily broad, encompassing the many kinds of rural health care personnel.

The rural medical system was a network that organized health care services through the barefoot doctors. During the tenure of the barefoot doctors program, the Cooperative Medical System provided health care funding for the vast majority of rural Chinese. By the early 1980s, the cooperative health funding system began to collapse as production brigades were abandoned and the Household Responsibility System began.

### *1.3 Characteristics of the Barefoot Doctor Model, 1968-1981*

The barefoot doctors reflected the basic Maoist ideology of “serving the people,” in order to provide care from the masses, to the masses. Indeed, the barefoot doctors were called “barefoot” in order to emphasize the peasant origins of the rural health care worker. Three categories of barefoot doctors are examined here: local villagers trained as paramedics, midwives, and urban residents forcibly sent down to the countryside for ideological re-education.<sup>44</sup> Additionally, it reviews the basic characteristics of the barefoot doctors, such as their education level, training, and gender makeup.

Most barefoot doctors were local villagers recruited from production teams.<sup>45</sup> Local villagers trained to work in their own village were already well acquainted with the cultural and social topography of their brigade or production teams, and could better serve their local communities. Barefoot doctors were also recruited for their ideological aptitude for “serving the people,” a common theme in Mao’s China.<sup>46</sup>

Barefoot doctors were supposed to spend a portion of their time doing agricultural work, although this rarely occurred in practice.<sup>47</sup> Some villagers recruited as barefoot doctors had experience in sanitation and disease prevention from participation in the patriotic health campaigns during the 1950s and early 1960s.<sup>48</sup> Brigade officials selected candidates that had some education and were popular among residents, and could therefore more easily integrate and interact with their patients. This ideal of peasants providing for peasants fit comfortably with the prevailing ideological theme of peasant self-sufficiency.

There are no good statistics on the number of “re-educated” urban youths who became barefoot doctors, although an estimated 12 million urban youths were sent to the countryside between 1966 and 1975, around the end of the Cultural Revolution.<sup>49</sup> A substantial number of barefoot doctors were urban youths sent down for re-education.<sup>50</sup> Most urban youth had little experience in agricultural work and proved unproductive and uncooperative. Thus, in the eyes of rural villagers, sent-down urbanites represented an unnecessary burden, consuming more resources than they were producing.<sup>51</sup> In one instance, villagers selected a sent-down youth from the city of Guangzhou for barefoot doctor training because of her high level of education—which was only middle school—and her connections to the city which might allow the brigade to acquire better medicines for the clinic.<sup>52</sup> In turn, by becoming barefoot doctors, urbanites achieved lighter workloads and made use of their comparative advantage in education and literacy.

Midwives also were employed as barefoot doctors in the Chinese countryside.<sup>53</sup> Rural midwives in the barefoot doctors program included those who

had been retrained after Communist takeover, and those who had been educated under the Communists and subsequently sent down to the countryside. Midwifery had existed in rural villages prior to 1949, although many midwives were unschooled in basic sanitary childbearing practices and used unsterilized instruments during delivery.<sup>54</sup> The midwives of this older generation were re-trained during the 1950s in safe delivery practices, and they then returned to their villages.<sup>55</sup> During the late 1960s, these midwives were incorporated into the Cooperative Medical System as barefoot doctors. Midwifery training followed that of other barefoot doctors, usually a few months time in a county or commune hospital.<sup>56</sup>

Although rarely acknowledged as health care workers, midwives played a crucial role in providing child and maternal health services in the countryside. Similar to the “sent down” urban youth, some non-native midwives were initially greeted with lukewarm enthusiasm. However, infant and maternal mortality often dropped after their arrival in villages, simply by the presence of these trained birth attendants. These “young girls with their pigtails,” as described by one dubious mother who had seven children die prematurely of tetanus, became trusted members in rural communities.<sup>57</sup>

Most barefoot doctors had achieved a basic level of literacy. On average, barefoot doctors had completed primary school and had at least some middle school education. One study found that male barefoot doctors had an average of nine years of schooling, and eight for females, which generally provided a basic level of literacy.<sup>58</sup> Few had secondary school or college education, which is unsurprising given that higher education had essentially collapsed during the late 1960s. Most

barefoot doctors were between ages twenty and forty, young enough to have benefited from education campaigns in the 1950s and 1960s.<sup>59</sup>

Although barefoot doctors were formally required to have at least three months of training, the duration of training was variable. The Ministry of Health originally stipulated that rural health workers should receive at least three years of training in 1965, but in 1968 the publication “Red Flag” published a report condemning this curriculum as inadequate for providing rural health care.<sup>60</sup> This rapid shift in health care training would supposedly allow a much greater number of health care personnel to begin working in the countryside almost immediately. The first cohorts of barefoot doctors, trained from the late 1960s to the mid-1970s, received only one to two months of training, while later cohorts in the mid-1970s received a more standardized six-month course.<sup>61</sup>

Most barefoot doctors were trained at commune or county level hospitals.<sup>62</sup> Under the guidance of experienced physicians, barefoot doctors learned basic health care practices. Public health schools were also used to train barefoot doctors.<sup>63</sup> In 1970, China published two versions of the *Barefoot Doctor's Manual*, one version specific to northern China, and the other to the south. The latter was published by the Institute of Traditional Chinese Medicine of Hunan Province, and was later published abroad in translation.<sup>64</sup> By the time a more standard training course was developed in the mid-1970s, most barefoot doctors used one of these manuals. Barefoot doctors were also supposed to go through a refresher course at the commune hospital every year.<sup>65</sup>

It is unclear what proportion of barefoot doctors was female. One study of barefoot doctors in Shanghai County in 1980 found that 57 percent of the 448 barefoot doctors were female.<sup>66</sup> Chinese sources state that one third of barefoot doctors were female, although the majority of health aides and rural midwives were female.<sup>67</sup> Much of the work performed by barefoot doctors consisted of maternal and child health work, which may have favored women over men. Most barefoot doctor classifications do not include midwives, who were almost all female.<sup>68</sup> One brigade in Hubei province, however, only selected two girls out of a total 32 for health training, apparently because of a fear that girls would marry out of the village.<sup>69</sup> In a dissimilar instance, a production brigade called “Ink village” specifically chose a girl for barefoot doctor training who had been kidnapped into a village and forced into marriage, in order to give her greater freedom.<sup>70</sup> Women were probably incorporated into the barefoot doctor program in relatively equal proportions as men, but categorized as midwives or lower level health aides. Although the CCP made efforts to reduce unequal, patrilocal marriage arrangements, the barefoot doctors were still influenced by gender norms of the pre-1949 society.

#### *1.4 Responsibilities and Interventions of the Barefoot Doctor*

After training at a commune or county health center, barefoot doctors returned to their production brigade to provide basic primary care. The responsibilities of the barefoot doctors can be categorized into four general categories: the upkeep of environmental sanitation, disease control, basic diagnostic and curative care, and family planning work. The first two categories were offshoots of the patriotic health

campaigns, and were implemented with little additional effort. On the other hand, barefoot doctors introduced basic diagnostic and curative care, as well as family planning work that began in 1970. Wealthier production brigades with several barefoot doctors often divided labor, such that barefoot doctors specialized in one particular category like family planning or disease control. In contrast to the vertical health campaigns that preceded the barefoot doctors or the one-child campaign that followed, the barefoot doctors represented an integrated approach toward providing primary health care.

Improvements in environmental conditions can be a particularly efficient method of reducing transmission of infectious diseases. Unsanitary environments promote conditions under which infectious diseases may thrive.<sup>71</sup> Sanitary environments—often characterized by clean water supplies, proper disposal of garbage and human waste, and good personal hygiene—can limit the presence and incidence of many infectious diseases.<sup>72</sup> Most sanitation measures are preventative, and can be accomplished effectively at low cost. These improvements must occur through changes in environmental conditions, as well as through changes in individual practice or behavior.

The *Barefoot Doctor's Manual*, published in 1970, emphasizes the importance of maintaining sanitary conditions. “Hygiene” is the title of the second chapter, after the first chapter on “Understanding the Human Body.” The “Hygiene” chapter describes the patriotic health campaigns that began during the 1950s and the chief interventions: water sanitation, excreta management, and food sanitation. These responsibilities were summed up by the slogan, “Two managements and five

improvements,” (两管五改, *liangguan wugai*), which included management of water and excreta, improvements in wells, toilets, animal stables, cooking areas, and environment.<sup>73</sup> Although a considerable amount of sanitation work had already been accomplished during the health campaigns of the 1950s, barefoot doctors were responsible for sustaining these efforts. In improving environmental sanitation, barefoot doctors worked to disinfect drinking water, while ensuring that water was properly drained and that waste properly was disposed of. Proper latrines utilized waste tanks and were to be far from water sources. After treatment, excreta were often used as fertilizer.<sup>74</sup>

The second category of responsibility, disease control, aimed to eradicate or prevent the spread of specific diseases. These disease-specific vertical health interventions overlapped significantly with environmental measures. For instance, preventative efforts at eradicating schistosomiasis included improving environmental conditions by cleaning water supplies, composting excrement, and behavioral education. In 1949 more than 10 million Chinese were infected by this disease, which is carried by certain species of snails that propagate in stagnant water and attack the liver and intestines after entry through the thighs and feet.<sup>75</sup> Although the Party set up a committee to eradicate schistosomiasis in 1956, the disease was still endemic in many parts of China by 1968.<sup>76</sup> After the implementation of the barefoot doctors, health efforts led to reductions in the prevalence of the disease, but the disease has actually reappeared in some areas since economic reforms in 1979.<sup>77</sup>

The barefoot doctors provided an integrated approach to disease control and pest elimination, reducing the incidence and prevalence of infectious diseases such as

typhus, malaria, and kala-azar.<sup>78</sup> Fleas are hosts to both typhus and kala-azar, and breed easily on mammal fur and unsanitary conditions. Mosquitoes transmit malaria, which was endemic during the 1950s, with prevalence rates as high as 48 percent in some rural areas of Yunnan and Guangdong provinces.<sup>79</sup> The incidence of malaria declined steadily until 1978, in part due to the barefoot doctors' efforts at reducing open sources of water, providing mass treatment, and increasing insecticide use.<sup>80</sup> These diseases affected children and adults alike. Although basic preventative measures could not eliminate diseases altogether, reductions in morbidity led to declines in disease-specific mortality.<sup>81</sup>

Disease control also included childhood immunizations, and barefoot doctors were responsible for making house visits to inoculate rural residents.<sup>82</sup> Afterwards, a standard of five vaccines were to be administered to all children: Bacillus Calmette-Guerin (BCG) tuberculosis vaccine, an oral polio vaccine (OPV), diphtheria, tetanus, and pertussis vaccine (DTP), measles vaccines, and a Japanese B encephalitis vaccine.<sup>83</sup> Although limited vaccine production prevented complete coverage, the barefoot doctors provided vaccines according to need, not on a fee-for-service basis.<sup>84</sup> Roughly 80 percent of children had received their first dose of the DTP, measles, and polio vaccines by 1983.<sup>85</sup>

The third responsibility of the barefoot doctors was to provide basic diagnostic and curative care, as well as first aid. Barefoot doctors delivered primary health care at the brigade clinic, in the fields during harvests, or directly to the homes of rural residents. Many barefoot doctors spent the majority of their time in brigade clinics, either providing care or doing clerical work, and occasionally went on house

visits.<sup>86</sup> During harvests, barefoot doctors sometimes accompanied farmers into the field to provide first aid.<sup>87</sup> One study found that barefoot doctors spent an average of seven hours per day working, and about three and a half hours were devoted toward outpatient consultation, and an hour and a half to home visits. This amounted to an average of roughly eleven outpatient visits and three home visits per day.<sup>88</sup>

The *Barefoot Doctor's Manual* contains a chapter on diagnosis, as well as a chapter on symptoms and possible diagnoses. Because this responsibility requires the most expertise, only barefoot doctors with significant training and experience performed diagnostic and curative services. Diagnostic techniques drew from both Western and Chinese medical traditions. For instance, diagnosis through pulse reading (脉诊, *mai zhen*), one of the standard diagnostic techniques used in Chinese medicine, was still commonly used among barefoot doctors.<sup>89</sup> Similarly, Chinese medical philosophies of disease etiology and bodily functions were incorporated into the care provided by the barefoot doctors.<sup>90</sup>

On the other hand, acute illnesses were often addressed using Western diagnostic techniques, emphasizing the cultural belief that Chinese medicine was good for chronic illnesses and overall health, whereas Western medicine was good for infectious and acute diseases.<sup>91</sup> Barefoot doctors often used intravenous and intramuscular injections for treatment, whether for a course of antibiotics, nutritional supplements, or vaccines. One barefoot doctor commented that patients who came to the brigade clinic “wanted to leave with at least an injection,” because injections had a positive psychological effect on the patient.<sup>92</sup> This is congruent with an anthropological finding among Chinese populations in Taiwan, who viewed Western

medical injections “as stream-lined, ultra-modern, quickly and easily administered... extremely powerful with dangerous side-effects but working immediately to cure symptoms.”<sup>93</sup> There appeared to be clear cultural preferences for both Chinese and Western medicines, depending on the context of the illness.

Unlike disease-specific immunizations, treatment in primary care requires a wide variety of pharmaceuticals. Western pharmaceutical production in China was limited to production of basic drugs such as vaccine, penicillin, aspirin, and drugs for infectious diseases such as schistosomiasis and malaria.<sup>94</sup> Some Chinese herbal drugs were also manufactured in pill form, such as the extremely effective malaria drug artemisinin, derived from Chinese wormwood.<sup>95</sup> Aside from these Western and manufactured Chinese herbal drugs, however, production was limited, and there existed a distinction between institutionalized Chinese medicine and local herbal treatments. In many remote areas, production brigades had to rely on locally grown herbs. In one remote village in Yunnan province, brigade members collected local medicinal herbs, which supplied the majority of brigade clinic medicines.<sup>96</sup> Indeed, almost all illnesses listed in the *Barefoot Doctor's Manual* provide a remedy that involves a concoction of herbs and animal plants, usually boiled into a soup or ground into a powder. The efficacy of these treatments, however, is difficult to determine.

The Party heavily promoted the integration of Chinese and Western medicine among barefoot doctors. The Party had rejuvenated Chinese medicine, which had been suppressed for decades amid reformist cries for “Science and Democracy” in 1919.<sup>97</sup> After barefoot doctors were employed, 85 percent of prescriptions in production brigade clinics were for herbal remedies.<sup>98</sup>

The final component of barefoot doctor responsibility involved family planning efforts. Family planning includes maternal and child health, midwifery, and birth control. Family planning programs had been initiated in urban areas during the early 1960s, but failed to reach rural areas until intense efforts were initiated in 1970, which coincided with the implementation of the barefoot doctors system.

Barefoot doctors were responsible for advocating birth control policies during the 1970s. Birth control policies during this decade are summarized by the chief slogan of the family planning campaign, “later, longer, fewer” (晚, 析, 少, *wan, xi, shao*). Beginning around 1971, married couples were supplied with contraceptives and were provided birth control services without charge.<sup>99</sup> Barefoot doctors were responsible for educating rural residents on contraceptive options, for promoting birth control and late marriage, for distributing oral contraceptives and condoms, and for carrying out abortions and sterilization procedures.<sup>100</sup> Those who were willing to undergo these birth control procedures were compensated with pay or work points.<sup>101</sup>

Most rural mothers still gave birth at home during the 1970s, although brigade clinics were sometimes equipped with maternity facilities. As a result, midwives were responsible for assisting homebirths and were trained in modern delivery methods.<sup>102</sup> Midwives and barefoot doctors were also responsible for providing pre-natal care and counseling the expectant mother at home.<sup>103</sup> A former barefoot doctor in Guangdong province remarked that nutritional interventions were also provided to expectant mothers, often intravenously.<sup>104</sup> After birth, barefoot doctors became responsible for providing basic maternal and infant care. This included frequent check-ups and

providing an adequate supply of nutritional foods, as well as counseling on breastfeeding and sanitation.

The responsibilities of the barefoot doctors were relatively simple and their rudimentary, but the interventions they implemented may have had a significant impact on reducing early-age mortality. Environmental sanitation, disease control, basic illness treatment and maternal and child health care are all strong proximate determinants of child survival.<sup>105</sup>

### *Conclusion*

By the time the Party made serious efforts to provide a systematic rural health care program in 1968, it had already been in power for nearly twenty years. Between 1950 and 1968, the only health services rural residents received came from the patriotic health campaigns. Although these initiatives succeeded in reducing excess morbidity and mortality, rural residents still lacked basic health care in 1968.

China's barefoot doctors addressed the enormous unmet medical need of China's rural areas. When economic reforms began in late 1978, roughly 81 percent of China's 956 million citizens lived in rural areas.<sup>106</sup> China's rural population increased from roughly 639 million to 792 million in the thirteen-year time span between 1968 and 1981, meaning that there was approximately one barefoot doctor for every five hundred rural citizens—roughly half the population of a typical production brigade. Barefoot doctors provided essential interventions such as environmental sanitation and childhood immunization. These interventions were inexpensive, required little training, and delivered to a high percentage of China's

rural population. The following chapter assesses the barefoot doctor model of health care, and evaluates the efficacy of the barefoot doctors in improving the health of the people they served.

## **Chapter 2: Barefoot Doctors, Human Development, and Health Outcomes**

China made rapid progress in improving the health status of its population during the first three decades of Communist control. By the time the CCP began implementing economic reforms in 1978, life expectancy in China rivaled that of much wealthier countries. Improving health outcomes plays a central role in human development. The economist and philosopher Amartya Sen has argued forcefully for understanding human development as the expansion of essential human capabilities.<sup>107</sup> Deprivation of basic capabilities can often be reflected in a society's literacy rates, level of premature mortality, malnutrition, and so on.<sup>108</sup> Good health is an essential capability that is appreciated for both its intrinsic and instrumental value; people value a life free of preventable disease, hunger, and premature death for its own sake.<sup>109</sup> The capability to live a healthy life is also instrumental toward human development; good health enables people to pursue a life they have reason to value, such as participation in meaningful social interactions, in economic transactions, or gainful employment.

Focusing solely on health outcomes or wellbeing, however, neglects a more expansive understanding of human development that considers individual agency. Human agency is distinguished from wellbeing in its consideration of the processes and capabilities involved in attaining a designated end. This distinction is crucial in evaluating the barefoot doctors program, which relied upon heavily restrictive procedures in its implementation. Although health outcomes are a useful metric of policy evaluation and human development, the first task of this chapter is to evaluate

the *processes* involved in the implementation of the barefoot doctors program, an assessment that illuminates limitations of the barefoot doctors program in contributing to human development (Section 2.1).

A more conventional approach toward health policy evaluation examines survival outcomes. This chapter first establishes that infant mortality is a useful health metric sensitive to health care provision (2.2), and that China's infant mortality data is adequate enough to use for further analysis (2.3). This chapter bears three types of supportive evidence that suggest the barefoot doctors improved health outcomes. The first body of evidence identifies a strong temporal coincidence between the introduction of the barefoot doctors program in 1968 and an increase in tempo of infant mortality decline until roughly 1980, when the program was disbanded (2.4). The second piece of evidence is a quantitative analysis of the association across thirteen Chinese provinces between health personnel, the sum of barefoot doctors and health aides, and infant mortality (2.5). It finds that a greater density of barefoot doctors per 1,000 inhabitants was associated with lower infant mortality. The final section argues that based on experiences in other countries, a plausible case can be made that the particular interventions of the barefoot doctors were at least partly responsible for improvements in health outcomes (2.6).

### *2.1 Processes, Functions, and Agency*

Before examining the effect of barefoot doctors on health outcomes, it is useful to evaluate the program using alternative criteria of human development. To be certain, a life free of preventable morbidity and premature mortality is a capability

that humans have reason to value. At the same time, however, the barefoot doctors program was implemented through processes that constrained basic human capabilities. It is crucial to gain a more comprehensive understanding of the costs and benefits associated with a program, including those costs associated with a program's procedures, and not simply outcomes. The purpose here is to utilize an alternative framework that identifies and assesses the processes and procedures involved in the program's implementation.

There are several limitations to the conventional approach of evaluating health care programs solely on the basis of health outcomes. Such an approach does not consider unexpected outcomes, procedural costs and benefits, or the social arrangements utilized in its implementation. The assessment of development policies must involve a broader focus on human agency, rather than simply human wellbeing. To evaluate the barefoot doctors solely on the basis of its outcomes presents a rather limited assessment of the program's overall value. A more procedural perspective, adopted here, evaluates the program's impact on human agency and its overall contribution to human development.

The implementation of the barefoot doctors program relied on a series of coercive policies that constrained human agency and basic human freedoms. Large numbers of "sent-down" health care personnel and other urban residents were utilized in the program; the vast majority would have likely preferred to stay in urban areas. Additionally, restrictions on mobility, specifically rural-urban migration, prevented barefoot doctors and other rural residents from moving at will. Collective production arrangements were similarly restrictive and economically inefficient. Limitations on

private land cultivation and large control of agricultural policies restricted basic economic freedoms. Many such basic freedoms were foregone during the Cultural Revolution, and the barefoot doctors program thus relied on restrictive social arrangements for its successful implementation.

The barefoot doctors program also operated under a political system that left little room for the exercise of political dissent or disagreement with government policies. Although production team members may have desired the provision of basic health care, many resented the lack of individual autonomy under the collective-based production system. Indeed, the barefoot doctors program was so deeply embedded in the detrimental policies of the Cultural Revolution, that upon economic reforms in 1979, some production team members wanted to do away with the collective medical system altogether, because of its association with the politics of the time.<sup>110</sup> Although the barefoot doctors program succeeded, it will be argued, in improving health outcomes, the processes involved in the program's implementation were highly restrictive of human agency. Rural Chinese residents were generally unable to participate in meaningful political dialogue, to engage in free markets, or to move from one place to another at will.

The one-child policy may serve as a useful comparison to the barefoot doctors program; both utilized processes with high social costs in order to improve some aspect of human wellbeing. The one-child policy is not actually a single policy, but rather a complex series of incentives, rewards, and punishments with the aim to reduce fertility rates. There are good reasons to reduce high fertility rates, which are often detrimental to maternal health and are associated with higher infant mortality

and slower economic growth. The one-child policy, however, has utilized numerous coercive measures in order to reduce fertility rates. These measures have drawn widespread attention, and many observers question whether the outcome—lower fertility rates—justifies the social costs and loss of freedoms inherent in the implementation of the policy.<sup>111</sup> If one places greater emphasis on the processes and social costs associated with the one-child policy, which include sterilizations, forced abortions, and an increase in male-female sex ratios at birth, then the drawbacks of the policy are made explicitly clear. Indeed, the one-child policy is illustrative of the difficulties in judging social programs solely on the basis of expected outcomes.

In contrast to the one-child policy, however, the barefoot doctors program did not *impose* large social costs. Rather, the barefoot doctors program *relied* on policies and arrangements with high social costs. The barefoot doctors did not impose restrictions on rural residents, nor did it constrain the capabilities of the health care personnel it utilized. As the previous chapter illustrated, many rural residents chose to become barefoot doctors, given their limited set of opportunities. On the other hand, the implementation of the program relied upon inefficient collective structures for production, coercive urban-rural transfers, and restrictive migration policies. A useful perspective on the barefoot doctors is thus one that considers the social arrangements that undergirded the program, as well as the agencies of those involved. From this perspective, the implementation of the barefoot doctors program had substantial social costs, restricting the agencies of millions of rural Chinese. Furthermore, the program relied upon the coercive social arrangements and broad restriction of individual freedoms that so distinctively characterized the Cultural Revolution period.

## 2.2 *Evaluating Basic Health Care Provision and Early-Age Mortality*

Primary care, and more broadly basic health care, is critical in maintaining and improving health conditions. Basic health care includes provision of maternal and child health services, immunization coverage, preventative measures, promotion of basic sanitation, and health-related education. These services can have a significant impact in lowering preventable morbidity and premature mortality in developing nations.

Basic health care provision is feasible, and indeed vital, for many low-income countries with poor health indicators. Indeed, basic health care provision has been a crucial to the promotion of human development in resource-poor societies, such as the Indian state of Kerala, Sri Lanka, and pre-1978 China. Such societies have relatively high life expectancies despite low GDP per capita.<sup>112</sup> Programs such as the barefoot doctors are particularly useful in achieving these gains, working through low-cost interventions to combat preventable morbidity and premature mortality.

Infant mortality, defined as the number of deaths occurring between birth and age one per 1,000 live births, is a good indicator of a society's ability to avoid preventable death.<sup>113</sup> Alternative measures such as life expectancy are often further extrapolations from infant mortality data, and are based on ambitious demographic assumptions about the study population. Adult mortality data are reliable in only a small number of developed countries with good demographic statistics, and is rarely used to measure public health outcomes. Adult mortality is also less sensitive to inexpensive preventative care, and more sensitive to expensive curative care. Infant

mortality rates, by contrast, can be calculated indirectly utilizing simple questions and necessitating fewer assumptions.

Recently, under-five mortality has also been used as a barometer of survival outcomes. Under-five mortality data may also be more accurate than infant mortality when vital registration data is incomplete or inaccurate.<sup>114</sup> Under-five mortality takes into account nutritional inputs after a baby is no longer breastfeeding, and other health inputs that may be foregone during the infancy period. One study suggested that six million deaths of those under five could have been avoided in 2000 with basic health interventions.<sup>115</sup> Because under-five mortality data for China is not as widely cited as infant mortality data, however, infant mortality will be used as the primary indicator of health outcomes evaluated here. Additionally, infant mortality and under-five mortality rates are often closely associated, such that either measure is a useful indicator of early-age survival.

Infant mortality is also a useful prism through which one can evaluate a society's success at providing social support for human development. Firstly, the death of an infant or child results in more productive years of life lost than the death of an adult or an elderly person.<sup>116</sup> The social costs of infant deaths are unmistakably high. Early-age mortality is arguably one of the worst deprivations of human capability, depriving the individual of life at a very early age, before one has the opportunity to begin living a fruitful life.

Secondly, most deaths are concentrated in the early stages of life, and a significant proportion of these deaths are preventable.<sup>117</sup> One study found that 40 percent of all deaths and 50 percent of avoidable deaths took place within the first

five years of life.<sup>118</sup> Infant mortality is indicative of a region's progress in lowering preventable and unnecessary deaths. If all avoidable deaths were addressable with equivalent interventions, the most cost-effective intervention would be in early-age mortality. Viewed in this light, the high levels of global child mortality currently are unacceptable, and must be prevented.

A final reason for examining infant deaths is that most infant and child deaths are preventable with basic interventions.<sup>119</sup> Sanitation and safe water supplies can reduce the risk of death from diarrhea. Other behavioral interventions such as birth spacing and breastfeeding also significantly reduce the risk of infant death.<sup>120</sup> Basic interventions can usually occur through two routes: vertical health programs such as the patriotic health campaigns, and integrated primary care programs such as the barefoot doctors. One study found that primary care programs were both more effective *and* less expensive than comparable vertical health campaigns.<sup>121</sup> Infant mortality risk reductions can thus be achieved with relatively simple measures, and can be expedited by an integrated primary care approach.

### *2.3 Quality of infant mortality data, 1955-1995*

Available demographic data provide a good sketch of recent infant mortality trends in China. Table 2.1 compares four widely cited sources of infant mortality estimates for China from 1955 to 1995. The sources include estimates gathered by Judith Banister and the U.S. Census Bureau, the demographer Kenneth Hill and others, the World Bank, and the United Nations Population Division. Both Hill and the World Bank use similar data sets, although the World Bank uses more recent data

to provide 2005 projections based on recent census data and a child surveillance system from 1991 to 1998.<sup>122</sup> Banister's estimates extrapolate ambitiously to 1953, although the series provide useful sex-specific data based on sex ratios. The UN Population Division estimates are useful in their mortality projections in the future, particularly among regions that have been affected by HIV/AIDS.<sup>123</sup> The UN data are thus somewhat superfluous for purposes here and are included primarily for greater breadth, and to demonstrate the variation of infant mortality estimates in China.

Until 1980, China's population data were relatively incomplete. Surveys conducted prior to the 1980s vastly underreported deaths. Demography was not taken seriously as a scientific endeavor until the 1980s, and releasing politically acceptable results was more important than obtaining accurate results.<sup>124</sup> Mao's belief that the socialist mobilization of China would enable the country to support a large population, coupled with his determination to prove Malthusian theories of population growth wrong, undermined the collection of accurate data.<sup>125</sup> In many respects, the Party's obsession with producing favorable data impeded its efforts at collecting usable statistics before 1982.

Table 2.1 Infant Mortality Rates in China by Source, 1955-1995

Year	World Bank		Banister/ U.S. Census Bureau		UN Population Division		Hill / UNICEF	
	IMR	Percent Decline	IMR	Percent Decline	IMR	Percent Decline	IMR	Percent Decline
1955			154		195			
1960	150		284	-85%	179	8%	150	
1965	111	26%	84	70%	121	32%	111	26%
1970	85	23%	70	17%	81	33%	83	25%
1975	65	24%	49	31%	61	24%	62	25%
1980	49	25%	42	14%	52	15%	46	26%
1985	39	20%	50	-20%	38	27%	35	24%
1990	38	3%			31	17%	36	-3%
1995	37	3%			30	5%	37	-3%
Percent decline, 1970-1980		42%		41%		36%		45%
Source	World Bank 2007		Banister 1987: 116		UN 2006		Hill <i>et al.</i> 1999	
Notes	1							

## Notes

1. Data for 1985 actually from 1984, the last year of the survey.

## Definitions

*Infant Mortality Rate*: Number of deaths occurring between birth and age one, per 1,000 live births.

*Percent Decline*: The proportion of change in infant mortality levels from its initial level to zero, calculated as  $[(IMR_{initial}-IMR_{final})/(IMR_{initial}-0)*100]$ . Calculated here in five-year intervals, except from 1970-1980.

Although vital registration is a useful source of infant mortality data, the quality of China's vital registration appears quite poor, consistently under-registering infant deaths when weighted against other estimates.<sup>126</sup> Hence, these data are given no weight in the World Bank and Hill estimates of infant mortality, and under-five mortality data is instead used as the primary benchmark.<sup>127</sup> Under-five mortality data has been collected mostly from indirect estimates derived from fertility surveys and census data since 1982. Infant mortality data is extrapolated from under-five mortality estimates using a Coale-Demeny "West" model life table.<sup>128</sup>

In 1982, China conducted both a census and a fertility survey that examined one percent of the population which both provided usable data. The 1982 census and fertility survey appear to show consistent trends in infant mortality for the 1970s, and are weighted highly in the Hill and World Bank estimates, which weights sources according to perceived source quality. For the first time, these two sources provided China with relatively high-quality indirect estimates of early-age mortality grounded in rigorous methodology.<sup>129</sup>

The Hill data should be considered the most accurate representation of infant mortality for 1965 and after, and thus the best data for analyzing infant mortality trends during the barefoot doctors program. The Hill data appears to be based on the most reliable set of data, and makes few ambitious assumptions. For most data points, data from Hill correlate closely with the World Bank's estimates, because both estimates extrapolate from similar data sets for pre-1995 periods. United Nations estimates are less consistent with the World Bank estimate, and suggest that the tempo of infant mortality decline began in the 1990s, rather than the 1980s, as other sources suggest.<sup>130</sup> World Bank estimates suggest a fast decline from 2000 to 2005, but the result seems excessively ambitious in light of the fact that there have thus far been few results of sufficient quality since 2000. As a result, data after 1995 have been omitted. Regarding data before 1965, the infant mortality rate of 150 in 1960 given by the World Bank and Hill might in fact be too *low*; as infant mortality levels were artificially raised during the Great Leap famine. This rise in infant mortality is most clearly shown in Banister's data, which serves as a guideline for pre-1965 infant mortality data.<sup>131</sup>

Despite a substantial degree of extrapolation, Banister's estimates are useful in providing sex-specific data and in that they extrapolate back to 1953. The estimates use data from the 1982 fertility survey, as well as a Cancer Epidemiology Survey conducted in 1980, a nationwide survey that gathered data of relatively high quality on age-specific mortality rates.<sup>132</sup> The data shows an alarming trend in sex-specific infant mortality rates after 1979, reproduced in Table 2.2.

*Table 2.2 Infant Mortality Rate by Sex, 1970-1984*

Year	IMR, Males	IMR, Females	IMR, both sexes	IMR decline in preceding year, Males	IMR decline in preceding year, Females	IMR decline in preceding year, both sexes
1970	70	70	70			
1971	65	65	65	7.4%	7.4%	7.4%
1972	60	60	60	8.0%	8.1%	8.1%
1973	56	56	56	6.3%	6.0%	6.2%
1974	52	53	52	7.0%	6.6%	6.8%
1975	48	49	49	7.3%	7.0%	7.3%
1976	45	45	45	8.1%	7.6%	7.6%
1977	41	42	41	8.5%	8.2%	8.7%
1978	37	38	37	9.6%	9.2%	9.3%
1979	36	43	39	1.4%	-13.3%	-5.9%
1980	36	48	42	1.4%	-11.7%	-5.6%
1981	35	53	44	1.4%	-10.3%	-5.0%
1982	35	58	46	1.1%	-9.3%	-5.0%
1983	34	62	48	1.4%	-8.5%	-4.6%
1984	34	67	50	1.5%	-7.7%	-4.4%

Source: Banister, *China's Changing Population*, 1987: 116.

The data might overestimate the number of female infant deaths; infant deaths are partially, not solely, responsible for the widening sex ratios between male and female births. Nevertheless, the value of Banister's data is primarily in its illustration of sex-specific infant mortality trends.

The estimates derived by Hill should be used as the primary guidelines for assessing infant mortality trends here. Since the 1980s, scholars have made relatively successful attempts at extracting accurate infant mortality estimates from available

censuses, fertility and sample surveys. All four sources show similar trends, but each source varies in its depiction of the pace and timing of China's infant mortality decline. Good infant mortality data can be extrapolated back to the 1970s and late 1960s, but earlier figures are more tentative. China's infant mortality data is usable, but must still be viewed with some caution.

#### 2.4 *Chief Determinants of Infant Mortality Trends, 1955-1995*

Between roughly 1955 and 1995, the most rapid declines in infant mortality occurred during periods of broad provision of rural health services. As outlined in the previous chapter, the two principle rural health initiatives were the patriotic health campaigns, which begun in 1952, and the barefoot doctors program, which was implemented between roughly 1968 and 1981. Nevertheless, various socioeconomic determinants also shaped infant mortality trends, such as the one-child policy in the late 1970s and the Great Leap famine between 1958 and 1960. Survival outcomes are often influenced by many factors and social arrangements, such as social stability, economic growth, gender equality, education, and provision of health care.

Reductions in China's infant mortality began in the early 1950s. National infant mortality rates before the Communist takeover were likely well above 200 deaths per thousand live births.<sup>133</sup> All four sources in Table 2.1 show a rapid decline in infant mortality before 1965. There are three main reasons for the rapid infant mortality decline between 1950 and 1965. Although the barefoot doctors program had not yet been initiated, the patriotic health campaigns had already become widespread by the mid-1950s. These interventions targeted environmental conditions that

facilitated disease transmission, and were associated with education campaigns aimed to promote hygiene and sanitation. Secondly, disease and epidemic control stations flourished between 1950 and 1958. Thirdly, the retraining of traditional midwives during the early 1950s led to more sanitary birthing practices and to reductions in common neonatal diseases such as tetanus. Finally, and more broadly, the absence of civil war, along with more abundant and more equitably distributed food, also contributed to improvements in rural survival rates.

The Great Leap Forward interrupted the steady infant mortality decline between roughly 1958 and 1961. National infant mortality rates skyrocketed during the Great Leap Forward, which was initiated in 1958 and called off in 1960. Consensus now holds that the movement induced a famine of astronomical proportions.<sup>134</sup> Absence of democracy aggravated poor information flow from local levels to the central Communist Party apparatus, leading to excess state grain extraction in hard-hit areas. Hence, politically motivated grain shortages contributed to large nutrient deficiencies among mothers and infants, which in turn led to excess infant mortality during the Great Leap period. The chaos and disaster generated by the Great Leap Forward also led to a shortage of medicine and reductions in public health efforts. Disease control efforts collapsed, and lack of epidemiological control led to a cholera epidemic in Guangdong.<sup>135</sup>

Immediately after the Great Leap famine ended, infant mortality resumed pre-Great Leap levels. Government neglect of rural health care between 1961 and 1965, however, did not encourage rapid infant mortality declines. Because health services

were based at county level hospitals, the majority of China's vast rural population was unable to access and utilize health care services.

The tempo of infant mortality decline increased noticeably during the tenure of the barefoot doctors program in the late 1960s and the 1970s. From 1970 to 1980, all four sources in Table 2.1 show a rapid decrease in infant mortality rates. Indeed, during the barefoot doctors "decade," there was an associated decline in national infant mortality rates. Infant mortality decline was both steady and rapid during this period, building upon survival gains already made during the 1950s.

As indicated in the previous chapter, barefoot doctors served as effective agents in implementing many public health policies, ranging from family planning to sanitation. The integration of vertical health initiatives and incorporation of retrained rural midwives into the program improved early-age survival. The integrated approach of the barefoot doctors to infant illness may have accelerated the pace of infant mortality decline.

Higher literacy rates, particularly among women, may have also affected infant mortality trends after 1950. Literacy and education do, in fact, have a positive effect on early-age mortality.<sup>136</sup> This advantage can be both informational (literate mothers are better able to receive maternal and childrearing health education), and empowering (women with higher social status have greater decisional power). Evidence suggests that an increase in female empowerment tends to be associated with improved maternal and child health.<sup>137</sup> Early on, literacy rates improved as the Communist Party launched anti-illiteracy campaigns. These campaigns were developed to provide basic education to the masses, similar to the health campaigns

examined here. The quality of education was highly variable, however; many secondary schools and universities shut down during the Cultural Revolution. The scope of and efficacy of China's literacy campaigns is subject to considerable debate, although the campaigns seemed at least effective in improving youth literacy and reducing gender disparities in literacy.<sup>138</sup> The disparity between female to male illiteracy began a steady decline after 1964.<sup>139</sup> In 1990, illiteracy stood at only 16 percent for the age group that went to school after 1949, compared with 62 percent among those who went to school before 1949.<sup>140</sup>

Infant mortality declines slackened in the 1980s, a decade often heralded as the beginning of China's economic boom. All four sources depict a noticeable slowdown in infant mortality decline, although the sources differ on when the slowdown occurred. The Hill, World Bank and UN data estimates all show that the slowdown occurred between 1985 and 1990, whereas the Banister data shows a dramatic reversal, and indeed a rise in infant mortality, between 1980 and 1985. Banister's ignominious estimates are perhaps exaggerated, but suggest an alarming trend in sex-specific mortality. There are two associated determinants of this alarming trend during the 1980s. The first was the collapse of the barefoot doctors program, which was officially terminated in 1981. The program began to collapse when the Household Responsibility System was introduced in 1978, which shifted the basic unit for agricultural production from the production brigade to the household. Along with the collapse of collectives, the Cooperative Medical System, which financed the barefoot doctors, also broke down. The sudden collapse of rural health care system led to a stagnation in infant mortality reduction. Schistosomiasis, which had been so

actively campaigned against by Mao, began to reappear, along with other preventable diseases such as goiter, plague and malaria.<sup>141</sup>

A second associated determinant of poor infant mortality progress was the one-child policy, which coincided with the collapse of the barefoot doctors. The one-child policy particularly affected female infants and children.<sup>142</sup> When allowed only one child, many rural families demonstrated a clear preference for sons.<sup>143</sup> The introduction of the one-child policy in 1979 was associated with a rise in female infant mortality, possibly through infanticide and selective neglect.<sup>144</sup> The rise in female infant mortality elevated total infant mortality, documented in Table 2.2. Many female infants and children may not have suffered infanticide, but still received less medical attention, nutrition, and care than their male counterparts since economic reforms.<sup>145</sup> One Chinese study suggested that female infant mortality rate rose from 36 per 1,000 live births in 1981 to 40 per thousand in 1989.<sup>146</sup> Since the early 1990s, the disparity between female and male infant mortality may have in fact dropped, because of the broad availability of sex-detection technologies. On the other hand, excess sex ratios at birth have continued to increase since 1980.<sup>147</sup>

The disparity between female and male infant mortality was partially due to the introduction of the Household Responsibility System, which, coupled with a lack of state initiatives supporting gender equality, reduced the social position of Chinese women. During the collective period, rural women enjoyed a degree of support from agricultural collective arrangements, which reduced the burden of child rearing and gave women greater say in family planning matters.<sup>148</sup> Although female labor was valued less than male labor, the state made a conscious effort to expand female

employment before reforms.<sup>149</sup> Once reforms began sweeping the cities, the security of the state sector's "iron rice bowl" was shattered.<sup>150</sup> In the countryside, traditional patrilineal patterns resumed, and many rural women no longer participated in outside employment.<sup>151</sup> By constraining female status through inequitable household and labor arrangements, land reform played an indirect role in affecting rural health.<sup>152</sup>

Although income has become a more significant indicator of health since 1978, rising incomes have not led to better health. Perhaps due to the shift to a market-driven health care system in the early 1980s, the correlation between high levels of GDP per capita and low levels of infant mortality has grown increasingly strong.<sup>153</sup> Although rapid economic growth can potentially lead to broad gains in health, China's economic gains have not been distributed equitably or utilized toward social service provision. Income inequalities have increased substantially, and infant mortality declines have stagnated.<sup>154</sup> Indeed, good health is not simply a consequence of rising incomes.

Nevertheless, the disappearance of barefoot doctors and introduction of the one-child policy did not eliminate rural health services altogether. Intriguingly, infant immunizations increased after reforms. Only 58 percent of children had received their third dose of diphtheria, tetanus, and pertussis (DTP) in 1983, roughly the end of the barefoot doctors period.<sup>155</sup> Polio and measles vaccinations stood at roughly 80 percent in 1983.<sup>156</sup> DTP, measles and polio immunizations rose to 95 percent in 1989, a substantial increase in a short span of time. An increase in immunization coverage since economic reforms has not, however, led to commensurate declines in infant mortality. Although China made progress in immunizing infants since economic

reforms, it failed to provide health care needed to address other basic needs of the rural population.

For the first five decades of the PRC, changes in infant mortality rates were strongly associated with basic health care provision efforts. The greatest gains in infant mortality occurred during periods of health service provision, particularly during the late 1960s and 1970s. Although it is unclear when, precisely, the tempo of infant mortality decline slackened, there is an agreement among the sources examined here that rapid reductions in infant mortality came to a halt by the late 1980s. Additionally, the mass deployment of barefoot doctors also ensured that health services, if somewhat rudimentary, were available on an unprecedented scale in China. An increase in basic health care provision, vis-à-vis the barefoot doctors, was strongly associated with a precipitous decline in infant mortality.

### 2.5 *Health Personnel and Infant Mortality: A Thirteen-Province Study*

Beyond a temporal association between policy implementation and outcomes, there has thus far been no systematic examination of the relationship between the barefoot doctors and infant mortality. A preliminary assessment of China's infant mortality trends clearly warrants further examination of the efficacy of the barefoot doctors program. Demographers have documented mortality trends on national and even provincial levels, whereas public health specialists have tended to focus on the mechanisms of public health programs. There has been an alarmingly little attention toward examining the relationship between the two, however, particularly during the implementation of the barefoot doctors program. Presented here is a quantitative

analysis that presents new, original evidence to strengthen the relationship between policy and outcomes.

It is hypothesized that provinces with a higher ratio of basic health personnel per inhabitants will have lower provincial infant mortality rates, even when controlling for economic output per capita. If provinces with a higher proportion of health personnel have an advantage in lowering preventable mortality, then the finding will be consistent with the claim that the barefoot doctors were responsible for improved health outcomes. By examining data across thirteen Chinese provinces, this study attempts to further examine the relation between policy and outcome.

Provincial gross product per capita data from 1978 was used for this study, the earliest year in a study of economic growth during reforms.<sup>157</sup> Provincial infant mortality for 1981 was gathered from a 1989 French demographic study utilizing the 1982 census and older data from the 1980 Cancer Epidemiology Survey.<sup>158</sup> The study provided data for 28 of China's 29 provinces, municipalities, and autonomous regions at the time, excluding Tibet. The study constructs estimates of provincial infant mortality using these sources, concluding that the national infant mortality rate was roughly 34 per 1,000 live births, lower than the range of 42 to 52 given by the four sources in Table 2.1. Assuming that underreporting was uniform across provinces, however, these data may still be used.

*Table 2.3* Infant Mortality, Output per Capita, and Health Personnel in Thirteen Select Provinces, 1973-1981

Province	Infant mortality rate, both sexes, 1981	Gross provincial product per capita, 1978	Total health personnel, 1973	Estimated provincial population, 1973	Health personnel per 1000 inhabitants	Population per total health personnel, 1973
prov	imr	gdp	hp	pop	hpper	popperhp
Guangxi	29.45	574	220000	26900000	8.18	122
Jilin	17.1	709	105066	18400000	5.71	175
Sichuan	50.1	454	500000	89600000	5.58	179
Anhui	28.74	481	225700	41400000	5.45	183
Guangdong	18.17	726	251000	46200000	5.43	184
Jiangsu	28.61	692	350000	65600000	5.34	187
Shandong	19.13	676	320000	69800000	4.58	218
Fujian	19.51	577	85000	18700000	4.55	220
Hebei	19.15	668	253000	61800000	4.09	244
Yunnan	71.44	479	90000	23500000	3.83	261
Inner Mongolia	37.41	572	24500	6700000	3.66	273
Liaoning	18.27	1224	106022	36800000	2.88	347
Heilongjiang	30.46	1038	65000	24300000	2.67	374
Sources	Calot and Caselli 1989: 860	Yao 1999	Calculated from Hu 1980	Hu 1980: 236-239	Calculated from Hu 1980	Calculated from Hu 1980
Notes	1	2	3	4	5	6

Notes and Definitions:

- 1 National infant mortality rate is given as 33.81 for 1981, although the four sources in Table 2.1 estimate the rate to fall somewhere between 42 and 52.
- 2 Gross provincial product per capita figures are from 1978, in Yuan at 1990 prices
- 3 Total health personnel is the sum of “barefoot doctors” and “health aides” categories, based on data from various media sources in Hu 1980, gathered between 1970 and 1973.
- 4 Provincial population provided in millions from Hu 1980
- 5 Ratio calculated by multiplying total health personnel by 1,000 and dividing by provincial population:  $(hp*1000/pop)$
- 6 Ratio calculated by dividing provincial population by total health personnel  $(pop/hp)$ .

This study gathered data from a variety of sources, presented in Table 2.3. Demographic data on provincial population size and distribution of barefoot doctors were obtained through a compilation of foreign broadcasts provided by the Chinese government between 1970 and 1973.<sup>159</sup> These reports provide the number of barefoot doctors in twenty-five of China’s provinces, as well as estimated population sizes during that time. The data set also provides approximations of health aides in thirteen of China’s provinces.<sup>160</sup> Because barefoot doctors and health aides often performed

similar tasks and the distinction between the two categories is inessential, they are amalgamated as one group termed “health personnel,” a sum of the estimates of barefoot doctors and health aides. The number of health personnel is expressed as the proportion of health personnel per 1,000 inhabitants in each provinces used in the study. Because only thirteen provinces provided data for total health personnel, the data set for this study is somewhat limited.

In order to assess the data, infant mortality was used as the dependent variable and the proportion of health aides per 1,000 inhabitants as the independent variable of interest. As is standard in the literature, the natural logarithm of provincial infant mortality rates was used as the dependent variable, and the natural logarithm of provincial output per capita as the right-hand side control variable. The logarithm of infant mortality in 1981 was then regressed on the logarithm of provincial output per capita in 1978, and the number of health personnel per 1,000 inhabitants in 1973. If there was indeed a relation between the proportion of health personnel and infant mortality, the coefficient on the proportion of health personnel should be negative. In other words, a *higher* provincial proportion of health personnel would be associated with a *lower* infant mortality rate. Additionally, for the relationship to be judged statistically significant, the p-value of the *t*-statistic should be 0.05 or lower.

*Table 2.4* Statistical Effect of Health Personnel on Infant Mortality, Controlling for Provincial Output per Capita, Thirteen Chinese Provinces, 1973-1981

Variable	Variable name	Coefficient	Standard error	<i>t</i> -statistic	P>(t)
Provincial output per capita	gdp	-1.15	0.42	-2.74	0.021
Health personnel per 1,000 inhabit.	hpper	-0.12	0.08	-1.47	0.173

The results of the regression, shown in Table 2.4, found the expected negative relation between health personnel and infant mortality levels. Provinces with more health personnel per 1,000 inhabitants had lower infant mortality rates, even when controlling for the variation in provincial output per capita. The regression also found that provinces with higher output per capita had lower infant mortality rates, also an expected result. The strength of the association between provincial output per capita and infant mortality levels was statistically significant at the 2 percent level, strongly supports that the results were not obtained by chance. On the other hand, the association between health personnel and infant mortality was found to be significant at the 17 percent level, which is higher than the normal statistically acceptable level. Although regression analysis found a relation between health personnel and infant mortality, the imprecision of the estimate is unlikely to convince skeptics of the program.

Whereas the previous test is a measurement of statistical significance, it may be useful to evaluate the substantive impact of barefoot doctors on infant mortality decline. A second test can be used to estimate the marginal effect of increasing the number of health personnel on the infant mortality level. The data set of thirteen provinces showed that the number of health personnel per 1,000 inhabitants ranges from 2.67 in Heilongjiang to 8.18. Using the CLARIFY routine written for the *Stata* statistical program, a simulation was performed examining the effect of increasing the number of health personnel from 2.67 to 8.18 per 1,000 inhabitants, while setting provincial output per capita to its mean in each of the thirteen provinces. The test found that infant mortality would fall by 18.5 deaths per 1,000 live births with the

additional health personnel, with a rather large margin of error of  $\pm 28$  deaths. Given that infant mortality levels ranged from 18 to 71 over the thirteen provinces, however, the midpoint estimate of a reduction in 18.5 deaths is fairly large. The qualitative effect of tripling the proportion of health personnel over a population is small in relative terms, increasing the number of health personnel from roughly three to eight within a production brigade of roughly 1,000 inhabitants. This small increase in health personnel would translate into an estimated reduction of 18 infant deaths per 1,000 live births, a substantive reduction that should be emphasized.

This study has a number of limitations. The data set of thirteen provinces provides a limited number of data points in the regression. With a larger data set including all of China's provinces, or using a different unit of analysis, such as the county or production brigade, more data points would provide a more rigorous basis for assessment. A few assumptions have been made as well, the most glaring perhaps being the faith in China's reported data for the number of barefoot doctors. The study may have also suffered from endogeneity, which can arise when reverse causation exists between the the independent variable and dependent variable. In this study, provinces with high infant mortality levels may have been allocated a higher proportion of health personnel to combat poor health standards.

These limitations should not detract from the general emphasis of the study, however, in further clarifying the relation between health care provision and health outcomes. By examining inter-provincial demographic trends, the study has aimed to address the lacuna of literature on the effectiveness of the barefoot doctors. At the

very least, this inter-provincial study contributes additional evidence that the barefoot doctors program was indeed efficacious in improving health outcomes.

## 2.6 *Efficacy of Specific Interventions*

With a stronger relationship established between the implementation of the barefoot doctors program and health outcomes, it is now appropriate to explore the specific interventions that may have contributed to declines in infant mortality. Certain interventions have proven especially effective in reducing premature mortality, and certain factors have also been shown to be strongly associated with infant mortality declines. The intention here is thus to illuminate specific factors and interventions in the barefoot doctors program that were likely responsible for the rapid progress in health outcomes. The analysis highlights several areas: emphasis on better family planning and maternal health, preventative care aimed at reducing neonatal and infant disorders, and greater effort at delivering health care to rural locales.

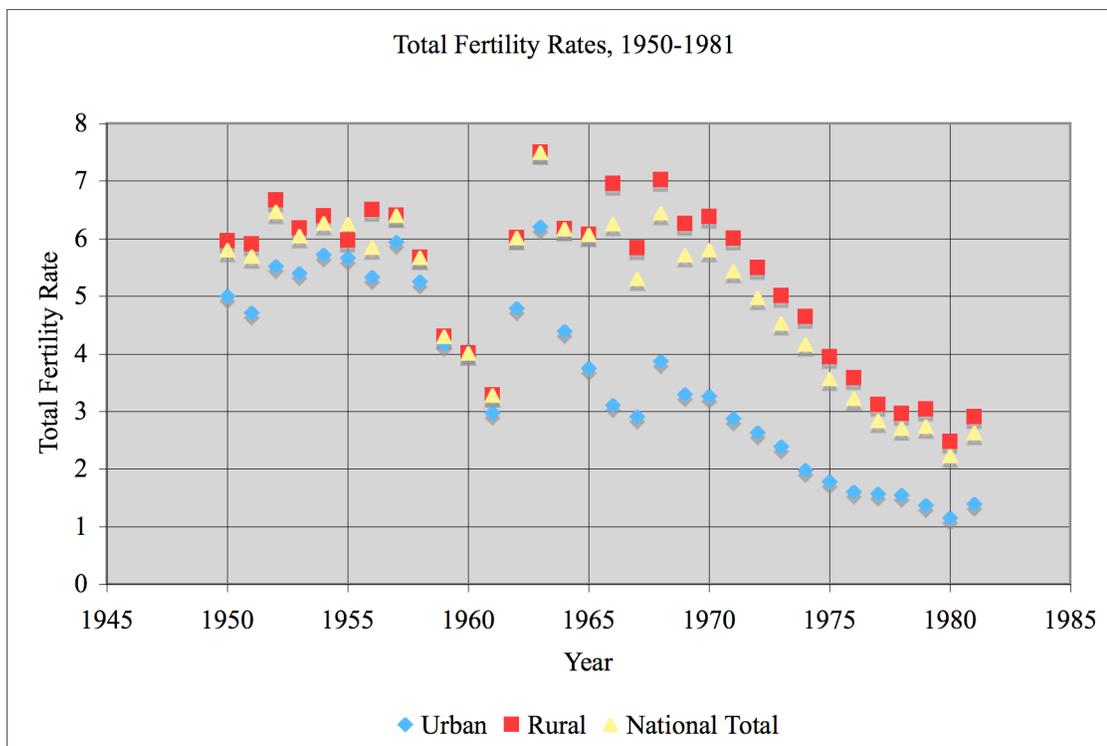
The previous chapter indicated that a large number of barefoot doctors were women, especially if midwives and health aides are included, who provided vital maternal health care. Maternal health is a key determinant of infant mortality, because a mother's diet and nutrition directly affect birth weight and infant nutrition.<sup>161</sup> The retraining of traditional midwives during the early 1950s, as well as the utilization of additional midwives and birth assistants in the barefoot doctors program, should be stressed as a particularly effective component of the program.

A cross-national study of 46 and 92 developing countries found that maternal and infant program effort and attendance at birth by trained personnel respectively are particularly powerful statistical determinants of under-five mortality.<sup>162</sup> In fact, these indicators proved more significant than other commonly used indicators of health care, such as spending, geographic access to care, and the proportion of physicians and hospital beds in a given population. Access and spending indicators provide little information about actual health service utilization among the majority of a developing nation's population; health spending and high-level resources are often concentrated among a society's elite. On the other hand, the provision of basic maternal services as well as the attendance at birth of trained midwives can have a substantive impact on early-age health. Neonatal mortality, or death within 28 days of birth, composes of over 35 percent of under-five deaths worldwide, certainly a significant proportion. Of all neonatal deaths, it is estimated that 24 percent are caused by severe infections, 29 percent by birth asphyxia, 24 percent by complications of prematurity, all preventable causes that are addressable with adequate maternal care.<sup>163</sup>

Fertility decline in rural areas, initiated by a rigorous family planning effort under the barefoot doctors, was also an instrumental factor in infant mortality decline. Beginning in 1970, family planning efforts carried out by the barefoot doctors encouraged birth patterns to be "later, longer, and fewer," or later marriage and childbearing, longer spacing between births, and fewer children.<sup>164</sup> In fact, fertility rates began a rapid decline *before* the coercive one-child policy in 1979; rural fertility rates fell from 6.4 in 1970 to 3.0 in 1979. Figure 2.1 demonstrates that urban fertility rates had already begun to drop during the 1960s, but rural fertility rates only began

to decline after family planning efforts began in 1970. Lower fertility rates reduce unwelcome burdens on potentially young mothers, and help focus resources and attention on successfully rearing fewer and healthier children.<sup>165</sup> Reductions in infant mortality reinforce fertility decline, as improved early-age survival reduces the incentive to have multiple births in the hope of having a child live through its vulnerable infant years.<sup>166</sup> By way of the family planning efforts carried out during the 1970s, the barefoot doctors were responsible for enhancing women's agency, as well as reducing infant mortality rates.

Figure 2.1 Total Fertility Rates, 1950-1981



Source: Banister, *China's Changing Population*, 1987: 243.

Interventions aimed at preventable early-age disorders should also be emphasized within the repertoire of the barefoot doctors' responsibilities. These interventions included the efforts made by barefoot doctors to ensure safe water and

sanitation efforts, immunization, as well as disease control. Adequate supply of safe water can drastically reduce mortality from diarrhea. Although UNICEF reported that only 59 percent of China's rural population had access to improved water sources in 1990, water and sanitation improvements under the barefoot doctors helped to reduce water-related diseases such as schistosomiasis and malaria.<sup>167</sup> It is also possible that access to improved water sources have worsened since reforms, given the increased incidence of schistosomiasis and lack of preventative measures.<sup>168</sup> The barefoot doctors were unable to provide universal childhood immunizations, although it is worth noting that the statistical relation between under-five mortality and DTP or measles immunizations is weaker than the relation between under-five mortality and attendance at birth of trained birth attendants.<sup>169</sup> Given that few Chinese had likely received immunizations in 1950, the large marginal increase in immunization coverage during the 1960s and 1970s likely played a part in infant mortality declines.

A final instrumental factor that contributed to the efficacy of the barefoot doctors program was the broad utilization of its services, through efforts to overcome geographical and financial obstacles. The barefoot doctors provided community-level health care at brigade clinics, and production teams often had a specific barefoot doctor assigned to them. The active provision of health services, through home visits and work visits, ensured actual utilization of health care, rather than simply geographical access to health services.

### *Conclusion*

The aim of this chapter has been to situate the barefoot doctors program within a broader perspective of human development in China. It has presented two main approaches of policy evaluation. The first method examined the processes and social arrangements involved in implementing the barefoot doctors program, an analysis that argued that the program relied on restrictions on human agency and coercive policies. The second approach assessed the impact of the barefoot doctors on health outcomes during the program's tenure. Given the paucity of data examining the effects of the barefoot doctors program in health outcomes, this task has proven challenging. Beyond a temporal association between the program's implementation and rapid infant mortality decline, the chapter has also revealed an association between a higher density of rural health personnel and lower infant mortality over a select group of Chinese provinces. Additionally, evidence from other countries shows that basic interventions such as improving water and sanitation, attendance of trained birth attendants, and improved maternal care all have a strong statistical effect on early-age mortality. Although the arguments presented here do not provide conclusive evidence that the implementation of the barefoot doctors caused rapid infant mortality decline, the strength of the association is significant enough to warrant an examination of how and why the program was implemented.

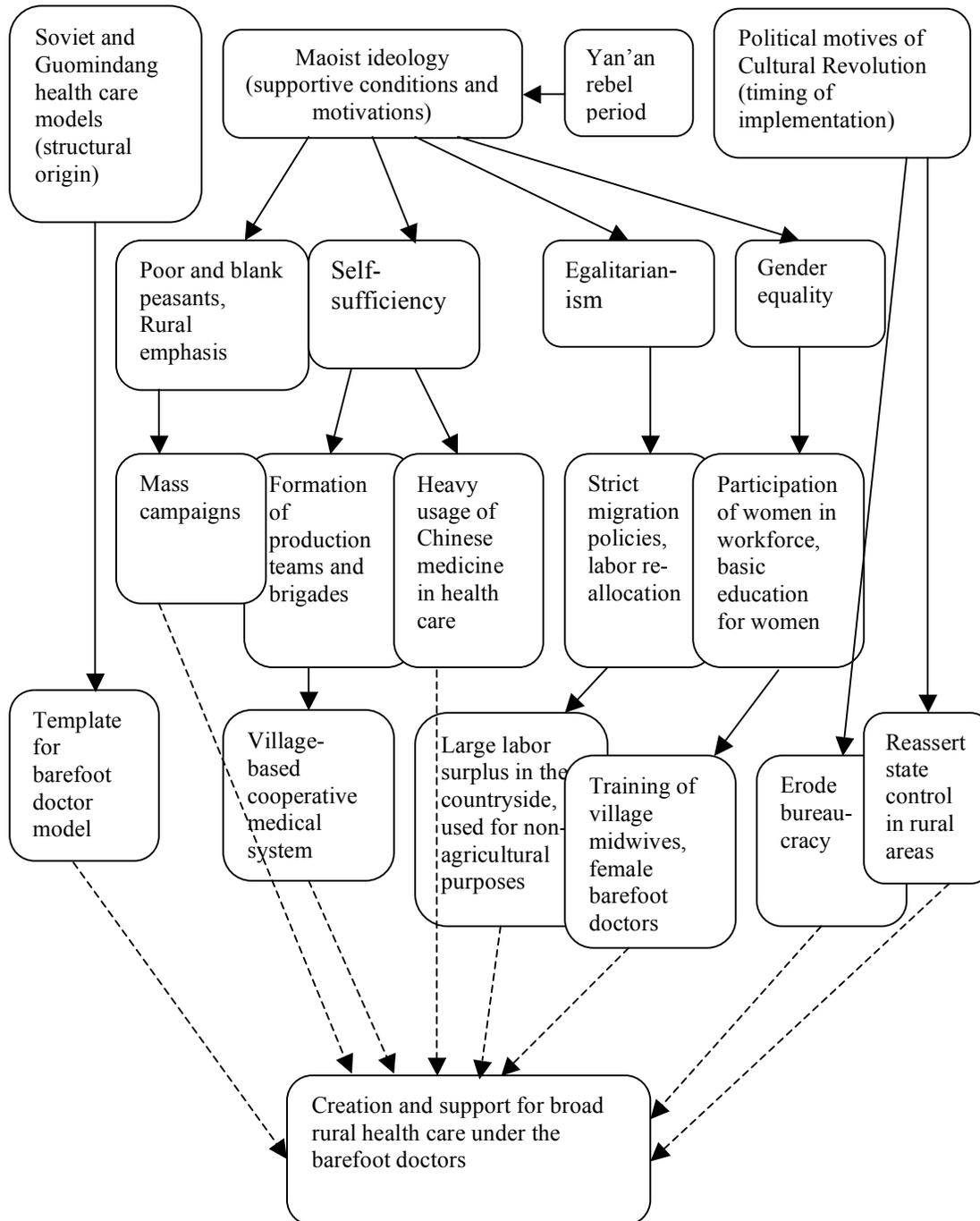
### **Chapter 3: Determinants of the Barefoot Doctors Program**

The CCP implemented the barefoot doctors program during the Cultural Revolution in the late 1960s and 1970s, periods rarely associated with broad human development. It is puzzling that despite all of the pernicious policies that arose from the Cultural Revolution, an effective primary health care program came to fruition. This chapter aims to explain how and why, during a chaotic period of political intrigue, violence, and lack of basic freedoms, the CCP implemented the barefoot doctors program. In unraveling this apparent paradox, the chapter presents a rigorous framework that identifies and explores the determinants and proximate factors of the barefoot doctors program, laid out in Figure 3.1.

Three broad categories of determinants explain the implementation of the barefoot doctors program in complementary, but distinct ways. Emulation of foreign paramedic models provided the basic template of the barefoot doctors program, Maoist ideological principles facilitated the supportive conditions of the program, and political determinants of the Cultural Revolution largely explain the timing of the program's implementation. The CCP developed the barefoot doctor from Guomindang and Soviet models (Section 3.1). Ideological principles, originating from the Yan'an era, included an emphasis on rural development, self-sufficiency, egalitarianism and gender equality (3.2-3.5). Each of these principles underscored the development of China's rural political economy, which provided the essential conditions for the implementation of the barefoot doctors. The Great Leap Forward, however, demonstrated that there were limits to ideological and political forces in bringing about a health care program (3.6). On the other hand, the political forces of

the Cultural Revolution, which reasserted state control in the countryside and emphasized rural mass movements, help to explain why the program was implemented in 1968 (3.7).

Figure 3.1 Origins and Determinants of the Barefoot Doctors Program



### 3.1 *Emulation of Foreign Models*

The implementation of the barefoot doctors program would likely have not been possible without a basic template, or structural precedent, for a rural health care model program. Earlier models, which emphasized the role of minimally trained, community-based health care workers, provided the basic structure for the development of the barefoot doctors model. Two foreign models of health care informed the barefoot doctors program. The CCP based the barefoot doctor on models developed by the Guomintang and the Soviet Union. The Guomintang instituted a compelling health care pilot program outside Beijing during the 1930s, which actually had covert ties to the CCP. A foreign model from the Soviet Union, the *feldsher*, was also influential. Although the barefoot doctor program originated from these two models, Mao could not credit the Guomintang or the Soviet Union, for they represented opposing ideologies.

The Guomintang, despite its ultimate failure to win the support of Chinese peasants, had instituted a compelling health care program in Dingxian county in the mid-1930s, a county a little over a hundred miles from Beijing. Both the Guomintang and CCP were vying for the allegiance of the Chinese people, which provided significant incentive to address the population's health. In fact, the Dingxian pilot program was widely, although perhaps secretly, admired by the CCP.

The Dingxian experiment began in 1932, when C.C. Chen, a Peking Union graduate, began a five-year community medicine pilot program in an area under Guomintang control.<sup>170</sup> This model of care was formed under the Mass Education Movement, a movement that had been initiated by James Yen, a Christian convert

educated at Yale.<sup>171</sup> This model trained “ordinary, lay people as the basic personnel of the system of rural health service,” as well as local traditional medicine practitioners, who “had very little in common with the scholar-physicians ... in the cities.”<sup>172</sup> In fact, Chen mandated that villagers be trained for only ten days, because any longer would have been too expensive.<sup>173</sup> The model also emphasized basic health education and mass inoculations among infants and children.<sup>174</sup>

The Guomindang also promoted a three-tiered rural health care system, similar to the three-tiered system the CCP would implement under the barefoot doctors. After the Dingxian experiment had been overrun by the Japanese in 1937, Chen began a rural health care program that organized care on district, subdistrict, and village levels. The Guomindang had created some 1,775 county health centers by the end of Second World War.<sup>175</sup> These initiatives found an unlikely ally in the Rockefeller Foundation, which had lent support to the Peking Union Medical College, whose graduates became administrators in the Guomindang health bureaucracy.<sup>176</sup>

Guomindang public health schemes also reflected strong foreign influences, and hence, further ideologically incorrect sources. Chen and Yen had attended Harvard and Yale, respectively, before returning to China.<sup>177</sup> Western missionaries had also influenced public health work during the Guomindang and the last years of the Qing dynasty.<sup>178</sup> Moreover, medical missionaries had constructed hospitals and initiated public health and environmental campaigns in rural areas, akin to the “patriotic health campaigns” later used by Mao.<sup>179</sup> Chen, who initiated the Dingxian

experiment, had observed rural health programs during visits to the Soviet Union, Yugoslavia, and India in 1935.<sup>180</sup>

Although formally working for the Guomintang, Chen and Yen were politically unallied with either the Guomintang or the CCP.<sup>181</sup> When Yen went to the Yan'an base in 1938, Mao Zedong reportedly told him and other representatives of the Mass Education Movement, "The Communist Party wants to be your friend ... We have the highest respect for your using the spirit of religion to do such hard work in mass education."<sup>182</sup> Despite the sponsorship of the Guomintang, Dingxian had in fact been a hotbed for revolutionary activity, and one resident later said that there were "more revolutionaries and Communists born in Ting Hsien [Dingxian] than in any other county in China."<sup>183</sup> There was thus a widespread acknowledgement and admiration among the Communists of the social work in Dingxian.

Mao did not explicitly replicate the Dingxian model and the Mass Education Movement, but these Guomintang campaigns may have informed the CCP's own mass campaigns and programs. Additionally, the CCP was unlikely to admit that it had emulated a social program from the Guomintang, given the supposedly great ideological difference between the two parties. Nevertheless, despite its efforts to provide health care in mainland China in 1948, the Guomintang ultimately failed to win the support of the Chinese peasants.

The Soviet Union had also played a key role in shaping the barefoot doctors model during the 1950s. Direct Soviet assistance to the CCP reached its zenith during this time, before the Sino-Soviet split in 1960; like many aspects of early CCP policy, health care policy in the 1950s was heavily influenced by the Soviets. On the eve of

the establishment of the PRC, Mao proclaimed, “The Communist Party of the Soviet Union is our best teacher and we must learn from it.”<sup>184</sup> Soviet advisors essentially conceived the first Five Year Plan in 1953, which promoted rapid urban industrialization, and allocated a large portion of government spending to this end. On the other hand, public health and welfare spending was kept to a minimum: in comparison to the 52.3% spent in industry, health spending comprised only 0.9% of the government budget in 1957.<sup>185</sup>

Despite the relatively small public health expenditure, the Soviet Union still managed to instigate some major changes in the public health realm. The Chinese replicated the Soviet model for medical education, concentrating on building and restoring urban hospitals and building county-level curative facilities.<sup>186</sup> As in other industries, the Soviets encouraged occupational specialization in health and bureaucratization of the Party. Within medical education, the emphasis on early specialization divided schools into specialties such as adult medicine, pediatrics, public health, stomatology, and pharmaceuticals.<sup>187</sup>

The Soviets also promoted a health care system that featured health workers that shared similar characteristics as the barefoot doctor. These semiprofessional health workers were called *feldshers*, derived from the German *Feldscher*, a military field doctor used during the Middle Ages.<sup>188</sup> These *feldshers* were often local peasants who provided care to rural populations, filling in a gap in a health care system that heavily favored urban areas.<sup>189</sup> *Feldshers* staffed primary health care stations in rural areas, supervised by trained physicians in a hierarchical health care system. The standards for *feldsher* training were relatively low, and they usually

required only a primary education of seven or eight years. Like the Chinese barefoot doctors, most *feldshers* were female.<sup>190</sup>

During the 1950s, the Chinese flirted with reproducing the *feldsher* model. In 1958, just as the Great Leap Forward was beginning, 225 *feldsher*-type workers in Shanghai were chosen by the Provincial Party Committee to train rural health workers, after receiving two months' education.<sup>191</sup> A reported 3,900 health workers were later assigned to production brigades, treating some 2,700,000 in Shandong province. This pilot program illustrates attempts at transferring the *feldsher* into China's health care system, and early attempts at creating the barefoot doctor model.

Emerging political tensions between the Soviets and the Chinese, however, would render the Soviet *feldsher* model ideologically unacceptable. Criticism of the Soviet Union escalated the One Hundred Flowers movement in 1957, in which intellectuals were encouraged to criticize the Party. Intellectuals complained that the Chinese slavishly copied the Soviets, that Soviet models had an urban bias, that they neglected preventative and traditional medicine for the masses, and that doctors focused too much time on Party officials.<sup>192</sup> Mao would later punish over 300,000 intellectuals as "poisonous weeds" for voicing their criticism, but criticism of the Soviet Union remained acceptable.<sup>193</sup> Mao himself later echoed these criticisms, as Sino-Soviet relations deteriorated. In the summer of 1960, the Soviet Union withdrew all of its 1,390 experts and advisors from China.<sup>194</sup>

It is startling that the prototype of the barefoot doctors model may have actually stemmed from two ideologically inappropriate sources, the Soviet Union and the Guomindang. The Guomindang initiated rural health care pilot programs that

trained peasants to provide basic health care to local populations, and contact between the CCP and the Dingxian program exposed the CCP to a health care model quite similar to the barefoot doctors. The Soviet Union also had an undeniable influence on health policy during the 1950s. Despite their supposed urban bias, the Soviet Union had promoted their *feldsher* paramedic model, which the CCP had begun to experiment with in 1958. Nevertheless, it is difficult to ascertain to what degree the CCP borrowed from these two sources, given the vehement ideological opposition to the Guomindang and the Soviets. Rather than credit these two sources, the CCP sought to embellish and revitalize its formative experiences in Yan'an, which served more as an ideological impetus than a structural one.

### 3.2 *Yan'an and the Formation of Maoist Ideology*

The ideological motivation for broad provision of health care can be traced back to the Yan'an era, which was an incubatory period that clarified and developed the Party's ideological direction. After the establishment of the People's Republic, Mao consistently argued for a return to the "Yan'an Spirit," or the "Yan'an Way." Three articles written during the Yan'an period between 1939 and 1945 became staples of Maoist education: the eulogy "In Memory of Norman Bethune," "Serve the People," and "The Foolish Old Man Who Removed the Mountains." These three articles, known as the "three constantly read essays" (老三篇, *lao san pian*), highlighted the most basic principles of Maoist thought: volunteerism, the will of the people, and selfless struggle in favor of the common good.<sup>195</sup> Additionally, the

emphasis on rural mobilization and Mao's affinity for China's peasants originated from the Yan'an era.

In 1936, at the same as the Dingxian experiment, the CCP had established a base in Yan'an, a city in the central province of Shaanxi. Prior to their retreat to Yan'an, the Communists were based in mountainous regions of the southeastern Jiangxi province, where they formed the Jiangxi Soviet.<sup>196</sup> In 1935, the Communists began the Long March, during which a total of 80,000 marchers who left the Jiangxi Soviet were reduced to the mere 8,000 that reached Yan'an in 1936.<sup>197</sup> In Yan'an, CCP membership increased dramatically from roughly 40,000 in 1937 to 800,000 in 1940.<sup>198</sup>

Yan'an served to incubate Maoist ideologies of self-sufficiency, ideological re-education, egalitarianism, and gender equality, which would develop more fully during the 1950s and 1960s. Because the Japanese army had effectively isolated Yan'an, by 1942, the base area population shrank from 44 million to roughly 25 million.<sup>199</sup> Despite the great loss of life, this isolation cultivated a sense of self-sufficiency. The Communist veterans of Yan'an had seen local villagers use Chinese herbs and traditional healing practices during the 1930s and 1940s, and perceived Chinese medicine as "closer to the people" and more "self-sufficient."<sup>200</sup> Marriage reform and women's suffrage were promoted, although many women were pressured to divorce so as to provide wives for Communist soldiers.<sup>201</sup> Foreshadowing similar campaigns during the Cultural Revolution, a "to-the-village" movement was set up in which students with barely a middle school education were sent down to establish schools and teach in remote villages.<sup>202</sup> Although these initiatives may have seemed

innocuous at the time, they would later be re-interpreted as precedents for some of the more pernicious aspects of the Cultural Revolution.<sup>203</sup>

It was also in Yan'an that the Party found a hero in Norman Bethune. The Canadian physician had arrived in Yan'an in 1938, just as other Westerners were beginning to learn of the CCP, and began training paramedics and establishing mobile medical units.<sup>204</sup> Bethune also met the American physician George Hatem, who would later lead campaigns against venereal diseases in the 1950s, and the Indian physician Dwarkanath Kotnis.<sup>205</sup> Bethune's journals record his interactions with wounded soldiers dying of preventable diseases such as gangrene, anemia, and malnutrition.<sup>206</sup> He wrote that there were only five Chinese doctors, fifty semi-trained doctors, and one foreigner to do all this work.<sup>207</sup> Bethune would die later in 1939 in Yan'an, from an infection sustained after cutting his finger while performing surgery.

The significance of Bethune lies in the Party's propagandistic exploitation of Bethune as a model worker. Indeed, barefoot doctors in the 1960s were not meant to imitate the relatively high-level trauma care Bethune and others provided, but rather to embody the selfless spirit he personified. Like the ill-fated Chinese soldier Lei Feng, or the Soviet coal miner Alexei Stakhanov, Bethune was martyred by the Party as a selfless and noble worker, and became a Chinese hero.<sup>208</sup> Yan'an thus provided important political antecedent to the values and ideologies that guided Mao and the movements he initiated, such as the Great Leap Forward and the Cultural Revolution.

Mao's later attempts to transform the countryside also originated in his experiences in Yan'an. Mao idealized the rural peasants he encountered there, which gave way to his idea of the "poor and blank" peasant. Mao, perhaps deviating from

his ideological predecessors such as Lenin and Trotsky, believed that socialist transformation must begin among the “poor and blank” peasants.<sup>209</sup> Indeed, in 1958, he declared that China’s peasants were “a clean sheet of paper [that] has no blotches, and so the newest and most beautiful words can be written on it, the newest and most beautiful pictures can be painted on it.”<sup>210</sup> Mao conceptualized China’s peasantry as a kind of *tabula rasa*, a blank slate on which he could leave his legacy and transform China. More importantly, the peasants would be the fundamental *agents* of Mao’s revolution, not simply the beneficiaries of socialist transformation.<sup>211</sup>

Assembling the relevant strands of Yan’an remains a difficult task, as the events remain veiled in part by the agenda of Communist historiography.<sup>212</sup> With regard to health care, one can see principles of self-sufficiency and learning from the peasants in Yan’an. One can also see the patriotic health campaigns in the 1950s adumbrated by similar campaigns in Yan’an, as well as the roots of the Maoist focus on transforming the countryside. The lasting legacy of Yan’an was not its flirtation with socialist policies, but rather its role as an important incubation period for the growth of Maoist ideological principles. It is now appropriate to turn to the key ideological determinants of the barefoot doctors program, which underscored the basic facilitating conditions and motivations of the barefoot doctors program. The next three sections will explore how Maoist principles of local self-sufficiency, egalitarianism, and gender equality contributed to providing the supportive conditions of the barefoot doctors.

### 3.3 *Local Self-Sufficiency: The Cooperative Medical System and Chinese Medicine*

Principles of self-sufficiency may explain the implementation of village-based cooperative medical systems, as well as the heavy usage of Chinese medicine by the barefoot doctors, two major components of the barefoot doctors program. Within the modest literature on barefoot doctors, there appears to be a consensus that the cooperative medical system was the key facilitating condition of the barefoot doctor's program, a hypothesis that will be critiqued. A more robust causal explanation of the program, however, demonstrates that the cooperative medical system originated in political principles of self-sufficiency. A second aim of this section is to explore the expression of self-sufficiency within the promotion of Chinese medicine.

Rather than examine the determinants of the barefoot doctors program, most of the literature on China's rural health care system focuses on the factors that led to the collapse of health care in 1979, and almost uniformly point to the corresponding demise of the cooperative medical system.<sup>213</sup> The Cooperative Medical System, the production brigade-based insurance scheme, provided nearly universal health care to village members. If the absence of health care was due to the collapse of the cooperative medical system, by implication, the presence of a health care program was due to cooperative finance.

There are several compelling points to this view, which focuses on the collective structure of health care as the primary facilitating condition of the barefoot doctors program. Firstly, the emphasis within the literature on cooperative financing addresses a unique aspect of the barefoot doctors, wherein the responsibility of health care lay in local communities. Secondly, the hypothesis provides both positive and

negative evidence for the provision of basic health care: when the cooperative medical system was in place, the barefoot doctors worked, and when it dissolved, the barefoot doctors disappeared. Moreover, the hypothesis also addresses why rural residents today no longer use health care, which is attributable to the unfavorable fee-for-services health care model.<sup>214</sup> Fee-for-service health care tends to discourage preventative care, a fundamental tenet of the barefoot doctors program, because there is weakened economic incentive for physicians to prescribe inexpensive preventative care, and weakened demand for preventative care if one must pay.

One major concern with this hypothesis is that the emphasis on health system financing only examines proximate factors of health care provision, and is a poor analytical lens for understanding the determinants of broad primary health care provision. By focusing on the causes of the absence of adequate rural health services, the literature makes a glaring omission in failing to examine the determinants of the presence of rural health care through the barefoot doctors. This myopic tendency examines financing as strictly a technical issue, without exploring the political determinants behind the support of public health care. Indeed, there is a lacuna in the literature where the role of politics and state intervention in providing health care in China are concerned.<sup>215</sup> China was largely able to provide cooperative-based health care because of a political climate that supported cooperative organization.<sup>216</sup> Given the highly politicized atmosphere of the Cultural Revolution, it is imperative to flesh out the political and ideological foundations of the cooperative medical system.

Village-based political and social organization served as the foundation of the cooperative medical system, which in part stemmed from principles of local self-

sufficiency, and in part from the failure of communes during the Great Leap Forward. The catastrophe of the Great Leap Forward demonstrated that large communal structures were inefficient and ineffective in both agricultural production and provision of basic social services. The Party, however, did not abandon collective structures altogether. After the Great Leap Forward ended in 1960, the basic unit of rural governance changed from the commune to the smaller village-based production brigade. Production brigades and teams were more stable than communes as political organizations, largely because they followed pre-existing village and neighborhood social units.<sup>217</sup> In addition, production brigades served as the basic unit of social organization during the Cultural Revolution, and provided a basis for cooperative medical care under the barefoot doctors. Cooperative medical care functioned largely because of political support for production brigades, which the Party promoted as self-sufficient units responsible for providing basic health care.

On a local scale, Mao encouraged self-sufficiency in rural agricultural production and industrialization among production brigades.<sup>218</sup> Maoist ideals of local self-sufficiency had failed during the Great Leap Forward, but succeeded under the smaller, more autonomous production brigades and teams.<sup>219</sup> The motivations for self-sufficiency were not, however, purely ideological. Self-sufficiency essentially allowed the Party to continue to extract grain from production brigades without draining state resources to provide basic social services. Indeed, production brigades were only self-sufficient insofar as the state provided minimal funding for the cooperative medical system, whereas the Party still exerted strong political control over brigade administration with Party directives, and brigade officials could be

punished for violating state policy. Although promotion of rural self-sufficiency led to market inefficiencies as well as poor management of labor and capital, it also encouraged provision of basic social services such as health care.

Self-sufficiency had long been a dominant principle in Chinese Communist ideologies. Self-sufficiency (自力更生, *zili gengsheng*), literally translated as “regeneration through one’s own efforts,” had strong ideological roots in the Yan’an era in the 1930s.<sup>220</sup> Principles of self-sufficiency affected China on both macro and micro levels. On a national level, China attempted to break from the Soviet bloc, and began a policy of import substitution during the early years of the Cultural Revolution.<sup>221</sup> National self-sufficiency led to China’s economic isolation and an autarkic national economy. Self-sufficiency had perceptible nationalistic undertones, and even provinces were expected to be more or less self-sufficient.<sup>222</sup>

The principle of self-sufficiency also supported the heavy usage of herbal medicine among barefoot doctors, because traditional Chinese medicine fit conveniently with nationalistic aims. This was partially a result of a nationalistic backlash: “Traditional” Chinese medicine, which had been relegated to a subordinate role in relation to Western medicine before Communist takeover, made an important shift toward being termed as “national” medicine as the CCP began a period of recognizing and promoting the work of Chinese practitioners.<sup>223</sup> Nationalism and ideals of self-sufficiency thus promoted the usage of Chinese medicine.

Principles of self-sufficiency also supported the Party’s political consolidation of traditional medical practitioners. Numerous shamans, midwives, healers, and non-Western physicians were scattered across China, the majority of whom had operated

independently, outside the jurisdiction of the government. As one Western-trained physician observed, “Traditional practitioners... were simply ordinary farmers who sold herbs on the side.”<sup>224</sup> These groups already played important healing roles in local communities. The Party worked to exploit these locally embedded healers, using them for health campaigns and later utilizing them at various levels of the rural cooperative medical system. The incorporation of traditional healers into the rural health care system, as barefoot doctors and higher-level health care personnel, enabled the Party to alleviate some of its manpower shortages in rural health services.

Principles of self-sufficiency found two major expressions in the barefoot doctors program. First, self-sufficiency served as a guiding principle for the organization of rural areas and the village-based cooperative medical system, and were then expressed within the barefoot doctors program through the cooperative basis for health care finance. Secondly, nationalistic aspects of self-sufficiency functioned to promote Chinese medicine within the rural health care system.

### *3.4 Egalitarianism, Labor Surplus, and Incentives*

While principles of self-sufficiency guided the organization of the barefoot doctors, egalitarian principles operated to redistribute health care services. Egalitarianism may be expressed in different kinds of redistributive policies—including income, land, social status, labor, and capabilities—many of which have been practiced among socialist countries around the world.<sup>225</sup> Almost immediately following the establishment of the People’s Republic in 1949, in an extraordinarily violent process, China began a series of land reforms and reversed the social statuses

of peasants and landlords.<sup>226</sup> Former peasants became village cadres, and land redistribution was quickly followed by collectivization through the establishment of mutual aid teams. Wage distribution also changed to reflect egalitarian principles.<sup>227</sup> Egalitarian principles of land redistribution provided the foundations for the collective-based rural economy until 1978.

The egalitarian principles explored here, however, focus the redistribution of labor and its central importance in the barefoot doctors program. What concerns this examination is the large transfer of productive labor to the countryside and, more crucially, the strict migration policies that prevented urbanization. The influx of urban health care personnel and the restrictions on internal mobility ensured a broad base of labor in the countryside. The labor surplus in the countryside was so large that nonagricultural work was common among production brigades, and was used for the barefoot doctors program. Rural labor allocation and health care provision did not strictly follow Maoist ideological principles, however. The rural labor surplus actually strengthened incentives to provide rural health care, and also led to labor specialization, which Mao opposed vehemently.

In order for production brigades to function as self-sufficient units, strong redistributive policies were necessary to provide basic health care. Between roughly 1968 and 1975, the transfer of urban residents to the countryside was accomplished under the premises of ideological re-education and redistribution of labor resources. Labor redistribution would reduce what Mao saw as the “great difference” between urban and rural areas.<sup>228</sup> Mao in fact articulated three great differences: between workers and peasants, town and countryside, and mental (e.g., intellectual) and

physical labor; ideological re-education aimed to reduce these differences through greater urban-rural interaction. Maoist ideologies of re-education had foundations in the Yan'an Communist base during the 1930s, which had also featured re-education and rustication campaigns. Mao believed in the cathartic and educational features of physical labor, and that ideological re-education in the countryside would cleanse intellectuals of their spiritual pollution.<sup>229</sup>

The urban-rural transfer of labor has been the most publicized aspect of migration, likely because it was most disruptive to urban residents. Rustication of urban youths had in fact begun prior to the Cultural Revolution, because of urban unemployment among middle school graduates.<sup>230</sup> Urban youths from “good” family backgrounds were encouraged to participate in short-term “Socialist education movements” in the countryside. These sometimes took the form of ideological awareness camps, whose purpose was, as the *People's Daily* put it, “to discover the history of oppression and exploitation experienced by their families.”<sup>231</sup>

Redistribution of urban physicians and other health personnel also reflected egalitarian principles in their aim to reduce inequities with the redistribution of health resources, which had strongly favored urban areas. Health personnel joined other professionals in providing technical assistance for rural industrialization, such as paving roads to reduce geographic barriers to rural villages. In the late 1960s, Party directives sent many health care personnel to staff commune clinics and brigade health stations, and later to train barefoot doctors. Nevertheless, the influx of trained physicians was still small compared with the number of trained barefoot doctors.

On the other hand, redistributive policies also reflected less ideologically driven (but perhaps more fear-driven) concerns about over-urbanization and urban unemployment.<sup>232</sup> Because most urban employment was state-run, an influx of urban migrants would force the Party to supply additional urban residents with basic facilities and services such as employment, health care, utilities, and so on. On the other hand, rural populations could essentially be made “self-sufficient,” and could further be exploited through grain extractions. It is thus no wonder that Mao characterized urban residents as leeches corrupted by material comforts, whereas rural peasants were the hardworking backbone of China’s economy.

Indeed migration restrictions that prevented peasants and sent-down urbanites from entering cities had a far greater effect on labor distribution than the forced urban-rural migration. Household registration, which began in the early 1950s, gave residents either rural or urban registration status, tying peasants to rural areas and preventing them from migrating to urban areas.<sup>233</sup> The urban-rural transfer involved between 12 and 20 million urban residents, a small portion of the roughly 783 million rural residents in 1979.<sup>234</sup> China’s rural population fluctuated within a narrow range of 84 and 81 percent of the total population between 1960 and 1979; an extremely large proportion was thus rural until reforms began in 1979.<sup>235</sup> Restrictions on urbanization prevented the transfer of labor into cities, and constrained the vast majority of Chinese residents to the countryside.

As a result of these redistributive and restrictive policies, rural production brigades gained a surplus of labor during the Cultural Revolution era, excess labor that offered diminishing returns in agricultural production.<sup>236</sup> Indeed, politically

motivated markets tended to distort labor allocation and create inefficiencies in labor supply, whereas economically driven markets would be able to more freely allocate labor. During the Cultural Revolution, labor misallocation became so rampant that the national rural labor surplus was estimated to be between one third and one half of the total rural labor force.<sup>237</sup> The surfeit of rural labor and poor labor allocation led to market inefficiencies, because of an overabundance of labor in rural areas and a dearth of labor in the cities.<sup>238</sup>

On the other hand, the abundance of labor provided rural areas with the necessary human capital to implement the barefoot doctors program. Indeed, the excess labor supply allowed Mao to carry out highly labor-intensive campaigns such as the barefoot doctors program or the patriotic health campaigns. These campaigns emphasized the Maoist principle of the “mass line.”<sup>239</sup> This principle emphasized labor intensive, low-skill work produced by the masses, for the masses.<sup>240</sup> Although the “mass line” approach contributed little toward actual provision of health care, it undergirded the barefoot doctors as a politically viable program.

The labor surplus did not simply provide the human capital needed to implement the barefoot doctors program, but also provided significant incentive to engage in nonagricultural activities, such as the barefoot doctors program. Because collective grain production was mostly siphoned off by the state grain monopsony, rural households had strong incentives to channel some of their labor resources into nonagricultural production. Moreover, individual workers lacked control over collective income distribution, which had a negative effect on production incentives.<sup>241</sup> Rural villagers thus had an incentive to provide nonagricultural labor,

and often competed for positions as barefoot doctors, a relatively prestigious position in the brigade.<sup>242</sup> The barefoot doctors program provided the greatest return in work points with the least amount of physical labor.<sup>243</sup> Production teams thus had strong incentives to use the barefoot doctors program, in order to address the surplus of farm labor, and, lest one forget, address the tremendous health needs of the rural population.

Rural production and health services did not strictly follow Maoist ideology, and villagers often followed practical needs incongruent with ideological principles. Mao expressed his vehement opposition to labor specialization in a famous letter to Lin Biao in 1966, and barefoot doctors were also expected to participate in agricultural production.<sup>244</sup> Specialization had capitalistic connotations and ran counter to Maoist principles of self-reliance and Marxist critiques of the division of labor. In practice, however, few barefoot doctors participated in agricultural production. It was not in the brigade's interests to use them for agricultural production, especially after investing in their training. Nor was it in the interest of the barefoot doctors, who preferred less strenuous work as health care personnel. Barefoot doctors "specialized" in their production brigades, to increase efficiency and make use of their comparative advantage. Barefoot doctors did engage in some sideline activities in order to generate additional income outside of the work point system, but to a much smaller degree than did the agricultural labor force.<sup>245</sup>

In 1979, however, the introduction of the household responsibility system reduced incentives to contribute to collective production and services. The Household Responsibility System increased incentives for agricultural production, and grain

production rose in the first years of economic reform, stimulated partly because of an increase in government grain procurement prices.<sup>246</sup> The return to household-level production, however, reduced incentives to provide collectively based health care. Additionally, when reforms began in 1979 and Deng Xiaoping officially condemned the “mass line” approach and the lack of professionalism of the barefoot doctors, the program lost its official ideological approval. The relaxation of migration policies caused an outflow of rural labor into urban areas, including many barefoot doctors who sought employment in other sectors or simply moved their services to the city.

### 3.5 *Gender Equality, Female Empowerment, and Female Barefoot Doctors*

“Women hold up half the sky,” Mao declared upon the establishment of the People’s Republic of China. Principles of gender equality were manifested in the provision of basic health care by promoting female participation in the work force, and in improving maternal health care. Although one third of officially designated barefoot doctors were female, women made up the majority of midwives and health aides, who also functioned as barefoot doctors. Ideologies promoting female participation in the rural labor force provided the barefoot doctors program with a significant source of labor, contributing to effective maternal and child health programs.

In the early 1950s, the Party began enacting a series of reforms with the aim of reducing gender inequality. In 1953, the Party implemented marriage reform laws that gave women greater freedom to divorce. Similar to the violent process of land reforms, radical marriage reform policies were met with fierce resistance. Many rural

men had vehemently opposed a 1950 version of the law that had stressed the drawbacks of “feudal marriages,” and between 1950 and 1953, 70,000 to 80,000 women had either been murdered or driven to suicide when they attempted to divorce.<sup>247</sup> The process of collectivization was also supposed to break down gender divisions of family labor and the idea of the family as the main unit of production, which the Party saw as the root cause of gender inequality.<sup>248</sup> Mao believed that paternalism confined women to traditional household roles, preventing them from participation in the “social labor” that would lead to their emancipation.<sup>249</sup> Moreover, such female participation would supposedly lead to greater agricultural productivity.

Principles of gender equality contributed to greater female agency through increased participation in collective labor and in the public sphere. The retraining of traditional midwives during the 1950s helped strengthen the role of women in providing health services. The entrance of women into the rural labor market also contributed to the labor surplus during the 1960s and 1970s, and to the training of many women as barefoot doctors. More directly, greater female empowerment may have also led to better maternal and infant health outcomes.

The work of the barefoot doctors may have also been perceived as more suitable for women than men, particularly the maternal and child health care barefoot doctors provided, of which midwives were the natural exponents. Despite efforts to make labor gender-neutral, most labor arrangements were still heavily segregated based on gender.<sup>250</sup> Whereas men were expected to perform hard physical labor, women were still perceived as more suited to lighter domestic work.

It is important to recognize, however, that Maoist principles of gender equality could be highly problematic. The complexities of gender equality were somewhat lost on the Maoists who assumed that women would simply “assimilate” and “become more like men.” During the 1960s and 1970s, a sort of “socialist androgyny” was encouraged, typified by the decidedly androgynous appearance of Mao’s wife, Jiang Qing.<sup>251</sup> As a result, women were expected to work as hard as men in manual labor. Maoist ideals of labor dictated that resources should be allocated “to each according to one’s work,” as opposed to one’s need. Women and men were thus expected to perform equal amounts of work, and excess labor demands were sometimes made of women under the guise of gender equality.<sup>252</sup> Excess labor demands may well have led to poor health among women. Indeed, labor demands placed on pregnant women during the Great Leap Forward led to an increase in miscarriages and infant deaths during this period as well.<sup>253</sup> Ideological demands that women be treated as men could therefore be extremely destructive.

Gender inequality persisted in terms of pay and labor expectations. Because their work was valued less, most women earned fewer work points than men, even if they worked for longer hours.<sup>254</sup> Work points were an arbitrary measure of the effort and labor that an individual contributed to the collective, so it is not surprising that this system was subject to widespread abuse.<sup>255</sup> Rural workers were allotted anywhere between one and ten work points per day, which were then accumulated at the end of the harvest. Because of gender discrimination in work points and employment, including agricultural production, women turned to employment as health care

personnel, because of the less strenuous workload and higher pay.<sup>256</sup> In practice, however, male barefoot doctors still received more pay.<sup>257</sup>

Once economic reforms began, there was a backlash against the seemingly excessive social policies advocating gender equality. This backlash might have been in part due to lingering sexist resentment over increased female agency. In the early 1980s, the state media told urban women to “return home” from work, claiming they were inefficient workers.<sup>258</sup> In rural areas, many women returned to domestic work.<sup>259</sup> Even the intellectual elite claimed that gender equality was incompatible with economic productivity.<sup>260</sup> Domestic relations once more became highly gender-based, and as mothers were confined to domestic work, their perceived household contribution decreased. Women thus lost intra-household bargaining power, as well as the confidence to participate in outside life.<sup>261</sup>

Principles of gender equality did not follow a clear path from ideology to implementation. In fact, during the Cultural Revolution, many rural Chinese men fiercely resisted ideologies of gender equality, and rural women were often overworked and underpaid. Nevertheless, political forces advocating for gender equality ensured that women participated in work outside of the household. Support for gender equality, increased participation in outside employment, and better educational opportunities contributed to improved health outcomes and the enrollment of women as barefoot doctors.

### 3.6 *Limits of Ideological and Political Determinants: The Great Leap Forward, 1958-1960*

Before examining the political determinants that help to explain the timing of the implementation of the program, it is crucial to understand why a basic rural health care program failed to materialize before 1968. The Great Leap Forward represents a case in which structural, ideological, and political determinants all appeared to be in place for implementing a primary health care program, but poor policies led to worsening social and economic conditions that presented insurmountable obstacles for effective health care provision. The Great Leap Forward, initiated in 1958, attempted to harness the Party's political forces and transform Chinese society into a socialist utopia, with community-based agricultural production, health care, education, and living arrangements.<sup>262</sup> Mao provided vague guidelines for the movement, advocating for the masses to follow the slogan of "Letting Politics Take Command."<sup>263</sup> The movement failed spectacularly. Due to a combination of poor agrarian, social, and economic policies, the Great Leap failed to supply adequate health care and more dramatically, led to one of the worst famines in history.

Radical land reforms and the formation of large communes during the Great Leap Forward were particularly detrimental to community organization. After the CCP initially seized land and distributed it among peasants and landless tenants in 1950, Mao began to encourage the formation of small mutual aid teams and other cooperative organizations in 1952.<sup>264</sup> The constant re-organization of rural agricultural production broke down local community organization during the 1950s and early 1960s. Land reforms suddenly accelerated in 1958, as village-based mutual aid teams and cooperatives amalgamated into large communes, which contained

roughly around 4,500 households.<sup>265</sup> Nationwide, 740,000 cooperatives merged into 26,000 communes, comprising 120 million rural households, or 4,615 households per commune.<sup>266</sup> These colossal communes were unwieldy and inefficient structures that crippled household and village-level units of organization and production.

Large communes led to weak village organization and to over-utilization of public goods.<sup>267</sup> In fact, during the famine, provincial mortality rates in 1959 were strongly correlated with the percentage of the rural population with commune mess halls.<sup>268</sup> Weak community organization also led to the destruction of the infrastructure needed to support the alleged benefits that went along with collectivization: communal dining, free education, medical care, child and elderly care. After free medical services were introduced to the communes in 1958, huge strains were put on hospitals, clinics, and drug supplies.<sup>269</sup> The quality and availability of healthcare facilities varied greatly among communes.<sup>270</sup> 50,000 collective-based clinics were merged into commune clinics, but there was no transfer of physicians to rural areas to ameliorate the strain on clinic services, and the Party was reluctant to finance the communes.<sup>271</sup>

Poor macroeconomic policies, aggravated by a lack of free information flow, led to large grain extractions and in turn to the neglect of rural health care. Lack of knowledge prevented the Party from responding to famine conditions and emerging epidemics. When grain production initially faltered in some areas, there were no remedial measures taken to bring grains in from other provinces because of media censorship.<sup>272</sup> The provincial party committees put pressure on statistical bureaus to inflate production yields, and the Party leadership uncritically accepted exaggerated

harvest claims in an initial outburst of euphoria.<sup>273</sup> The government thus continued to extract larger amounts of grain, unaware of real grain production and food shortages. As grain shortages began sweeping the countryside, the famine overwhelmed the provision of health services. Ironically, the Great Leap Forward devastated rural areas most heavily, even though the movement was targeted to benefit the countryside.<sup>274</sup>

Disease control also suffered from this lack of information flow. Most infectious diseases had been controlled or eradicated during the patriotic health campaigns of the 1950s, but re-emerged during the Great Leap Forward. During the famine, several areas experienced cholera and malaria epidemics that went unaddressed.<sup>275</sup> It is worth noting that China continues to suffer from restricted flow of epidemiological information. In recent years, China has been criticized in its slow response to SARS, having suppressed information about the disease. Fortunately, remedial policies can be implemented quite simply. In the case of the SARS epidemic, a representative of the Chinese Center for Disease Control noted that although the government was slow to respond, “Once resources were mobilized, the threat was suppressed quickly within 84 days.”<sup>276</sup> Similarly, once the Party awakened to the rural calamity of the campaign and allowed greater autonomy among village-based production brigades, mortality rates plummeted to pre-Great Leap levels.

Even when politically motivated campaigns were effectively implemented, they were often highly problematic. The weaknesses of the patriotic health campaigns exposed the limits of Party doctrine in shaping health policy. Mass health campaigns could often be misguided, concerned more with political motives than with real health concerns. This was the case with the “Four Pests” campaign that targeted sparrows,

which were thought to eat seeds and thus deplete harvests. After two years of peasants banging gongs and knocking down sparrow nests, the National Academy of Sciences published reports in 1960 showing that sparrows primarily ate insects and not seeds, making them the farmer's ally.<sup>277</sup> Ending the campaign against sparrows in 1960, Mao simply said "*Suanle*" ("Forget it").

The harmfulness of Maoist doctrine was also apparent in unchecked population growth during the 1950s and 1960s. Despite modest family planning efforts during the 1950s, efforts came to a halt during the Great Leap Forward. The lack of birth control efforts during this time was largely due to Mao's belief that a socialist economy both supported and required a large population, as well as a desire to disprove Malthusian fears of population growth.<sup>278</sup> Mao encouraged multiple births among women, whose children would form the labor-intensive backbone of socialist development.<sup>279</sup> Family planning efforts were thus nearly nonexistent until 1970, when the Party reluctantly began implementing birth control policies.

Examples abound of the dangers and failures of putting "politics in command." When Mao finally admitted the mistakes committed during the Great Leap Forward, his retreat from Party politics led to the restoration of the Party bureaucracy.<sup>280</sup> The basic principles that had guided the Great Leap Forward—collectivism and mass mobilization of labor—were rejected in favor of more conservative approaches embracing smaller-scale production. Small private plots were restored and rural markets were allowed under administrative supervision.<sup>281</sup> The Great Leap Forward also led to the Ministry of Health's re-entrenchment in matters of public health.<sup>282</sup> The political support for minimally trained rural health

care personnel was dormant from 1960 to 1965, and the Ministry of Health refused to finance rural health clinics because of the fresh wounds of the Great Leap Forward.

The cumulative effect of poor policies during the Great Leap Forward hampered provision of basic health care, despite a strong political impetus supporting implementation. Successful policy implementation requires a recognition of and adaptation to local conditions, which failed during the Great Leap Forward. The Great Leap campaign attempted a massive social transformation of the countryside that included provision of basic health care. The implementation of a rural health care program largely failed during this time because of poor policies that led to worsening economic conditions, political administration, and social organization.

### *3.7 Political Determinants and the Cultural Revolution*

The political determinants of the Cultural Revolution help to clarify why the program began in 1968. Two dominant motivations of the Cultural Revolution, the need to reassert Party control in the countryside and a desire to weaken Party bureaucracy, provided the impetus for a mass rural health care program. A rural health care program would help to address the Party's need to reassert control in the countryside through mass movements after the failure of the Great Leap Forward. In addition, a fear that China was falling back into bureaucratic entrenchment, and that the original revolutionary values of the Party were at stake, motivated the Party to cleanse its bureaucracy and institute a mass health program.

The impetus for the barefoot doctors emerged from the cataclysmic onslaught of the Cultural Revolution that began in 1965. In June of that year, as the storms of

the Cultural Revolution were brewing, Mao issued what became known as the “June Twenty-Sixth Directive,” demanding more focus on the countryside:

Tell the Ministry of Health that it only works for fifteen percent of the total population of the country and that this fifteen percent is mainly composed of gentlemen, while the broad masses of the peasants do not get any medical treatment ... The methods of medical examination and treatment used by hospitals nowadays are not at all appropriate for the countryside, and the way doctors are trained is only for the benefit of the cities. And yet in China over 500 million of our population are peasants ... We should leave behind in the city a few of the less able doctors who graduated one or two years ago, and the others should all go to the countryside.<sup>283</sup>

This directive represents one front of a broadening assault on the entrenchment of Party bureaucracy and professionalization of the Party.<sup>284</sup> In particular, the speech targeted the Ministry of Health and the bureaucratization of medical services. With increasing attacks on the party bureaucracy and Mao’s tacit support, the publication *Red Flag* also published an article attacking the medical curriculum in 1968. By 1968, nearly a million rural residents, including those “sent down” to the countryside, began training as barefoot doctors. These events outline the basis for the provision of rural health care within a rapidly shifting political climate.

In certain respects, the Cultural Revolution was a political response to the failure of the Great Leap Forward. After the colossal failure and trauma of the Great Leap Forward, many peasants both covertly and overtly resisted participation in collective agriculture.<sup>285</sup> Few rural residents were willing to continue such disruptive campaigns, and rural discontent hampered the Party’s alleged commitment to the countryside.<sup>286</sup> The Great Leap crippled the Party’s ability to carry out massive structural changes in rural areas, and Maoist factions within the Party were salivating at the chance to reassert control in rural villages. Winning the support of the peasants

thus gained primary importance under Mao. Economic motives also factored into the Party's desire for greater integration of the countryside and broad provision of rural health care. The Party wanted a productive rural agricultural base for grain extraction, and an unhealthy rural workforce was economically unproductive and inefficient. Poor rural health led to less productivity, and hence less state grain extraction.

The reassertion of rural control began before the barefoot doctors during earlier campaigns to "clean" the countryside. In 1963, the Party initiated the Four Cleanups campaign, aiming to bring "clean politics, clean economics, clean organization, and clean thought."<sup>287</sup> The campaign used the cathartic language of "cleanup" in order to recognize some of the wrongs done in the past, but also to reassert the Party as the primary agent of development, and re-shift peasant obedience from the household and village to the Party.<sup>288</sup> Similar to the health workers of the patriotic health campaigns, barefoot doctors were, in a sense, agents of the Party. By going from door to door in the countryside, barefoot doctors became a mechanism for implementing the Party's health policy in remote parts in China.

Mao's criticism of the Ministry of Health bureaucracy was, in fact, partially substantiated by the lack of primary care in rural areas. In 1960, because of the failure of commune clinics during the Great Leap Forward, the Vice-Minister of Health, He Biao, mandated that county hospitals be made the primary unit of health care provision.<sup>289</sup> County hospitals were often geographically and financially inaccessible to production brigade members, and hospital staff generally did not go to the countryside to provide care.<sup>290</sup> As a result, the majority of rural residents did not receive health services before 1968.

The backlash against Party bureaucracy, however, also stemmed from international frictions and personal disputes with the Party, and not simply from a pragmatic desire to provide health care. Mao framed the Sino-Soviet rift in 1960 in ideological terms, criticizing “Khrushchev’s phony communism” and “Khrushchev’s revisionist clique.”<sup>291</sup> Mao equated the initial victims of the Cultural Revolution with the Soviets, labeling the former Party chairman Liu Shaoqi “China’s Khrushchev” for his supposed conservatism, and used the rift as an opportunity to condemn those within the Party who advocated a less ideological and more pragmatic approach to socialist transformation.<sup>292</sup>

Mao’s call for the renewal of mass health campaigns, under the administration of the barefoot doctors program, was a method of weakening the Ministry of Health’s power. The weakening of the health bureaucracy had actually begun during the 1950s with the establishment of patriotic health campaigns, which bifurcated health responsibilities between the Ministry of Health and Maoist factions within the CCP. Political commune committees even ran commune health clinics during the Great Leap Forward, which were subsequently criticized by the Ministry of Health during the early 1960s.<sup>293</sup> Patriotic health campaigns were highly unpopular with the Ministry of Health, but as the bureaucracy weakened under the chaos of the Cultural Revolution, health campaigns were again reinstated, in the form of the barefoot doctors. The usage of a more expansive primary health care system reflected the basic aims of the patriotic health campaigns, but also allowed the initiatives to be sustained over longer periods of time. The effects of the Cultural Revolution blunted the power of the Ministry of Health, while strengthening highly political health care initiatives.

The political motivation for the barefoot doctors thus originated in deep-seated discontent within the Communist Party. The re-entrenchment of the Party bureaucracy and the lack of control in the countryside had irritated Maoist factions within the Party. As a result, two fundamental aspects of the Cultural Revolution were the reassertion of state control in the countryside, and the erosion of Party bureaucracy. Mao also applied these political determinants to the provision of basic health care under the barefoot doctors, criticizing the Ministry of Health and articulating a need “to go to the countryside.” The timing of the barefoot doctors program was thus a product of these emergent political forces stemming from the Cultural Revolution. Strong political motivation guided the provision of basic rural health care during the Cultural Revolution, which was finally becoming a realized dream.

### *Conclusion*

This chapter has explored the causal pathways that led to the implementation of the barefoot doctors, highlighting the role of three groups of determinants: emulation of foreign models, Maoist ideological principles, and the political motives of the Cultural Revolution. Guomindang and Soviet models provided the basic template for the barefoot doctor, ideological principles created the supportive conditions for the program, and political determinants of the Cultural Revolution led to the timing of the program’s implementation. These three categories each influenced the program in complementary ways, through the creation, support, and implementation of the program.

The supportive conditions of the program stemmed largely from several crucial ideological principles. Although these ideological principles were not exclusively Maoist, the support and promotion of these principles by the Communist Party underscored some of the fundamental aspects of the barefoot doctors program. Principles of self-sufficiency led to the oft-cited cooperative medical system, which provided a village-based system of health care funding, and to the heavy usage of Chinese medicine, thereby reducing the demand for scarce Western medicines. Principles of egalitarianism and gender equality also led to an unprecedented increase in the rural labor force. A rural labor surplus led to stagnation within the Chinese rural economy, but the surplus also supported the provision of basic health care by allowing barefoot doctors specialization.

It may be useful to view Maoist ideological principles as the genotypic constitution of China's policies. Ideological principles found varying phenotypic expressions in policy implementation, creating and providing the basic conditions of the program, such as the collective labor production and entrance of women into the rural labor market. Additionally, Mao's desire to weaken the Party bureaucracy and reassert control in the countryside helps to explain why Mao implemented the program during the Cultural Revolution. cursory observations may consider the provision of basic health care in Cultural Revolution-era China as an epiphenomenon of the Cultural Revolution, especially given the negative interpretations of the Cultural Revolution. This chapter, however, has attempted to link explicitly the prevailing ideologies and political motives of the Cultural Revolution, to the

proximate conditions and factors that supported and led to the implementation of the barefoot doctors.

Political support for the barefoot doctors program, as well as many of the egalitarian and socialist policies that supported the program, waned after broad social and economic reforms began in 1979. The shift back to the household as the basic unit of production reduced incentives for collective provision of health care, and also raised the relative cost of providing it. Less restrictive migration policies after 1979 led to an outflow of rural residents. The resumption of traditional household patterns constrained many rural women to the household, thereby negating achievements in gender equality during the 1960s and 1970s, and further reduced the capacity of rural health care in China. Political principles that had helped to sustain basic health care provision during much of the 1960s and 1970s were dismissed with the introduction of economic reforms in 1979.

## Concluding Remarks

“The barefoot doctor must one day learn how to walk in straw sandals, then he has to walk in cloth shoes, and finally, he must be able to wear leather shoes.”<sup>294</sup> So declared Deng Xiaoping in 1981, signaling a transformation, yet again, of China’s rural health care system. Although macroeconomic growth and an increase in living standards have partially vindicated sweeping economic reforms, the promise of improvements in rural health care and the health of China’s rural poor have thus far rung hollow. Progress in reducing premature mortality has slackened noticeably, and in several cases, the incidence of preventable morbidity has increased. Indeed, China’s current rural health crisis has provided a new perspective on the barefoot doctors, making the program’s achievements all the more remarkable.

The legacy of China’s barefoot doctors program continues to reverberate across China. It is instructive that despite the negative repercussions of the Cultural Revolution, the barefoot doctors are considered by many to be a positive product of Maoist China.<sup>295</sup> Furthermore, during a period of poor socioeconomic development in the 1960s and 1970s, barefoot doctors provided a basic system of health care that contributed to enviable improvements in human wellbeing during this period.

### *Summary and Review*

During the late 1960s and 1970s, China implemented an effective primary health care program through the barefoot doctors program. The program emphasized community-based preventative care, and contributed substantially to laudable declines in premature mortality, even before China’s rapid economic development

began in the 1980s. The achievements of the program are particularly striking given the massive social upheaval and restrictions on personal freedoms resulting from the Cultural Revolution.

China's barefoot doctors provided nearly universal care to China's vast rural population of over 700 million, roughly 80 percent of the total national population. The program provided health care through the production brigade, the village-based collective unit. Barefoot doctors were often brigade members with only a basic education, and had received training from more experienced physicians usually amounting to only a few months. Interventions emphasizing infectious disease control, improved sanitation, basic curative treatment, and maternal and infant health services have all proven to be efficacious across many other communities.

This thesis has evaluated the value of the barefoot doctors through two related but distinct approaches. An evaluation of the procedures involved in the program's implementation casts an unfavorable light on the barefoot doctors program, which relied upon, but did not impose, restrictive and coercive policies. A second, more conventional approach focused on the outcomes of the barefoot doctors program. An analysis of thirteen Chinese provinces finds a correlation between high provincial density of health care personnel and low infant mortality levels. This corroborates an existing temporal association between the implementation of the barefoot doctors program and rapid infant mortality decline. Although there is no conclusive evidence of the barefoot doctors' efficacy, this thesis has contributed additional, supportive evidence that further strengthens the relationship between the barefoot doctors program and health outcomes.

Finally, this thesis represents an attempt to identify the causal pathways that led to the implementation of the barefoot doctors program. The program developed out of previous models of basic health care provision, including a pilot program under by the Guomindang and the *feldsher* model from the Soviet Union. These models provided the basic template for the barefoot doctor. Maoist ideological principles of self-sufficiency, egalitarianism, and gender equality contributed substantially, if somewhat unintentionally, to the successful implementation of the barefoot doctors program. Finally, political forces of the Cultural Revolution that sought to reassert state control in the countryside and erode government bureaucracy were realized in a rural, mass-based health care program. The barefoot doctors program was not simply a coincidental phenomenon of the Cultural Revolution, but rather a direct result, and indeed, an integral part of the movement.

### *Lessons and Implications*

Considering growing evidence of the efficacy of the barefoot doctors program, it is natural to examine the implications of the program for other developing nations and for China's future. Applying the barefoot doctors model requires a keen understanding of its characteristics, and furthermore, a recognition and analysis of the determinants of the program in China. The creative process of borrowing and adapting a foreign model of health care is not new. Indeed, it was demonstrated that the idea for the barefoot doctor model originated in previous efforts to provide basic health care, including models that were even more rudimentary than the barefoot doctor.

The implications of the barefoot doctors program for China are not radically different than those for other developing nations, especially considering China's current rural health care crisis. The re-emergence of infectious diseases such as schistosomiasis and malaria, as well as the introduction of new pathogens such as HIV/AIDS, threaten to exacerbate disappointing levels of premature mortality. China's rural health crisis suggests that a new health care program might usefully borrow from the barefoot doctors, although the shifting socioeconomic landscape strongly suggests that China cannot simply reinstate the barefoot doctors program. Nevertheless, even though rural Chinese residents may now demand higher quality health care than that provided by the barefoot doctors program, the basic paramedic model has proven to be malleable and adaptable. At the very least, China may consider applying a basic community model toward better disease control and maternal and infant health services.

Given the unacceptable neglect of basic health care around the world, it is also worth considering the feasibility of applying the barefoot doctor model in other developing countries. It is welcome news that many of the effective interventions utilized by the barefoot doctors program require very little capital input. China's lack of economic growth did not serve as an obstacle toward implementation. Additionally, the barefoot doctors model, presented in the first chapter, demonstrated that basic interventions in areas such as sanitation, maternal care, and attendance at birth by trained personnel can have a substantial impact on reducing preventable disease and mortality.

Although other countries may do well to implement a basic health care program similar to the barefoot doctor program, China's program was unique to certain historical conditions. It was argued in the third chapter that many of the policies of the Cultural Revolution helped facilitate the program. Even today, China's authoritarian government has shown little hesitation to impose draconian measures to achieve certain aims, perhaps most clearly evidenced by the one-child policy. The barefoot doctors program also relied upon a strict set of migration policies and inefficient economic policies, which would be nearly impossible to implement in a democratic society.

Nevertheless, the determinants of China's barefoot doctors program, put forward in the third chapter, are not prerequisites for successful implementation of a rural health care program. The political impetus for a broad-based health care program may also arise from interest groups, such as labor unions or religious organizations, or perhaps from a strong, functioning democratic society, such as in the state of Kerala in India. It would seem absurd to assume that certain ideological principles, such as Mao's fear of urbanization, a belief in the "poor and blank" peasants, or a charismatic dictator are necessary conditions of effective health policy. China's barefoot doctors program is one, but not the only, route toward effective health care implementation; still, considering its successes, an adapted version of the barefoot doctors may be possible in other developing countries.

## Notes

The works cited here are in short form. Complete authors' names and publication data are in the Bibliography, pp. 119-135.

<sup>1</sup> Amartya Sen makes this argument in *Development as Freedom* (1999), and with Jean Dreze in *Hunger and Public Action* (1989). This argument that will be taken up later in this thesis.

<sup>2</sup> David Lampton has provided the most extensive look on health care politics under Mao, in *Health Policy during the Great Leap Forward* (1974), *Health, Conflict and the Chinese Political System* (1974), and *The Politics of Medicine in China: The Policy Process, 1949-1977*. Also see Li 1975. These studies, however, were all written before economic reforms and the collapse of the barefoot doctors program.

<sup>3</sup> See Liu *et al.* 1995, Liu *et al.* 1996, Tang and Bloom 2000, Feng *et al.* 1995, Bloom and Gu 1997, Liu and Hsiao 1995, Zhu *et al.* 1989, among others. These studies focus largely on the finance and insurance schemes of China's rural health care systems.

<sup>4</sup> *China's Changing Population* (1987) by Judith Banister is the definite compendium of demographic trends in modern China. More recent demographic data since 1987 includes Coale and Banister 1994, Das Gupta and Li 1999, Banister Hill 2004, Banister and Zhang 2005.

<sup>5</sup> The U.S. physicians Ruth Sidel and Victor Sidel published a number of books describing their decidedly positive experiences with China's health care system. These include *The Health of China* (1982), *Women and Child Care in China* (1972), and *Serve the People* (1973). Also see Li 1975, Pickowicz 1973, White 1998. A study of Shanghai County's barefoot doctors system also provides some useful details of a wealthy area's utilization of barefoot doctors: Gong and Chao 1982, Hu 1982, Li *et al.* 1982. Young (1984) also has provided an excellent description of barefoot doctors.

<sup>6</sup> Wang 2000: 270, Banister 1987: 52, Shapiro 2001: 86.

<sup>7</sup> Wang 2000: 270.

<sup>8</sup> Wang 2000: 271.

<sup>9</sup> Horn (1969: 91) writes that propaganda declared, "Comrades, we're going forward to Communism and we can't take this rotten disease with us."

<sup>10</sup> Horn (1969: 91-93) writes on campaign against syphilis; Banister (1987: 54) notes that "most cases of gonorrhoea... were probably cured at the same time as syphilis."

<sup>11</sup> See Survey of China Mainland Press 1951:15, "China-Made Pencillin on Sale in Shanghai." Also see Banister 1987: 54.

<sup>12</sup> Cohen *et al.* 2000, Banister 1987: 54.

<sup>13</sup> Foege (1980: 97), as cited in Banister (1987: 55). Also see "Health Work in Canton" in *Nanfang Ribao* (Southern Daily), July 27, 1951, in SCMP, no. 150, pp. 26-7.

<sup>14</sup> Banister 1987:53, Chien and Kochergin 1959: 36 as cited in Banister 1987: 36.

<sup>15</sup> Banister (1987: 54-56) and sources quoted within.

<sup>16</sup> Banister 1987: 70-71.

- 
- <sup>17</sup> The number of China's villages is approximated in Hsiao (1995: 1048). Both Rong (2008) and Lampton (1977: 228) confirm the variation of barefoot doctors depending on commune wealth, size, and location.
- <sup>18</sup> Lampton 1977: 238.
- <sup>19</sup> Jamison 1985: 24-25.
- <sup>20</sup> Liu *et al.* 1995: 1086.
- <sup>21</sup> Unger 2002: 17.
- <sup>22</sup> Rong 2008.
- <sup>23</sup> Unger 2002: 10-11, Potter and Potter 1990: 94-99.
- <sup>24</sup> Unger 2002: 14.
- <sup>25</sup> See Unger (2002: 16) and sources quoted within, Burki 1969. This was also confirmed by Rong (2008), much to the author's surprise.
- <sup>26</sup> Liu *et al.* 1995: 1087, Liu *et al.* 1996: 157, Zhu *et al.* 1989.
- <sup>27</sup> Jamison 1985: 25.
- <sup>28</sup> Lampton 1977: 232, Feng 1995: 1111-1112.
- <sup>29</sup> Banister 1987: 72.
- <sup>30</sup> Li 1975: 831.
- <sup>31</sup> Estimates of villages with Cooperative Medical Schemes are given in Liu *et al.* (1995: 1087). Similar estimates are given in Feng *et al.* 1995.
- <sup>32</sup> Chang 1991: 425, Rong 2008, Cao 2007 .
- <sup>33</sup> Zhu *et al.* 1989, Sidel and Sidel 1982: 35-60.
- <sup>34</sup> Rong (2008), Chang (1991: 425), White (1998), Young (1984: 71) all give examples of traditional Chinese medicine physicians that functioned as rural barefoot doctors.
- <sup>35</sup> Information gathered from Rong (2008). Rong also described the Guomindang as humble and kind, and highly respected among villagers.
- <sup>36</sup> Rong 2008, Chang 1991: 425.
- <sup>37</sup> Young 1984: 65.
- <sup>38</sup> Henderson and Cohen 1984: 38.
- <sup>39</sup> Henderson and Cohen 1984: 38.
- <sup>40</sup> Heller 1973: 96.
- <sup>41</sup> See, for instance, Heller 1973: 94-98.
- <sup>42</sup> Banister 1987: 71.
- <sup>43</sup> For instance, Young (1984: 26) divides rural health care personnel among barefoot doctors, health aides, and rural midwives.
- <sup>44</sup> Gong and Chao 1982: 59, De Geyndt 1992: 1.
- <sup>45</sup> Young 1984: 73.
- <sup>46</sup> Rong 2008, Sidel and Sidel 1973: 82.
- <sup>47</sup> Young 1984: 78-82.
- <sup>48</sup> Pickowicz 1973: 136-137, White 1998: 482-483.
- <sup>49</sup> Bernstein 1977: 31.
- <sup>50</sup> See Henderson and Cohen 1984: 38, White 1998: 482, Chang 1991: 425-426, Rong 2008.
- <sup>51</sup> Bernstein 1977: 132-133.
- <sup>52</sup> Rong 2008.

- 
- <sup>53</sup> Potter and Potter 1990: 132, Rong 2008, White 1998: 482.
- <sup>54</sup> In one study, Hu and Zhang (1982: 33-35) found in one county that rural women relied almost entirely on traditional birth attendants before 1949. These birth attendants did not become barefoot doctors, however, because of their advanced age. Banister (1987: 58), Yip (1992), and Croll (1978: 245) give examples of unsanitary birthing, such as use of unsterilized instruments for delivery, biting the umbilical cord, and putting dung on the cut.
- <sup>55</sup> Chu 1959: 367, as cited in Banister 1987: 58, Croll 1978: 245.
- <sup>56</sup> Sidel 1972: 61, Rong 2008.
- <sup>57</sup> Croll 1978: 245.
- <sup>58</sup> De Geyndt *et al.* 1992: 4.
- <sup>59</sup> De Geyndt *et al.* 1992: 3-4, Gong and Chao 1982: 60. Horn (1969: 135) writes, "Production brigades in the area held meetings to select candidates for medical training, giving preference to intelligent youths with three years of secondary school education."
- <sup>60</sup> Hu 1997: 213-215.
- <sup>61</sup> White 1998: 482, Zhu *et al.* 1989.
- <sup>62</sup> Kan 1990: 42, Potter and Potter 1990: 132, Li 1975: 829-830.
- <sup>63</sup> Potter and Potter 1990: 149, Horn 1969: 136. Heller (1973: 97) also indicates that peasant doctors were trained at medical secondary schools.
- <sup>64</sup> See bibliography for English translations of *The Barefoot Doctor's Manual* (1977), as prepared for by The Revolutionary Health Committee of Hunan Province.
- <sup>65</sup> Potter and Potter 1990: 132.
- <sup>66</sup> Gong and Chao 1982: 61.
- <sup>67</sup> Survey of World Broadcast 1979, as cited in Banister 1987: 71. Young (1984: 26) gives consistent statistics, as reported by the Chinese Ministry of Health. The State Statistical Bureau (1981) reported that 33.4 percent of 1.46 million barefoot doctors were female in 1980, while 31.7 percent of 1.40 million barefoot doctors were female in 1981.
- <sup>68</sup> Horn 1969: 140.
- <sup>69</sup> Horn 1969: 135.
- <sup>70</sup> Cao 2007: 29-31.
- <sup>71</sup> Mosley and Chen 1984: 27.
- <sup>72</sup> Avvannavar and Mani 2008: 2-3.
- <sup>73</sup> Lin 2004: 1-2.
- <sup>74</sup> One study (Avaannavar and Mani 2008: 5, citing Winblad and Kalima 1985) found that many Asian countries, such as China and India, have traditionally used human excreta as fertilizer, and are more "faecophilic" than other cultures where excreta reuse is taboo.
- <sup>75</sup> Banister 1987: 57.
- <sup>76</sup> See Lampton (1977: 64-65) on the origins of the Schistosomiasis campaign, also see Cheng and Feng (1999) and Ross *et al.* (1997) for epidemiological history of schistosomiasis.
- <sup>77</sup> Hunag and Manderson (2005: 225) cite a study (Zheng, *et al.* 1989) that showed that although schistosomiasis was eradicated in an area in Yunnan before economic

---

reforms, the disease reappeared following implementation of the Household Responsibility System.

<sup>78</sup> Chien and Kochergin (1959: 36-39), as cited in Banister (1987: 53-57)

<sup>79</sup> Banister 1987: 57, Jamison *et al.* 1984: 14.

<sup>80</sup> Jamison *et al.* 1984: 14-15.

<sup>81</sup> Banister 1987: 56.

<sup>82</sup> Li, *et al.*: 1982, Potter and Potter 1990: 132-133.

<sup>83</sup> Li, *et al.* 1982: 39, Sidel and Sidel 1973: 56.

<sup>84</sup> Vaccinations were free and although they were not provided universally, brought these diseases under control (Jamison *et al.* 1984: 17). Xie and Dow (2005: 602) suggest that the fluctuation in immunization rates after reforms may be due to the shift toward market-based health care.

<sup>85</sup> The World Health Organization (WHO 2007) estimates that 80 percent of the Chinese population had received a first dose DTP, but only 58 had completed their third dose.

<sup>86</sup> Young 1984: 104-105

<sup>87</sup> Rong 2008.

<sup>88</sup> Gong and Chao 1982: 61.

<sup>89</sup> Farquhar (1994: 42) provides an excellent ethnographic account of the clinical encounter of Chinese medicine.

<sup>90</sup> See Farquhar 1994: 19-20, Levin 1973: 107-108; Pickowicz (1973: 143-144) emphasizes the role of Chinese medicine in the *Barefoot Doctor's Manual*

<sup>91</sup> Farquhar (1994: 20) and Young (1984: 132) both confirm this dichotomy between the uses of Western and Chinese medicine.

<sup>92</sup> Rong 2008.

<sup>93</sup> Kleinman 1981: 286-287.

<sup>94</sup> Cheng (1971) and Feng (1960) as cited in Wegman (1973: 323-319).

<sup>95</sup> Cheng 1973: 189; Hsu (2006) indicate that the plant *Artemisia* was used in the 1970s in the People's Republic of China as an anti-malarial drug, but its history in the Chinese medical literature is much longer. Its potential as a treatment for drug-resistant malaria strains has garnered significant attention in recent medical literature (Duffy and Mutabingwa 2004, Mueller *et al.* 2000, Mueller *et al.* 2004, Agtmael, *et al.* 1999, Wilcox *et al.* 2004).

<sup>96</sup> White (1998: 483) provides an account of remote village in Yunnan, which collected its herbal medicine from surrounding areas, noting that approximately 40 to 80 percent of prescriptions during the Cultural Revolution were based on herbal medicine. The brigade clinic kept approximately 200 to 500 varieties of herbal medicine in stock.

<sup>97</sup> Croizier (1968: 1) quotes Hu Shi in Zhang (1923), "There is not a single person who calls himself a modern man and yet dares openly to belittle science."

<sup>98</sup> Heller 1973: 83-84.

<sup>99</sup> Hou (1981) as cited by Banister (1987: 166), Djerassi 1974: 42-43.

<sup>100</sup> Hemmel and Sindbjerg 1984: 95.

<sup>101</sup> Banister 1987: 166.

<sup>102</sup> Sidel 1972: 62, Potter and Potter 1990: 132, Rong 2008.

- 
- <sup>103</sup> Sidel 1972: 61.
- <sup>104</sup> Rong 2008.
- <sup>105</sup> See Mosley and Chen (1984), who provide a framework for analyzing the proximate determinants of child survival.
- <sup>106</sup> World Bank 2007; similar figures were reported by the government for 1979 (see Banister 1987: 297).
- <sup>107</sup> Sen's "capabilities approach" is described in depth in *Development as Freedom* (1999), and *Hunger and Public Action* (1989).
- <sup>108</sup> Sen 1999: 20.
- <sup>109</sup> Sen 1998: 2.
- <sup>110</sup> Zhu *et al.* 1989.
- <sup>111</sup> There is an extensive literature critiquing the one-child policy. On the effect on women, see Doherty *et al.* 2001, Watts 2005, Li 2004.
- <sup>112</sup> Sen 1999: 47, Caldwell 1986, Caldwell and Caldwell 1985.
- <sup>113</sup> Early-age mortality is a particularly useful indicator of a society's level of preventable mortality. See, for instance, Black *et al.* 2003, Brice *et al.* 2003, Lawn *et al.* 2004, Darmstadt *et al.* 2005, which discuss early-age mortality, ranging from neonatal mortality to child mortality.
- <sup>114</sup> Filmer and Pritchett 1999: 1312, UNICEF, WHO, *et al.* 2007: 27.
- <sup>115</sup> United Nations Development Programme 2005: 33.
- <sup>116</sup> McGuire 2006: 411, citing Murray 1988: 126.
- <sup>117</sup> Hill *et al.* 1999: 1.
- <sup>118</sup> Argued in McGuire 2006: 411, citing Murray *et al.* 1992: 28.
- <sup>119</sup> See, for instance, McGuire 2006, Darmstadt *et al.* 2005, Bryce *et al.* 2003.
- <sup>120</sup> Black *et al.* 2003: 2227.
- <sup>121</sup> Darmstadt *et al.* 2005: 982.
- <sup>122</sup> See World Bank 2007 for a full description of sources and weights.
- <sup>123</sup> United Nations 2006.
- <sup>124</sup> Banister 1987: 12.
- <sup>125</sup> Banister 1987: 17.
- <sup>126</sup> UNICEF, WHO, *et al.* 2007: 13.
- <sup>127</sup> UNICEF, WHO, *et al.* 2007: 27.
- <sup>128</sup> United Nations 1982.
- <sup>129</sup> Banister (1987: 106-110) describes these two sources and uses them in her own calculations of infant mortality.
- <sup>130</sup> United Nations 2006.
- <sup>131</sup> Banister 1987: 117.
- <sup>132</sup> Banister 1987: 88-89, 106.
- <sup>133</sup> Estimates vary on infant mortality rates before 1950, Barclay (1976: 618) estimates it to be roughly 300 per 1,000 live births, Kane (1984: 3) estimate puts it at somewhere between 290 and 500 per 1,000 live births.
- <sup>134</sup> See Drèze and Sen (1989: 210), and sources quotes within.
- <sup>135</sup> Banister 1987: 60.
- <sup>136</sup> Caldwell 1986, Caldwell and Caldwell 1985, Sen 1999: 197.

- 
- <sup>137</sup> Liu (2008) shows that greater female empowerment in the household can have a positive effect on child “quality,” such as child height, an effect particularly strong among girls.
- <sup>138</sup> Peterson (1997: 6) notes the complexity in measuring literacy, and summarizes the debate on literacy in China. Because Chinese is a character-based language, various metrics have been applied to define basic literacy.
- <sup>139</sup> World Bank 1997: 49.
- <sup>140</sup> World Bank 1997: 48.
- <sup>141</sup> Drummer and Cook 2007: 5.
- <sup>142</sup> Li *et al.* 2004. Calot and Caselli (1989: 860) show that female child mortality (ages 1 to 5) was slightly higher than male infant mortality in the 1981 census.
- <sup>143</sup> Arnold and Liu 1986, Li 2004, Banister and Hill 2004: 66.
- <sup>144</sup> Riley 2004: 9, Banister and Hill 2004: 66.
- <sup>145</sup> Li, *et al.* 2004: 97-104.
- <sup>146</sup> Sun *et al.* 1993, as cited in Croll 2001: 229.
- <sup>147</sup> Hull 1990, Das Gupta and Li 1999.
- <sup>148</sup> Davin 1975: 264-273, Croll 1978: 244-245.
- <sup>149</sup> Zheng 2003, Johnson 1983.
- <sup>150</sup> Zheng 2003: 163.
- <sup>151</sup> Croll 1983: 36-40, Wolf 1985: 221-237.
- <sup>152</sup> Summerfield 1994: 720-721.
- <sup>153</sup> Grigoriou *et al.* (2005) demonstrate that the statistical effect of GDP per capita on infant mortality levels across China’s provinces has increased substantially between 1981 and 1999.
- <sup>154</sup> China’s gini coefficient of income inequality has increased from 28.6 in 1975 to 44.9 in 2003, as reported in WIDER 2007.
- <sup>155</sup> WHO 2007.
- <sup>156</sup> WHO 2007.
- <sup>157</sup> Yao 1999: 108.
- <sup>158</sup> See Calot and Caselli (1989: 860) for provincial infant mortality estimates.
- <sup>159</sup> An excellent compilation of estimates of health personnel and population, used in this study, is found in Hu 1980: 236-237.
- <sup>160</sup> Hu 1980: 239. The total number of health personnel in Sichuan was given as 500,000, including barefoot doctors and health aides; the only province to report both barefoot doctors and health aides together.
- <sup>161</sup> Mosley and Chen 1984: 28, Lawn *et al* 2004: 400.
- <sup>162</sup> McGuire 2006: 413-420.
- <sup>163</sup> Bryce *et al.* 2003, 2230.
- <sup>164</sup> Hussain 2002: 1825.
- <sup>165</sup> Liu 2008 finds that Chinese children enjoy greater health when their mothers have greater intra-household power.
- <sup>166</sup> Sen 1999: 40-41, Caldwell 1986: 178.
- <sup>167</sup> World Health Organization and UNICEF 2006: 30.
- <sup>168</sup> Huang and Manderson 2005: 205; the authors also argue that the Three Gorges Dam has also been criticized for increasing the risk of water-borne diseases.

- 
- <sup>169</sup> McGuire 2006: 414-415. Using data from a 46-country study, McGuire finds the statistical effect of a measles immunization and DTP3 immunization to be insignificant at the 10 percent level, the normal threshold for a notable relationship.
- <sup>170</sup> See Chen 1989: 72, Chen 1936, and Yip 1992: 400.
- <sup>171</sup> Chen 1989: 36, Yip 1992: 400.
- <sup>172</sup> Chen 1989: 75-77.
- <sup>173</sup> Chen 1936: 374.
- <sup>174</sup> Chen 1937: 386
- <sup>175</sup> Chen 1961: 154.
- <sup>176</sup> Chen 1989: 60-63.
- <sup>177</sup> Chen (1989: 61-2, 69) and other Peking Union Medical College graduates went to Harvard's School of Public Health before beginning a rural health program. James Yen, who began Mass Education movements under the Guomindang, attended Yale. Many intellectual elites returned to China after studying in the United States or in other Western countries in order to strengthen China.
- <sup>178</sup> Tucker (1976) writes on the relationship of medical missionaries with the CCP and GMD. Chen (1989: 17) writes, "Missionary medical activity began in China in the early 1830s."
- <sup>179</sup> See Chen (1961: 154) and Yip (1992: 396). Yip writes, "It was the medical missionaries, with their often isolated clinics and dispensaries in the countryside, who were largely responsible for introducing Western medical practices and public health to the rural population."
- <sup>180</sup> Chen 1989: 100-105.
- <sup>181</sup> Hayford: 1990: 186.
- <sup>182</sup> Hayford 1990: 1985.
- <sup>183</sup> Hayford 1990: 185.
- <sup>184</sup> Meisner 1999: 110.
- <sup>185</sup> Eckstein (1977: 187) provides a table of the distribution of fixed capital investments by the state in 1952, 1955, and 1957. Industry consistently remained the largest investment sector, followed by agriculture and transportation.
- <sup>186</sup> Lampton 1977: 54.
- <sup>187</sup> Sidel and Sidel (1973: 22), also see "New Medical Education System Shows Results" in Survey of China Mainland Press (1951).
- <sup>188</sup> Sidel 1968: 934.
- <sup>189</sup> Field 1967: 127.
- <sup>190</sup> Field (1967: 126) observes, "the increase of Soviet semiprofessional medical personnel has been made possible by the massive influx of women into these occupations. Thus the percentage of women in the health system amounted to 86 in 1963."
- <sup>191</sup> Li 1959: 54.
- <sup>192</sup> Meisner 1999: 179.
- <sup>193</sup> Meisner (1999: 180-1) and Spence (1990) offer excellent, concise accounts of the Hundred Flowers Movement. Also see Schram (1974) for transcripts of Mao's speeches, and MacFarquhar (1974).
- <sup>194</sup> Spence 1990: 589-90.

- 
- <sup>195</sup> Tsou 1986: 21.
- <sup>196</sup> An extensive study of Yan'an is provided in Selden (1971), a more general, concise history of the Chinese Soviets can be found in Spence (1990: 370-379)
- <sup>197</sup> Spence 1990: 409.
- <sup>198</sup> Spence 1990: 461.
- <sup>199</sup> Selden (1971: 179) quotes Chalmer Johnson (1962: 56), also see Spence (1990: 464).
- <sup>200</sup> Crozier 1968: 153.
- <sup>201</sup> Selden 1971: 165-166.
- <sup>202</sup> Selden 1971: 226.
- <sup>203</sup> See Keating (1994) and the sources quoted within.
- <sup>204</sup> Edgar Snow's 1937 book, *Red Star Over China*, gave the CCP an international voice, helped establish a moral high ground for the CCP and led to the arrival of sympathetic Westerners.
- <sup>205</sup> Porter (1997) provides a thorough biography of George Hatem's work in China. On venereal diseases, see Porter (1997: 197).
- <sup>206</sup> Allan and Gordon 1973: 193.
- <sup>207</sup> Porter 1997: 121.
- <sup>208</sup> The eulogy "In Memory of Norman Bethune," dated December 21, 1939, is reproduced in Mao (1971: 179-181), among other places.
- <sup>209</sup> Meisner 1977: 213-214, also see Ch'en 1973: 86.
- <sup>210</sup> Red Flag 1958: 3-4, as cited in Meisner 1977: 213.
- <sup>211</sup> Ch'en (1973: 86) writes: "To Marx, Engels, and Lenin, the revolution was largely *for* the peasants rather than *by* the peasants... It is well known that Mao attributed a much more active role to the Chinese peasantry in the revolution."
- <sup>212</sup> Keating (1994) provides a number of references on this criticism of Yan'an historiography; also see Gray (1990: 284) and Chen (1986).
- <sup>213</sup> See Liu *et al.* 1995, Liu *et al.* 1996, Tang and Bloom 2000, Feng *et al.* 1995, Bloom and Gu 1997, Liu and Hsiao 1995, Zhu *et al.* 1989, among others. These studies focus largely on the finance and insurance schemes of China's rural health care systems.
- <sup>214</sup> Liu *et al.* 1996: 159. Young (1984: 124) showed that the income has a negative effect on preventative services offered and that the "change from the collective system to the fee-for-services system are strong incentives for the BFD to provide more curative services and earn more income."
- <sup>215</sup> See, for instance, Navarro *et al.* 2006, and Navarro and Shi (2001). These studies, however, tend to only investigate the role of politics in determining health outcomes in democratic countries, which is not as useful for studying a country like China.
- <sup>216</sup> Mehrotra (1997: 75) notes the varying financing schemes of Korea, Costa Rica, and Kerala. All these countries implemented successful public health programs under different financial schemes and different political climates.
- <sup>217</sup> Madsen (2008) argued that intra-village ties were particularly strong during the Cultural Revolution, because collective production and lack of mobility facilitated strong local communities.
- <sup>218</sup> Riskin 1987: 213-218.

- 
- <sup>219</sup> Shue 1988: 50-51, Riskin 1987: 138.
- <sup>220</sup> Riskin 1987: 204.
- <sup>221</sup> Riskin (1978: 207) asserts that China attempted to become less trade dependent on the Soviet Union after the 1950s. Industrial output grew during the first years of the Cultural Revolution, and international trade actually increased during the later years.
- <sup>222</sup> Mao (1977: 102-3, cited in Riskin 1987: 206) rejected division of labor among socialist countries, and making an analogy of China's intra-provincial self-reliance, "The correct method is each [province] doing the utmost for itself as a means toward self-reliance for new growth, working independently to the greatest possible extent, making a principle of not relying on others."
- <sup>223</sup> Farquhar 1994: 15, Cheng 1973: 139, Crozier 1968: 153.
- <sup>224</sup> Chen (1989: 75) had begun a program of rural health care described earlier under the Guomindang.
- <sup>225</sup> Riskin 1987: 224. Sen (1982: 353-369) introduced the notion of equality of human *capabilities*. Krauss (1976: 1085-1086) writes on the question of egalitarian ideologies and policies addressing "symbolic, political, and material inequalities."
- <sup>226</sup> Potter and Potter 1990: 54, Unger 2002: 30-31, Friedman *et al* 1991: 52-79
- <sup>227</sup> Riskin 1987: 223-256, Kraus 1976.
- <sup>228</sup> Sigurdson 1972: 332.
- <sup>229</sup> See Schram (1977: 152-160); Here Mao writes of the need for physical education as early as 1917, as China faced national humiliations at the hands of foreign powers. The author's great-uncle also participated in the re-education programs of the Cultural Revolution; his status as a nuclear physicist at a Qinghua University made him an obvious target of the Red Guard.
- <sup>230</sup> White 1989: 204-205.
- <sup>231</sup> White 1989: 208.
- <sup>232</sup> Bernstein 1977: 34.
- <sup>233</sup> Goldstein 1996: 11.
- <sup>234</sup> World Bank (2007) report in the World Development Indicators estimates of rural population, as well as the rural population as a percentage of the total population. Estimates of total urban residents sent down from Dietrich (1986: 208-220), as cited in Goldstein 1996: 12.
- <sup>235</sup> World Bank 2007.
- <sup>236</sup> Riskin 1987: 305.
- <sup>237</sup> Lin 1983: 112.
- <sup>238</sup> Banister (1987: 341) observes that although roughly 17 million urban residents were sent to the countryside to alleviate urban unemployment, paradoxically, 14 million urban jobs went to itinerant rural workers, to match the needs of the urban labor market.
- <sup>239</sup> Meisner: 1977 149-150.
- <sup>240</sup> Mao 1967: 117-12, as cited in Young 1980: 127.
- <sup>241</sup> Putterman 1993: 164.
- <sup>242</sup> Rong 2008.
- <sup>243</sup> Kan 1990: 42, Sidel (1982: 39) asserts that barefoot doctors were usually awarded between 8 and 10 work points.

- 
- <sup>244</sup> Riskin 1987: 213, Tsou 1986: 35.
- <sup>245</sup> Young 1984: 78-81.
- <sup>246</sup> Unger 2002: 112, Dorner and Thiesenhusen 1990: 72, Oi 1989: 17
- <sup>247</sup> Stacey 1983: 178.
- <sup>248</sup> Johnson 1983: 158-159.
- <sup>249</sup> Croll 1978: 275-276.
- <sup>250</sup> Potter and Potter 1990: 106, Hemmel and Sindbjerg 1994: 86-87.
- <sup>251</sup> Zheng 2003: 167.
- <sup>252</sup> Johnson 1983: 168, Potter and Potter 1990: 96, Hemmel and Sindbjerg 1994: 82-83.
- <sup>253</sup> Stacey 1983: 207, Davin 1979: 127-128.
- <sup>254</sup> Potter and Potter 1990: 116, Hemmel and Sindbjerg 1994: 83-85, Unger 2002: 77.
- <sup>255</sup> Potter and Potter 1990: 61, Unger 2002: 79-80.
- <sup>256</sup> Young 1984: 26.
- <sup>257</sup> Gong and Chao 1982: 61.
- <sup>258</sup> Zheng 2003: 163.
- <sup>259</sup> Croll 1983: 36-40, Wolf 1985: 221-237.
- <sup>260</sup> Zheng 2003: 163.
- <sup>261</sup> Sen 1990: 131-132.
- <sup>262</sup> Meisner 1977: 205, 230.
- <sup>263</sup> Baum 1964: 1050.
- <sup>264</sup> On the early years of the land reform process, see Dorner and Thiesenhusen 1990: 66-67, Friedman *et al.* 1991: 52-79, Potter and Potter 1990: 43-45, Unger 2002: 30-31.
- <sup>265</sup> Spence 1990: 579.
- <sup>266</sup> Spence 1990: 579.
- <sup>267</sup> Yang (1996: 36-37) writes of the initial euphoria at the exaggerated claims of the Great Leap harvest, and that commune members should “eat to his stomach’s content.”
- <sup>268</sup> Yang 1996: 62-63.
- <sup>269</sup> Lampton 1974: 19.
- <sup>270</sup> Burki (1969) offers an excellent summary of various communes formed during the Great Leap Forward. Although many communes listed are suburban, Burki shows that a wide range of health facilities existed among these supposedly prosperous communes.
- <sup>271</sup> Lampton 1974a: 675-684.
- <sup>272</sup> Dreze and Sen (1989: 210-214) have argued strongly for the protective role of democracy in fighting famines, including a succinct section on the Great Leap Famine.
- <sup>273</sup> Yang 1996: 37.
- <sup>274</sup> Yang 1996: 39.
- <sup>275</sup> See Banister (1987: 60) and sources quoted within. Yang (1996: 37) describes the exaggerated claims of production and the subsequent increases in state grain extraction.

- 
- <sup>276</sup> Wang Quanli, Center for Disease Control. Personal communication. March 21, 2007.
- <sup>277</sup> Shapiro 2001: 86-88.
- <sup>278</sup> Shapiro (2001: 34) quotes Mao Zedong, “Speech at the Conference of Heads of Delegations to the Second Session of the 8<sup>th</sup> Party Congress,” May 18, 1958. As commented upon in the previous chapter, fears that population growth would outstrip food supply hindered accurate collection demographic data during Mao’s tenure.
- <sup>279</sup> Banister 1987: 149.
- <sup>280</sup> Meisner (1999: 245-259) describes this bureaucratic restoration in succinct detail.
- <sup>281</sup> Dutt 1966: 135.
- <sup>282</sup> Lampton 1977: 160.
- <sup>283</sup> Schram 1974: 232-3.
- <sup>284</sup> Lampton (1977: 188) writes that before the Cultural Revolution in the early 1960s, “the Ministry [of Health] hierarchy was almost exclusively composed of Party members who were simultaneously medical professionals.”
- <sup>285</sup> Unger (2002), Yang (1996), Chan (2001), among others, write on rural resistance to state campaigns after the devastations of the Great Leap Forward. Yang (1996: 106) argues that the experience of the Great Leap Famine led to reluctance to form “higher forms of collective institutions in rural China,” and also limited state extraction from rural areas.
- <sup>286</sup> Yang (1996: 80-81) writes of rural reluctance to continue collectivization trends. One stark example he gives is of an aging farmer in Anhui who begged his commune to relieve himself of the burdens he placed on the commune, and was granted permission to cultivate land separate of the commune. Within the year, the farmer had not only fed his entire family but gave up 900 kilograms of grain to the famine-ravaged commune.
- <sup>287</sup> Friedman, et al (2005: 63). Unger (2002: 78) writes that a government team directed to carry out the Four Cleanups in 1965 stayed in the village for two years.
- <sup>288</sup> See Unger (2002: 78) and Chan, et al (1992). Shue (1988: 39-48) applies a “center-periphery” approach to state-rural relations, Huang (1990: 189) also writes on the villager’s relation to their local hamlets versus their allegiance to the state.
- <sup>289</sup> Lampton 1977: 159, 195.
- <sup>290</sup> Heller 1973: 92-94.
- <sup>291</sup> MacFarquhar 1997: 362-363.
- <sup>292</sup> Solomon 1973: 68-70. Solomon quotes Mao Zedong, who condemned those who were “Cloaking themselves in ‘Marxist-Leninist theory’ and relying on the political and organizational prestige built up by the Fourth Plenary Session, those comrades who were guilty of dogmatist errors were responsible for the domination of the third ‘Left’ line in the Party for four long years.” There is growing evidence that ideological concerns trumped practical concerns, and that “Maoism” prevailed over “pragmatism.” See for instance, Schram 1970, Riskin 1987.
- <sup>293</sup> Lampton (1974) argues that during certain periods, 1955-1960 and 1965-1970, the Ministry of Health bureaucracy broke down in favor of medical Party apparatuses, such as the Nine-Man Sub-Committee on Schistosomiasis Control.
- <sup>294</sup> New 1982: 1.

---

<sup>295</sup> *The Economist* (2007) suggested that despite the many poor macroeconomic and social policies during the 1960s and 1970s, rural peasants at least had a system of basic health care.

---

## Bibliography

- Agtmael, Michiel A. van, Teunis A. Eggelte, and Chris J. van Boxtel. "Artemisinin Drugs in the Treatment of Malaria: From Medicinal Herb to Registered Medicine." *Trends in Pharmacological Sciences* 20, no. 5 (1999): 199-2005.
- Allan, Ted, and Sydney Gordon. *The Scalpel, the Sword: The Story of Dr. Norman Bethune*. New York: Monthly Review Press, 1973.
- Arnold, Fred, and Zhaoxiang Liu. "Sex Preference, Fertility, and Family Planning in China." *Population and Development Review* 12, no. 2 (1986): 221-246.
- Avvannavar, Santosh M., and Monto Mani. "A Conceptual Model of People's Approach to Sanitation." *Science of the Total Environment* 390 (2008): 1-12.
- Banister, Judith. *China's Changing Population*. Stanford: Stanford University Press, 1987.
- Banister, Judith, and Kenneth Hill. "Mortality in China 1964-2000." *Population Studies* 58, no. 1 (2004): 55-75.
- Banister, Judith, and Xiaobo Zhang. "China, Economic Development and Mortality Decline." *World Development* 33, no. 1 (2005): 21-41.
- Barclay, George W., Ansley J. Coale, Michael A. Stoto, and T. James Trussell. "A Reassessment of the Demography of Traditional Rural China." *Population Index* 42, no. 4 (1976): 606-635.
- Baum, Richard D. "'Red and Expert': The Politico-Ideological Foundations of China's Great Leap Forward." *Asian Survey* 4, no. 9 (1964): 1048-1057.
- Beaver, Patricia, D., Lihui Hou, and Xue Wang. "Rural Chinese Women: Two Faces of Economic Reform." *Modern China* 21, no. 2 (1995): 205-232.
- Bernstein, Thomas P. *Up to the Mountains and Down to the Villages*. New Haven, CT: Yale University Press, 1977.
- Black, Robert E., Saul S. Morris, and Jennifer Bryce. "Where and Why Are 10 Million Children Dying Each Year?" *The Lancet* 361 (2003): 2226-2234.
- Bloom, Gerald, and Xingyuan Gu. "Health Sector Reform: Lessons from China." *Social Science & Medicine* 3 (1997): 351-360.

- 
- Bryce, Jennifer, Shams el Arifeen, George Pariyos, Claudio F. Lanata, Davidson Gwatkin, Jean-Pierre Habicht, and Multi-Country Evaluation of IMCI Study Group. "Reducing Child Mortality: Can Public Health Deliver?" *The Lancet* 362 (2003): 159-164.
- Burki, Shahid Javed. *A Study of Chinese Communes, 1965* Harvard University East Asian Monographs, No. 29. Cambridge, MA: Harvard University Press, 1969.
- Caldwell, John C. "Routes to Low Mortality in Poor Countries." *Population and Development Review* 12, no. 2 (1986): 171-220.
- Caldwell, John C., and Pat Caldwell. "Education and Literacy as Factors in Health." In *Good Health at Low Cost*, ed. Scott B. Halstead, Julia A. Walsh and Kenneth S. Warren. Bellagio, Italy: The Rockefeller Foundation, 1985.
- Calot, Gerard, and Graziella Caselli. "La Mortalité En Chine D'après Le Recensement De 1982. Analyse Selon Le Sexe Et L'âge Au Niveau National Et Provincial." *Population (French Edition)* 44, no. 4-5 (1989): 841-872.
- Cao, Guoxuan. "'Chijiao Yisheng' Jincheng Zhihou." *Zhongguo Xiangcun Faxian* 1 (2007): 29-31.
- Ch'en, Jerome. "The Development and Logic of Mao Tse-Tung's Thought, 1928-49." In *Ideology and Politics in Contemporary China*, ed. Chalmers Johnson. Seattle: University of Washington Press, 1973.
- Chan, Alfred. *Mao's Crusade: Politics and Policy Implementation in China's Great Leap Forward*. Oxford: Oxford University Press, 2001.
- Chan, Anita, Richard Madsen, and Jonathan Unger. *Chen Village under Mao and Deng*. Berkeley: The University of California Press, 1992.
- Chang, Jung. *Wild Swans*. New York: Simon & Schuster, 1991.
- Chen, C.C. "The Rural Public Health Experiment in Tingsien, China." *China Medical Journal* 50 (1936): 1125-1127.
- \_\_\_\_\_. "The Development of Systematic Training in Rural Public Health Work in China." *The Milbank Memorial Fund Quarterly* 14, no. 4 (1936): 370-387.
- \_\_\_\_\_. "Ting Hsien and the Public Health Movement in China." *The Milbank Memorial Fund Quarterly* 15, no. 4 (1937): 380-390.

- 
- \_\_\_\_\_. *Medicine in Rural China: A Personal Account*. Berkeley: University of California Press, 1989.
- Chen, Minggang, and Zheng Feng. "Schistosomiasis Control in China." *Parasitology International* 48 (1999): 11-19.
- Chen, William. "Medicine and Public Health." *The China Quarterly* 6 (1961): 153-169.
- Chen, Yung-fa. *Making Revolution: The Chinese Communist Movement in Central and Eastern China, 1937-1945*. Berkeley: The University of California Press, 1986.
- Cheng, Chu-Yuan. *Health Manpower: Growth and Distribution*. New York: The Josiah Macy, Jr. Foundation, 1973.
- Cheng, Tien-Hsi. "Schistosomiasis in Mainland China: A Review of Research and Control Programs since 1949." *The American Journal of Tropical Medicine and Hygiene* 20 (1971): 26-53.
- \_\_\_\_\_. "Disease Control and Prevention." In *Public Health in the People's Republic of China*, ed. Myron E. Wegman, Tsung-yi Lin and Elizabeth F. Purcell. New York: Josiah Macy, Jr. Foundation, 1973.
- Chiao, Chi-ming. "A Study of the Chinese Population." *The Milbank Memorial Fund Quarterly* 12, no. 1 (1934): 85-96.
- Chien, Hsin-chung, and I.G. Kochergin. *Zdravookhranenie I Meditsina V Kitaiskoi Narodnoi Respublike (Public Health and Medicine in the People's Republic of China)*. Moscow, 1959.
- Chu, Fu-t'ang. "Chien-Kuo Shih-Nien-Lai Erh-T'ung Pao-Chien Shih-Yeh Te Ch'eng-Chiu (Achievements in Child Health Care in the Ten Years since Liberation)." *Chinese Journal of Pediatrics* 10, no. 5 (1959): 367-373.
- Coale, Ansley J., and Judith Banister. "Five Decades of Missing Females in China." *Demography* 31, no. 3 (1994): 459-479.
- \_\_\_\_\_. "Five Decades of Missing Females in China." *Proceedings of the American Philosophical Society* 140, no. 4 (1996): 421-450.
- Cohen, Myron S., Gao Ping, Kim Fox, and Gail Henderson. "Sexually Transmitted Diseases in the People's Republic of China in Y2k: Back to the Future." *Sexually Transmitted Diseases* 27, no. 3 (2000): 143-145.

- 
- Croll, Elisabeth. *Feminism and Socialism in China*. Boston: Routledge & Kegan Paul, 1978.
- \_\_\_\_\_. *Chinese Women since Mao*. Armonk, NY: M.E. Sharpe, 1983.
- \_\_\_\_\_. "Amartya Sen's 100 Million Missing Women." *Oxford Development Studies* 29, no. 3 (2001): 225-244.
- Crozier, Ralph. *Traditional Medicine in Modern China: Science, Nationalism and the Tensions of Cultural Change*. Cambridge, MA: Harvard University Press, 1968.
- Daniels, Norman, Bruce Kennedy, and Ichiro Kawachi. "Health and Inequality, or Why Justice Is Good for Our Health." In *Public Health, Ethics, and Equity*, ed. Sudhir Anand, Fabienne Peter and Amartya K. Sen. New York: Oxford University Press, 2004.
- Darmstadt, Gary L., Zulfiqar A Bhutta, Simon Cousens, Taghreed Adam, Neff Walker, and Luc de Bernis. "Evidence-Based, Cost-Effective Interventions: How Many Newborn Babies Can We Save?" *The Lancet* 365 (2005): 977-988.
- Das Gupta, Monica. "Explaining Asia's "Missing Women:" A New Look at the Data." *Population and Development Review* 31, no. 3 (2005): 529-535.
- Das Gupta, Monica, and Shuzhuo Li. "Gender Bias in China, South Korea and India 1920-1990: Effects of War, Famine, and Fertility Decline." *Development and Change* 30 (1999): 619-652.
- Davin, Delia. "Women in the Countryside of China." In *Women in Chinese Society*, ed. Margery Wolf and Roxane Witke. Stanford: Stanford University Press, 1975.
- \_\_\_\_\_. *Women-Work: Women and the Party in Revolutionary China*. New York: Oxford University Press, 1979.
- De Geyndt, Willy, Xiyan Zhao, and Shunli Liu. "From Barefoot Doctor to Village Doctor in Rural China." *World Bank Technical Papers*, no. 187 (1992).
- Dietrich, Craig. *People's China: A Brief History*. New York: Oxford University Press, 1986.
- Djerassi, Carl. "Some Observations on Current Fertility Control in China." *The China Quarterly* 57 (1974): 40-62.

- 
- Doherty, Jim P., Edward C. Norton, and James E. Veney. "China's One-Child Policy: The Economic Choices and Consequences Faced by Pregnant Women." *Social Science & Medicine* 52 (2001): 745-761.
- Dorner, Peter, and William C. Thiesenhusen. "Selected Land Reforms in East and Southeast Asia: Their Origins and Impacts." *Asian-Pacific Economic Literature* 4, no. 1 (1990): 65-95.
- Drèze, Jean, and Amartya K. Sen. *Hunger and Public Action*. Oxford: Clarendon Press, 1989.
- \_\_\_\_\_. *India: Development and Participation*. Oxford: Oxford university Press, 2002.
- Drummer, Trevor J.B., and Ian G. Cook. "Exploring China's Rural Health Crisis: Processes and Policy Implications." *Health Policy* 83 (2007): 1-16.
- Duffy, Patrick E., and Theonest K. Mutabingwa. "Drug Combinations for Malaria: Time to Act?" *The Lancet* 363, no. 9402 (2004): 3-4.
- Dutt, Gargi. "Some Problems of China's Rural Communes." In *China under Mao: Politics Takes Command*, ed. Roderick MacFarquhar. Cambridge, MA: The Massachusetts Institute of Technology Press, 1966.
- Eckstein, Alexander. *China's Economic Revolution*. Cambridge: Cambridge University Press, 1977.
- Farquhar, Judith. *Knowing Practice: The Clinical Encounter of Chinese Medicine*. Boulder, CO: Westview Press, 1994.
- Feng, L.C. "Research on Parasitic Diseases in New China." *Chinese Medical Journal* 80 (1960): 1-20.
- Feng, Xueshan, Shenglan Tang, Gerald Bloom, Malcolm Segall, and Xingyuan Gu. "Cooperative Medical Schemes in Contemporary Rural China." *1995* 41, no. 8 (1995): 1111-1118.
- Field, Mark. *Soviet Socialist Medicine*. New York: The Free Press, 1967.
- Filmer, Deon, and Lant Pritchett. "The Impact of Public Spending on Health: Does Money Matter?" *Social Science & Medicine* 49 (1999): 1309-1323.
- Foege, William. "Surveillance and Antiepidemic Work, 1980." *Rural Health in the People's Republic of China, Report of a Visit by the Rural Health Systems Delegation*, Washington, D.C.

- 
- Friedman, Edward, Paul G. Pickowicz, and Mark Selden. *Chinese Village, Socialist State*. New Haven: Yale University Press, 1981.
- \_\_\_\_\_. *Revolution, Resistance and Reform in Village China*. New Haven: Yale University Press, 2005.
- Goldstein, Alice. "The Many Facets of Change and Their Interrelations, 1950-1990." In *China: The Many Facets of Demography Change*, ed. Alice Goldstein and Wang Feng. Boulder, CO: Westview Press, 1996.
- Gong, You-Long, and Li-min Chao. "The Role of Barefoot Doctors." *American Journal of Public Health* 72, no. Supplement (1982): 59-61.
- Gray, Jack. *Rebellions and Revolutions: China from the 1800s to the 1980s*. London: Oxford University Press, 1990.
- Grigoriou, Christopher, Patrick Guillaumont, and Wenyan Yang. "Child Mortality under Chinese Reforms." *China Economic Review* 16 (2005): 441-464.
- Hayford, Charles Wishart. *To the People: James Yen and Village China*. New York: Columbia University Press, 1990.
- Heller, Peter S. "The Strategy of Health-Sector Planning." In *Public Health in the People's Republic of China*, ed. Myron E. Wegman, Tsung-yi Lin and Elizabeth F. Purcell. New York: Josiah Macy, Jr. Foundation, 1973.
- Hemmel, Vibeke, and Pia Sindbjerg. *Women in Rural China: Policy Towards Women before and after the Cultural Revolution* Studies on Asian Topics, ed. Scandinavian Institute of Asian Studies. London: Curzon Press, 1984.
- Henderson, Gail. "Increased Inequality in Health Care." In *Chinese Society on the Eve of Tiananmen*, ed. Ezra F. Vogel and Deborah Davis. Cambridge, MA: Harvard University Press, 1990.
- Henderson, Gail, John Akin, Zhiming Li, Shuigao Jin, Haijiang Ma, and Keyou Ge. "Equity and the Utilization of Health Services: Report of an Eight-Province Survey in China." *Social Science & Medicine* 39, no. 5 (1994): 687-699.
- Henderson, Gail E., and Myron S. Cohen. *The Chinese Hospital*. New Haven, CT: Yale University Press, 1984.
- Heston, Alan, Robert Summers, and Bettina Aten. "Penn World Table Version 6.2." Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, 2006.

- 
- Hill, Kenneth, Rohini Pande, Mary Mahy, and Gareth Jones. *Trends in Child Mortality in the Developing World: 1960 to 1996*. New York: UNICEF, 1999.
- Horn, Joshua S. *Away with All Pests*. New York: Monthly Review Press, 1969.
- Hou, Wenruo. "Population Policy." In *China's Population: Problems and Prospects*, ed. et al. Liu Zheng. Beijing, 1981.
- Hsu, Elisabeth. "The History of *Qing Hao* 青蒿 in the Chinese *Materia Medica*" *Transactions of the Royal Society of Tropical Medicine and Hygiene* 100, no. 6 (2006): 505-508.
- Hu, Teh-wei. "Health Care Services in China's Economic Development." In *China's Development Experience in Comparative Perspective*, ed. Robert F. Dernberger. Cambridge, MA: Harvard University Press, 1980.
- Hu, Xing-juan, and Bao-juan Zhang. "Women's Health Care." *American Journal of Public Health* 72, no. Supplement (1982): 33-35.
- Hu, Xiaochuan (胡小川). "从赤脚医生产生, 发展的历史看乡村医生培军 (Observations on Village Doctor Education, from Looking at the Training and Origins of the Barefoot Doctors)." *西北医学教育 (Northwest Medical Education)* 15, no. 4 (1997): 213-215.
- Huang, Philip. *The Peasant Family and Rural Development in the Yangzi Delta, 1350-1988*. Stanford, CA: Stanford University Press, 1990.
- Huang, Yi-Xin, and Lenore Manderson. "The Social and Economic Context and Determinants of Schistosomiasis Japonica." *Acta Tropica* 96 (2005): 223-231.
- Hull, Terence C. "Recent Trends in Sex Ratios at Birth in China." *Population and Development Review* 16, no. 1 (1990): 63-83.
- Hussain, Athar. "Demographic Transition in China and Its Implications." *World Development* 30, no. 10 (2002): 1823-1834.
- Jamison, Dean T. "China's Health Care System: Policies, Organization, Inputs, and Finance." In *Good Health at Low Cost: A Conference Report*, ed. Scott B. Halstead, Julia A. Walsh and Kenneth S. Warren. New York: The Rockefeller Foundation, 1985.
- Jamison, Dean T., John R. Evans, Timothy King, Ian Porter, Nicholas Prescott, and Andre Prost. *China: The Health Sector*. Washington, D.C.: The World Bank, 1984.

- 
- Johnson, Chalmers. *Peasant Nationalism and Communist Power: The Emergence of Revolutionary China, 1937-1945*. Stanford, CA: Stanford University Press, 1962.
- Johnson, Kay Ann. *Women, the Family and Peasant Revolution in China*. Chicago: The University of Chicago Press, 1983.
- Kan, Xuegui. "Village Health Workers in China: Reappraising the Current Situation." *Health Policy and Planning* 5, no. 1 (1990): 40-48.
- Kanbur, Ravi, and Xiaobo Zhang. "Fifty Years of Regional Inequality in China: A Journey through Central Planning, Reform, and Opening." *Review of Development Economics* 9, no. 1 (2005): 87-106.
- Kane, Penny. "An Assessment of China's Health Care." *The Australian Journal of Chinese Affairs*, no. 11 (1984): 1-24.
- Keating, Pauline. "The Yan'an Way of Co-Operativization." *The China Quarterly* 140 (1994): 1025-1051.
- Kleinman, Arthur. *Patients and Healers in the Context of Culture*. Berkeley, CA: University of California Press, 1981.
- Kraus, Richard Curt. "The Limits of Maoist Egalitarianism." *Asian Survey* 16, no. 11 (1976): 1081-1096.
- Lampton, David. "Health Policy During the Great Leap Forward." *The China Quarterly* 60 (1974): 558-698.
- \_\_\_\_\_. *Health, Conflict, and the Chinese Political System* Michigan Papers in Chinese Studies, No. 18. Ann Arbor: The University of Michigan Center for Chinese Studies, 1974.
- \_\_\_\_\_. *The Politics of Medicine in China: The Policy Process, 1949-1977*. Boulder: Westview Press, 1977.
- Lawn, Joy E., Simon Cousens, Zulfiqar A Bhutta, Gary L. Darmstadt, Jose Martinez, Vinod Paul, Rudolf Knippenberg, Helga Fogstadt, Priya Shetty, and Richard Horton. "Why Are 4 Million Newborn Babies Dying Each Year?" *The Lancet* 364 (2004): 399-401.
- Levin, Kenneth. "Medicine and Chinese Society." In *Modern China and Traditional Chinese Medicine* ed. Guenter B. Risse. Springfield, IL: Charles C. Thomas, 1973.

- 
- Li, Beng-Xin, Chung-hua He, and Fu-min Shen. "Childhood Immunization." *American Journal of Public Health* 72, no. Supplement (1982): 39-40.
- Li, Huei-han. "Prevention and Treatment of Filariasis in Shantung Province." *Chinese Medical Journal* 78 (1959): 54.
- Li, Jianghong. "Gender Inequality, Family Planning, and Maternal and Child Care in a Rural Chinese County." *Social Science & Medicine* 59 (2004): 695-708.
- Li, Shuzhuo, Chu Zhu Zhu, and Marcus W. Feldman. "Gender Differences in Child Survival in Contemporary Rural China: A County Study." *Journal of Biosocial Science* 36 (2004): 83-109.
- Li, Victor H. "Politics and Health Care in China: The Barefoot Doctors." *Stanford Law Review* 27, no. 3 (1975): 827-840.
- Lin, Mu. "Chijiao Yisheng." *Dangshi Bolan (Extensive Readings on Communist Party History)* 12 (2004): 1-2.
- Lin, Zili. "The New Situation in the Rural Economy and Its Basic Direction." *Social Sciences in China* 3 (1983).
- Liu, Haoming. "The Impact of Women's Power on Child Quality in Rural China." *2008* 19 (2008): 101-115.
- Liu, Xingzhu, and William C. Hsiao. "The Cost Escalation of Social Health Insurance Plans in China: Its Implication for Public Policy." *Social Science & Medicine* 41, no. 8 (1995): 1095-1101.
- Liu, Yuanli, William C. Hsiao, Qing Li, Xingzhu Liu, and Minghui Ren. "Transformation of China's Rural Health Care Financing." *Social Science & Medicine* 41, no. 8 (1995): 1085-1093.
- Liu, Yuanli, Shanlian Hu, Wei Fu, and William C. Hsiao. "Is Community Financing Necessary and Feasible for Rural China?" *Health Policy* 38 (1996): 155-171.
- MacFarquhar, Roderick. *The Origins of the Cultural Revolution*. Vol. I. New York: Columbia University Press, 1974.
- \_\_\_\_\_. *The Origins of the Cultural Revolution, Vol. 3: The Coming of the Cataclysm, 1961-1966*. New York: Columbia University Press, 1997.
- Madsen, Richard. "Religious Renaissance and Asian Modernity." 33rd Annual Mansfield Freeman Lecture. Middletown, CT, 2008, March 27.

- 
- Mao, Tse-tung. *Selected Readings from the Works of Mao Tse-Tung*. Peking: Foreign Languages Press, 1971.
- Mao, Zedong. *Selected Works of Mao Tse-Tung*. Vol. III. Beijing: Foreign Languages Press, 1967.
- \_\_\_\_\_. *A Critique of Soviet Economics*. New York: Monthly Review Press, 1977.
- McGuire, James W. "Basic Health Care Provision and under-5 Mortality: A Cross-National Study of Developing Countries." *World Development* 34, no. 3 (2006): 405-425.
- Meisner, Maurice. *Mao's China*. New York: The Free Press, 1977.
- \_\_\_\_\_. *Mao's China and After: A History of the People's Republic*. 3rd ed. New York: The Free Press, 1999.
- Mosley, W. Henry, and Lincoln C. Chen. "An Analytical Framework for the Study of Child Survival in Developing Countries." *Population and Development Review* 10 (1984): 25-45.
- Mueller, M. S., I.B. Karhagomba, H.M. Hirt, and E. Wemakor. "The Potential of *Artemisia Annua* L. As a Locally Produced Remedy for Malaria in the Tropics: Agricultural, Chemical, and Clinical Aspects." *Journal of Ethnopharmacology* 73, no. 3 (2000): 487-493.
- Mueller, Markus S., Nyabuhanga Runyambo, Irmela Wagner, Steffan Borrmann, Klaus Dietz, and Heide Lutz. "Randomized Controlled Trial of a Traditional Preparation of *Artemisia Annua* L. (Annual Wormwood) in the Treatment of Malaria." *Transactions of the Royal Society of Tropical Medicine and Hygiene* 98, no. 5 (2004): 318-321.
- Murray, Christopher J.L. "The Infant Mortality Rate, Life Expectancy at Birth, and a Linear Index of Mortality as Measures of General Health Status." *International Journal of Epidemiology* 17, no. 1 (1988): 122-128.
- Murray, Christopher J.L., Gonghuan Yang, and Xinjian Qiao. "Adult Mortality: Levels, Patterns, and Causes." In *The Health of Adults in the Developing World*, ed. Richard G.A. Feachem, Tord Kjellstrom, Christopher J.L. Murray, Mead Over and Margaret A. Phillips. New York: Oxford University Press, 1992.

- 
- Navarro, Vincente, Carles Muntaner, Carme Borrell, Joan Benach, Agueda Quiroga, Maica Rodriguez-Sanz, Nuria Verges, and M Isabel Pasarín. "Politics and Health Outcomes." *The Lancet* 368 (2006): 1033-1038.
- Navarro, Vincente, and Leiyu Shi. "The Political Context of Social Inequalities and Health." *Social Science & Medicine* 52 (2001): 481-491.
- New, Peter Kong-ming. "Changing Health Policies in the Prc: Another Perspective." *Medical Anthropology Newsletter* 13, no. 2 (1982): 1-2.
- Novelli, Vas. "Bcg Vaccination Gets a Boost." *The Lancet* 367 (2006): 1122-1123.
- Nussbaum, Martha. "Women and Equality: The Capabilities Approach." In *Women, Gender, and Work: What Is Equality and How Do We Get There?*, ed. Martha Fetherolf Loutfi, 45-68. Geneva: International Labour Office, 2001.
- Oi, Jean. *State and Peasant in Contemporary China*. Berkeley, CA: University of California Press, 1989.
- Oksenberg, Michael. "Getting Ahead and Along in Communist China: The Ladder of Success on the Eve of the Cultural Revolution." In *Party Leadership and Revolutionary Power in China*, ed. John W. Lewis. New York: Cambridge University Press, 1970.
- Oster, Emily. "Hepatitis B and the Case of the Missing Women." *Journal of Political Economy* 113, no. 6 (2005): 1163-1216.
- Peng, Xizhe, and Juan Huang. "Chinese Traditional Medicine and Abnormal Sex Ratio at Birth in China." *Journal of Biosocial Science* 31, no. 4 (1999): 487-503.
- Pickowicz, Paul G. "Barefoot Doctors in China: People, Politics and Paramedicine." In *Modern China and Traditional Chinese Medicine*, ed. Guenter B. Risse. Springfield, IL: Charles C. Thomas, 1973.
- Porter, Edgar. *The People's Doctor: George Hatem and China's Revolution*. Honolulu, HI: University of Hawai'i Press, 1997.
- Potter, Sulamith Heins, and Jack M. Potter. *China's Peasants: The Anthropology of a Revolution*. Cambridge: Cambridge University Press, 1990.
- Putterman, Louis. *Continuity and Change in China's Rural Development*. New York: Oxford University Press, 1993.
- Red Flag. *Hong Qi (Red Flag Newspaper)* 1958, 3-4.

- 
- Ren, Xinhua Steve. "Sex Differences in Infant and Child Mortality in Three Provinces in China." *Social Science & Medicine* 40, no. 9 (1995): 1259-1269.
- Riley, Nancy E. "China's Population: New Trends and Challenges." *Population Bulletin* 59, no. 2 (2004): 2-36.
- Riskin, Carl. *China's Political Economy*. Oxford: Oxford University Press, 1987.
- Robeyns, Ingrid. "Sen's Capability Approach and Gender Inequality: Selecting Relevant Capabilities." *Feminist Economics* 9, no. 2 (2003): 61-92.
- Rong, Xinxia (Vivian Bien). Personal Communication, 2008.
- Ross, Allen G.P., Y.S. Li, A.C. Sleight, and D.P. McManus. "Schistosomiasis Control in the People's Republic of China." *Parasitology Today* 13, no. 4 (1997): 152-155.
- Schram, Stuart. "Chinese Communism in Crisis: Maoism and the Cultural Revolution." *The China Quarterly* 44 (1970): 209-214.
- \_\_\_\_\_. *Chairman Mao Talks to the People: Talks and Letters: 1956-1971*. New York: Pantheon Books, 1974.
- \_\_\_\_\_. *The Political Thought of Mao Tse-Tung*. New York: Praeger Publishers, 1977.
- Selden, Mark. *The Yen'an Way in Revolutionary China*. Cambridge, MA: Harvard University Press, 1971.
- \_\_\_\_\_. *The Yen'an Way in Revolutionary China*. Cambridge, MA: Harvard University Press, 1971.
- Sen, Amartya. "Gender and Cooperative Conflicts." In *Persistent Inequalities*, ed. Irene Tinker. New York: Oxford University Press, 1990.
- Sen, Amartya K. "Labour Allocation in a Cooperative Enterprise." *The Review of Economic Studies* 33, no. 4 (1966): 361-371.
- \_\_\_\_\_. "Mortality as an Indicator of Economic Success and Failure." *The Economic Journal* 108, no. 446 (1998): 1-25.
- \_\_\_\_\_. *Development as Freedom*. New York: Alfred Knopf, 1999.

- 
- Shapiro, Judith. *Mao's War against Nature: Politics and the Environment in Revolutionary China*. New York: Cambridge University Press, 2001.
- Shen, Tiefu, Jean-Pierre Habicht, and Ying Chang. "Effect of Economic Reforms on Child Growth in Urban and Rural Areas of China." *The New England Journal of Medicine* 335, no. 6 (1996): 400-406.
- Shue, Vivienne. *The Reach of the State: Sketches of the Chinese Body Politic*. Stanford: Stanford University Press, 1988.
- Sidel, Ruth. *Women and Child Care in China*. Baltimore, MD.: Penguin Books, 1972.
- Sidel, Ruth, and Victor Sidel. "Shoes for the Barefoot Doctor?" In *The Health of China*, ed. Victor Sidel and Ruth Sidel. Boston, MA: Beacon Press, 1982.
- Sidel, Victor. "Feldshers and Feldsherism: The Role and Training of the Feldsher in the Ussr." *The New England Journal of Medicine* 268, no. 17 (1968): 934-939.
- Sidel, Victor, and Ruth Sidel. *Serve the People*. Boston: Beacon Press, 1973.
- Sigurdson, Jon. "Rural Industry-- a Traveller's View." *The China Quarterly* 50 (1972): 315-332.
- Snow, Edgar. *Red Star over China*. New York, 1938.
- Solomon, Richard H. "From Commitment to Cant: The Evolving Functions of Ideology in the Revolutionary Process." In *Ideology and Politics in Contemporary China*, ed. Chalmers Johnson. Seattle: University of Washington Press, 1973.
- Spence, Jonathan. *The Search for Modern China*. New York: W.W. Norton, 1990.
- Stacey, Judith. *Patriarchy and the Socialist Revolution in China*. Berkeley, CA: University of California Press, 1983.
- Summerfield, Gale. "Economic Reform and the Employment of Chinese Women." *Journal of Economic Issues* 28, no. 3 (1994): 715-732.
- Sun, F., S. Li, and N. Li. "A Study of the under-Reporting of Deaths in the 1990 Census." *Zhongguo Renkou Kexue (Chinese Journal of Population Sciences)* 2 (1993): 20-25.
- Survey of China Mainland Press (SCMP). "Health Work in Canton." *Nanfang Ribao*

---

(*Southern Daily*), no. 150 (1951): 26-7.

\_\_\_\_\_. "Medical Work Made to Face Peasants and Workers." *Jinbu Ribao* (*Progressive Daily*), no. 187 (1951): 14-15.

\_\_\_\_\_. "China-Made Penicillin on Sale in Shanghai." *Wenhui Bao*, no. 187 (1951): 15.

\_\_\_\_\_. "New Medical Education System Shows Results." *Renmin Ribao*, no. 187 (1951): 19-20.

\_\_\_\_\_. "Education and Health Work in 1953 Plans." *Xinhuashe* (*New China News Agency*), no. 511 (1953): 6.

Survey of People's Republic of China Press. "Maternity and Child Care in China." *Survey of People's Republic of China Press*, 1 July 1975, 60-62.

Survey of World Broadcast Part 3: Weekly Economic Report. "Medical Services." 1979.

Tang, Shenglan, and Gerald Bloom. "Decentralizing Rural Health Services: A Case Study in China." *International Journal of Health Planning and Management* 15 (2000): 189-200.

The Economist. "Missing the Barefoot Doctors." *The Economist*, October 11 2007.

The Revolutionary Health Committee of Hunan Province. *A Barefoot Doctor's Manual* (赤脚医生手册) - *Translation*. Seattle: Cloudburst Press, 1977.

Trunz, Bernadette Bourdin, P.E.M. Fine, and C. Dye. "Effect of Bcg Vaccination on Childhood Tuberculous Meningitis and Miliary Tuberculosis Worldwide: A Meta-Analysis and Assessment of Cost-Effectiveness." *The Lancet* 367 (2006): 1173-1180.

Tsou, Tang. *The Cultural Revolution and Post-Mao Reforms*. Chicago: The University of Chicago Press, 1986.

Tucker, Nancy. "An Unlikely Peace: American Missionaries and the Chinese Communists, 1948-1950." *The Pacific Historical Review* 45, no. 1 (1976): 97-116.

Unger, Jonathan. *The Transformation of Rural China*. Armonk, NY: M.E. Sharpe, 2002.

- 
- UNICEF, WHO, The World Bank, and UN Population Division. "Levels and Trends of Child Mortality in 2006, Estimates Developed by the Inter-Agency Group for Child Mortality Estimation." New York, 2007.
- United Nations. *Model Life Tables for Developing Countries*. New York: United Nations Publications, 1982.
- \_\_\_\_\_. "World Population Prospects: The 2006 Revision Population Database." United Nations Population Division, 2006.
- United Nations Development Programme. *Human Development Report 1995*. New York: Oxford University Press, 1995.
- \_\_\_\_\_. *Human Development Report 2005*, ed. United Nations Development Programme. New York: Oxford University Press, 2005.
- Wang, Quanli. "Beijing Center for Disease Control." Personal Communication. Beijing, 2007.
- Wang, Ruotao. "Critical Health Literacy: A Case Study from China in Schistosomiasis Control." *Health Promotion International* 15, no. 3 (2000): 269-275.
- Watts, Jonathan. "Chinese Officials Accused of Forcing Abortions in Shandong." *The Lancet* 9493 (2005): 1253.
- White III, Lynn T. *Policies of Chaos*. Princeton, NJ: Princeton University Press, 1989.
- White, Sydney, D. "From 'Barefoot Doctor' to 'Village Doctor' in Tiger Springs Village: A Case Study of Rural Health Care Transformations in Socialist China." *Human Organization* 57, no. 4 (1998): 480-490.
- WHO. "Immunization, Vaccines, and Biologicals." World Health Organization, 2007.
- WIDER. "World Income Inequality Database, User Guide and Data Sources." United Nations University - World Institute for Development Economics Research, 2007.
- Winblad, U., and W. Kalima. *Sanitation without Water*. London: Macmillan, 1985.
- Wolf, Margery. *Revolution Postponed: Women in Contemporary China*. Stanford: Stanford University Press, 1985.

- 
- World Bank. *China 2020: Development Challenges in the New Century*. Washington, D.C.: The World Bank, 1997.
- \_\_\_\_\_. "World Development Indicators." The World Bank, 2007.
- World Health Organization, and UNICEF. *Meeting the Mdg: Drinking Water and Sanitation, the Urban and Rural Challenge of the Decade*. Geneva: World Health Organization Press, 2006.
- Xie, Jipan, and William H. Dow. "Longitudinal Study of Child Immunization Determinants in China." *Social Science & Medicine* 61 (2005): 601-611.
- Yang, Dali. *Calamity and Reform in China*. Stanford, CA: Stanford University Press, 1996.
- Yao, Shujie. "Economic Growth, Income Inequality and Poverty in China under Economic Reforms." *Journal of Development Studies* 35, no. 6 (1999): 104-130.
- Yip, Ka-che. "Health and Nationalist Reconstruction: Rural Health in Nationalist China, 1928-1937." *Modern Asian Studies* 26, no. 2 (1992): 395-415.
- Young, Graham. "On the Mass Line." *Modern China* 6, no. 2 (1980): 225-240.
- Young, Mary E-Ming. "A Study of Barefoot Doctor's Activities in China." The Johns Hopkins University, 1984.
- \_\_\_\_\_. "Impact of the Rural Reform on Financing Rural Health Services in China." *Health Policy* 11, no. 1 (1989): 27-42.
- Zhang, Jun-mai. *Science and Philosophy of Life (Ke-Xue Yu Ren-Sheng Guan)*. Shanghai, 1923.
- Zhang, Yin, and Guanghua Wan. "The Impact of Growth and Inequality on Rural Poverty in China." *Journal of Comparative Economics* 34 (2006): 694-712.
- Zheng, J., K. Qian, Q.H. Zhu, S.H. Chen, R. Zhang, Y.A. Wang, Z.L. Qiu, H. Yang, S.Z. Bi, J.B. Zhao, Z.H. Peng, H.Z. Pu, and G.H. Yao. "Effect of Man's Activity on the Family Aggregation of Schistosomiasis Patients." *Chinese Journal of Schistosomiasis Control* 1, no. 62-63 (1989).
- Zheng, Wang. "Gender, Employment, and Women's Resistance." In *Chinese Society: Change, Conflict and Resistance*, ed. Elizabeth Perry and Mark Selden. New York: Routledge, 2003.

---

Zhu, Naisu, Zhihua Ling, Jie Shen, J.M. Lane, and Shanlian Hu. "Factors Associated with the Decline of the Cooperative Medical System and Barefoot Doctors in Rural China." *Bulletin of the World Health Organization* 67, no. 4 (1989): 431-442.