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The Impact of the Chinese Rural Healthcare System on Infectious Disease: A Study of the History And Reform of Chinese Healthcare, And the Global Implications of Infectious Disease Control in China

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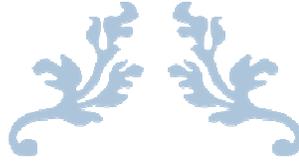
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THE IMPACT OF THE CHINESE RURAL HEALTHCARE SYSTEM ON INFECTIOUS DISEASE

A Study of the History and Reform of Chinese Healthcare, and the Global
Implications of Infectious Disease Control in China



MAY 27, 2013

SIT CHINA: LANGUAGE, CULTURE AND ETHNIC MINORITIES
John Barbadoro

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ABSTRACT

China's healthcare system has gone through significant changes in the 20th and 21st centuries. These changes have mirrored not only the political focus of the time, but also the social issues facing China. The NRCMCS for rural residents is a cheap annual fee that covers a percentage of medical costs. There are two urban equivalents, the BMIUE and BMIUR for urban employees through their job, and residency respectively. Despite the focus on cheaper healthcare for rural residents, the problems of income inequality and mistrust in the medical system are major problems that affect the health of this large and rapidly growing nation. A result of the inefficiencies in Chinese healthcare has resulted in the emergence of several epidemics in South Eastern China. Avian flu of the mid-20th century, Bird flu in the 1990s, SARS in 2002, and currently H7N9 have all emerged in this region of the world. With the advent of globalization, the spread of infectious disease is now a global problem, one that must promote change in Chinese healthcare, and healthcare systems around the world to help prevent the spread of epidemics.

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INTRODUCTION

Health care in China has always been a significant issue in the Chinese political system. The strong traditions in China and the changing political climate of the last hundred years has shaped the modern Chinese healthcare systems. The focus on traditional Chinese medicine, and the introduction of western medicine, combined with a significant inequality between urban and rural residents and the fastest growing economy in history have combined to present several challenges to health policy makers in China. As the world is moving towards more and more globalization, and China has recently encouraged and pushed for the opening of its borders to trade and travel, Chinese healthcare is becoming a global issue. The ramifications of inefficiencies and lack of comprehensive coverage spread far beyond China's borders. As the events of the first decade of the 21st century have shown, this issue cannot be neglected. The emergence of pandemic influenzas and coronaviruses such as H7N9 and SARS show that the policy of providing health care to residents in rural China affect policy and economy on a global scale. Travel advisories, screening passengers and panic can have a drastic effect on the economy of every nation in the world and affect the lives of people that have no direct connection to the disease. Models suggest that a pandemic level influenza that reaches a global level would cause around 166 Billion USD in economic costs unrelated to direct treatment.¹ Even in the latest H7N9 scare that infected slightly over 130 has cost the government of China near \$6 billion USD.² It is clear that the health of China and the monitoring of severe infectious diseases is a global issue, and in order to save costs globally, the focus must shift on proactive and preventive care for the risk of epidemic infections.

¹ (Rebmann, 2010)

² (Feng, 2013)

Disease detection and control are global responsibilities and the elimination of these diseases is a global public good. The key to evading global infection of these epidemics, or 'pandemic level' diseases, is as Larry Brilliant coined, "Early detection, early response."³ This philosophy is key to fighting the issues presented by epidemics. With early detection and response, governments can issue directed and appropriate responses such as transportation advisories, culling of animals in markets, and treatment and isolation procedures. These however, are reactionary methods that cause significant damages in terms of monetary cost and global trade. In China, early detection can be difficult. With a large mistrust of the health care system, primarily stemming from the high costs of treatment, and significant percentages of the populace avoiding treatment, infection rates of epidemics skyrocket. In this way, the healthcare system is inextricably linked to the spread of infectious diseases.

The most effective, and least expensive way to combat epidemics is stopping the spread at the source. The source for many of these diseases is in rural areas that practice animal husbandry, the use of livestock in domestic environments. Because of this epicenter for disease, rural healthcare is of vital importance to prevent that massive sickness, loss of life and expense that a pandemic level influenza can cause. When rural peoples become sick, a significant percentage choose not seek medical attention for a variety of reasons, primarily due to the mistrust in the medical system, and the cost of medical treatment, even if the patient has healthcare. Because this individual does not seek medical help, the disease is not detected early, and no response is taken. The lack of isolation that would occur in properly equipped facilities leads to more spread in markets and populated areas. From this point, the costs to control the disease sky rocket. Large measures must be taken to prevent widespread infection.

³ (Brilliant, 2006)

South eastern China appears to be the epicenter of most of these severe influenzas. In the last 15 years, H5N1 in 1997, SARS in 2003, H1N1 in 2009 and H7N9 currently have all begun in this region of the world. Why is this one region an epicenter for these highly infectious diseases? In this paper, I will explore the evolution of Chinese healthcare, and the events that shaped the system today. This healthcare system has several flaws that have affected the ability of the government to monitor, treat and respond to novel emerging epidemics. This emergence of pandemic level diseases is largely believed to be a result of societal practices, namely animal husbandry and the selling of a variety of animals in large scale markets. This insight implies policy changes and health care initiatives to help stem the tide of increasing emergence of disease in the globalized world.

This issue is no longer a problem that individual nations must deal with on their own. The cooperation of nations is paramount to protecting the world health and global populations. The trend towards globalization has raised the threat of pandemics. With increased global travel comes increased possible infection sites and 'mixing events' where large, susceptible, groups of people come together in a close environments for the spread of disease. This is often why airports are the first on alert for travel advisories; they are the hubs that allow not only people, but viruses and bacteria to escape to the rest of the world. I will explore the arguments for global cooperation towards preventing epidemic infections. Preventing pandemics is truly a global public good.

HEALTHCARE IN CHINA

Chinese healthcare, the 医疗保健大问题 (yi liao bao jian da wen ti) or, the healthcare question, is coming to the forefront of Chinese people's minds and their governments agenda. Recently, Chinese people complained about the lack of coverage and unfairness in the system. In my own experience, interviews with rural resident and urban employees both discussed the improving, yet problematic system of Chinese healthcare. Luckily, after a period of neglect during the opening of the economic border of China, The government implemented comprehensive reform for the people. First urban employees, then rural residents, and finally urban residents all seen benefits from healthcare reform in the past decade. These advances provided a much needed service for China, which has long been called the "sick man of Asia."⁴ Despite the successes of health care reform and the focus on public health, serious issues remain. Most of the problems with the healthcare system are connected to larger issues of modern China. As inefficiencies, mistrust and inequality persist, healthcare costs will continue to rise. The hardest hit by the inequalities of this system are the rural people. Once the focus of Chinese healthcare in cooperative systems, health care prices are currently rising out of reach for a majority of China's rural population. As of 2003, it is estimated that out of all rural peoples who were led to poverty, 33.4% are now living below the poverty line due to health care costs.⁵ This system is a step in the right direction and a departure from the twenty years before, but must improve coverage for rural people to help control the spread of serious infectious disease.

⁴ (Scott, 2008)

⁵ (Qichao, 2009)

HEALTHCARE IN CHINA: 1949-1979

Public health in China has seen as more changes and alterations in the past century than nearly every other health care system in the world. The theories and guiding principles behind the organization of public health campaigns, hospital structures, doctors and financing have changed along with government structure and party theory in China. The principles that shaped the modern Chinese healthcare system are engrained in the deep history that Chinese people hold, as well as the tumultuous last century. While the health care system has changed drastically, it has also improved drastically. China's life expectancy jumped from 32 years old in 1950 to 73 years old in 2005.⁶ While there have been significant improvements to this system, serious problems still remain. Among the 191 member nations of the World Health Organization, China is ranked 144th in healthcare performance, and 188th in fairness.⁷ This puts China among the three worst nations for fairness and accessibility to health services. This is primarily a result of the larger problem in China of the rural/urban income disparity. China primarily relies on a user-pay system, which puts the burden of pay on the patient, with public healthcare as a supplement. However, the Chinese healthcare system was not always set up this way. With roots in its ancient past of Traditional Chinese Medicine, and the draw to socialism that began in 1949, the Chinese health care system closely mirrored the political changes of the time.

Traditional public health in China that predates the 1949 revolution was primarily focused on preventative, rather than curative medicine programs.⁸ These programs are much more cost-effective and can often prevent many serious diseases on massive scales. Essentially, one Yuan towards preventative medicine will do more good than one Yuan towards drugs to

⁶ (Qichao, 2009)

⁷ Ibid.

⁸ (Qichao, 2009)

cure an illness.⁹ This was the focus of pre-modern China; a focus that was most realistic and most effective for the system of government. However, as the Chinese nation moved towards modernity, there was a need for a greater focus on the health of its people. Infant mortality was around 2%, and the maternal mortality was around 1.5%.¹⁰ Those numbers are significantly higher than today's statistics, as well as other industrialized nations of the time. Pre 1949, the government focused on the preventative coverage, while for curative medicine, a user-pay system was standard.¹¹

With the advent of socialism in China, the Ministry of Public Health began a campaign to help cure the sick and prevent further illness. By 1952, county level health centers and organizations covered about 90% of the residents in China. However, this coverage was not necessarily equal, and still put a large burden of payment on the user. This was still a large step in the right direction for Chinese Health care. However, the biggest catalyst for public health in China was the cooperative farming movement in China in the mid-1950s.¹² Cooperatives of farmers and villages in Henan set up health institutions managed by the cooperative. The fees for these institutions were levied from farmers themselves in annual dues, the cooperative's direct contributions, and medical fees (user-pay). This system required farmers to contribute between .5RMB to 2RMB annually and receive significant discounts.¹³ The patients were entitled to free preventative care and health services, excluding drug charges. After the ministry of health openly praised these 'Cooperative Medical System (CMS)' of Jishan County, Shanxi, in a 1959 report, this system swept through China and became the standard in Chinese health

⁹ (Brundtland & WHO, 2002)

¹⁰ (Qichao, 2009)

¹¹ (Wang S. , 2009)

¹² Ibid.

¹³ (Wang S. , 2009)

care.¹⁴ The CMS institutions would later be characterized by three important aspects that would contribute to their success. First, CMS expenses were shared by the public welfare funds of the collective and the individual fees. Second, CMS's were not legally mandatory, but were subsidized and initially encouraged by the central government and Ministry of Health. Third, the CMS would later be revitalized by 'barefoot doctors' whose services and training were low cost.

Despite the apparent momentum and success of the CMS movement, the central government shifted its policy away from the communal systems, criticizing their structure and encouraging more user-pay. There was a cut in government funding to CMS institutions. Therefore, in nearly all but a few affluent areas, CMS institutions drastically declined. By 1964, fewer than 30% of counties maintained CMS institutions.¹⁵ The problem worsened significantly enough to draw Mao's attention in 1964-1965. Mao reprimanded the Ministry of Health for mismanagement of the issue of Public Health. Most famously, in his *June 26 Directive*, Mao accused the Ministry of working only for 15% of the population, mainly affluent urban residents, and demanded "shifting the focus of health work to the countryside."¹⁶ Despite this strong directive, the CMS institutions did not become truly universal until about 1969.¹⁷ This directive did however, lay the groundwork for the 'barefoot doctors'.¹⁸

These 赤腳醫生 (chijiao yisheng) revitalized the rural healthcare system in the late 1960s China. The barefoot doctors were primarily local peoples trained in basic paramedic first aid, preventative medicine and traditional Chinese herbs to be sent to areas where doctors were in short supply.¹⁹ They became the crucial first tier in a three tier system to aid in rural health.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ (Qichao, 2009)

¹⁷ (Wang S. , 2009)

¹⁸ (Valentine, 2005)

¹⁹ (Qichao, 2009), (Valentine, 2005)

The key aspect that allowed these doctors to operate, which would later be their downfall, was the ubiquity and low cost of the TCM treatments. The first two tiers of the rural health system were organized and managed by CMS institutions. The first tier was the barefoot doctors in the most rural areas, serving around 1000 people for every two doctors. The next tier was the township clinics that treated around 10,000-30,000 people for 10-30 beds. These were often staffed with junior level trained doctors. The final tier was the county hospitals that served 100,000-300,000 people and were staffed by junior and senior doctors.²⁰ Generally, the county level institutions received government funding, but were much more expensive for rural residents. The urban areas had fully staffed hospitals. In the first tier of treatment for urban residents, factories generally had medical staff and health cooperatives.²¹

This system was actually quite effective and helped keep Mao's promise for the cultural revolutions focus on rural health. A big success for the program was the fight against the parasitic infectious disease, schistosomiasis, otherwise known as 'big belly.'²² The direct healthcare system was complimented by a government public health campaigns that emphasized basic environmental sanitation, hygiene, and the elimination of the 'four pests': rats, sparrows, flies and mosquitoes.²³ These campaigns and successes helped bring Chinese health to new levels. However, in 1970, the communal health system began to fall apart.

CHINESE HEALTHCARE AFTER 1979

A paradox of healthcare globally, is that healthcare financing is a system of diminishing returns. The more a state increases its healthcare system, the greater focus and funding that system requires as it increases the health of the state. For a simple example, 1 RMB can be

²⁰ (Qichao, 2009)

²¹ (Qichao, 2009), (Wang S. , 2009)

²² (Valentine, 2005)

²³ (Qichao, 2009)

donated to Haiti to buy a mother a simple salt and sugar solution to combat dehydration from cholera. That same 1RMB is next to useless in the American health system, which requires large funding for healthcare costs in an advanced system. Because of these diminishing returns, barefoot doctors were no longer the cost effective solution that they were a decade earlier. By 1980, China's life expectancy will have grown to 68 years of age.²⁴ The diseases of 1970s China were Cancer, Cerebrovascular, and Cardiovascular diseases. These are the diseases of industrialized nations.²⁵ Clearly, as China industrialized after the shifting of policies towards openness and economic growth, China inherited the diseases of industrialized nations and required a robust healthcare system to deal with them. This severely impacted the CMS and barefoot doctors, which could not support communal health systems without a strong collectivized economy.²⁶ The government neglected the growing issue as it pushed for economic growth. The household responsibility directive of the central government helped bring about a drop in coverage for 40% of the population over a six year period.²⁷ This continued as the trend in Chinese healthcare for the next 20 years. The opening of Chinese economic zones and trade led to an influx of western medicine. The two zones of medical ethos in China have always operated in two different spheres, even today operating in different wings of hospitals. It has always been a goal however to incorporate these two. As China became a more globalized country, the need for a more robust healthcare system became apparent, as public health is not an issue that stops at borders of nations.²⁸

²⁴ (Wang S. , 2009)

²⁵ (Qichao, 2009)

²⁶ (Wang S. , 2009)

²⁷ Ibid.

²⁸ (Fidler, 1997)

MODERN CHINESE HEALTH CARE

The current healthcare system was initially established after the 15-20 years of government neglect for health of the populace. The focus of the Chinese government in the 1980s and 1990s was on the implementation of openness policy for increased economic growth. While not immediately apparent, healthcare is beneficial for economic growth in the long term. As detailed by Rebmann, the costs of disease and preventing pandemics is much greater than the cost of increased monitoring of disease and prophylactic measures.²⁹ Despite this, the political shift towards openness began a troubling period where the health of China significantly declined. It wasn't until China became a true world power and economic influence that political focus slowly shifted towards the health of its populace. The primary care reform began in the mid 1990's with the establishment of a basic medical insurance for urban employees.³⁰ However, this change in focus towards public health progressed slowly. In 2004, China spent only 5.55% of its GDP on public health and health care. Compared to the U.S. who spent 16% and other industrialized nations with higher percentage expenditures, China still has a long path of reform before it has a truly modern system.³¹ Around 2003, it became apparent to the Government that changes had to be made, and the system introduced in the 90s was not sufficient. The populace began to complain more often and with a stronger voice. The people had noticed the decline in services and began to mistrust the system and avoid medical charges. The percentage of individuals that should be seeking treatment but do not went from 36.4% in 1993 to 48.9% in 2003.³² This is a serious issue that affects more than the individuals health. Clearly, the government needed to do more.

²⁹ (Rebmann, 2010)

³⁰ (Qichao, 2009)

³¹ Ibid.

³² (Qichao, 2009)

The Basic Medical Insurance for Urban Employees (BMIUE) introduced in the mid-1990s was later expanded. Initially however, this system was open only to government and enterprise type employees. This essentially gave health benefits to those who could afford health care despite government assistance. The inequality of this system quickly became apparent. Disparity in living conditions between urban and rural China is striking, but is most relevant in terms of healthcare. Infant mortality, maternal mortality, and children under 5 mortality percentages are all nearly double in rural areas when compared to urban areas.³³ The government eventually realized this need for comprehensive rural healthcare reform. However, they did face several problems. In urban areas, it is easier to administer health care through enterprises, factories and government agencies, due to the direct connection to the workers a documented income and regulated work force. In rural areas however, the majority of the rural population does not have a steady income and is primarily subsistence or cash crop farming. This presents a difficulty that only a socialized, unified system could solve. Another issue facing policy makers was the new and more expensive treatments as western medicine became more prevalent and necessary in Chinese health care. Reform for rural peoples finally came in 2005.

The advent of the New Rural Cooperative Medical Care System (NRCMCS) was a relief for the health of rural residents. With a history of on and off favoring entire user-pay models, this system was primarily user-pay based. However, rather than covering cost of visits and requiring user pay for medication, the new system provided an overall discount to medical services rendered, depending on coverage, location of stay and type of illness.³⁴ This system costs farmers 20Yuan annually, while 40Yuan is contributed from the provincial government, and 40Yuan is contributed from the central government for each resident enrolled in this

³³ Ibid.

³⁴ (Qichao, 2009), (Dr. Zhao, 2013)

program.³⁵ In Shaxi, a rural valley health clinic where I spent several weeks studying the daily activity, procedures and treatments, all rural people that come to this clinic are covered by this system.³⁶ While the coverage per treatment varies, I was informed by Doctor Yang that in Shaxi, general hospital checkups and treatments are around 45% covered by insurance. This low coverage for minor illness and checkups is a large reason for the avoidance of the medical system in general. This presents a problem as it disincentives trips to the hospital for influenza that often doesn't become serious until the disease has passed to several other people. This coverage can go up to 90% for emergencies and hospital stays. If a patient needs to be transferred, the system covers 80% in Jianchuan, the local county seat, 70% in Dali, the largest and best equipped hospital in the area, and up to 60% at the CDC for serious communicable disease treatments.³⁷ The NRCMCS, introduced in 2005, has grown to about 80% of the rural population covered. This is around 726 million people in 2009.³⁸

The urban medical system did see change as well. Adopted in 2007 after the relative success and failures of the NRCMCS and the urban system respectively, the government adopted the Basic Medical Insurance for Urban Residents (BMIUR). This system differed from the BMIUE, which required those enrolled to do so through a qualifying employer, instead offering widespread coverage, similar to that of the rural system. The new residents program allowed any urban resident to enroll in this system. The BMIUR functions closer to the rural system, yet the contributions for urban residents are much higher than their rural counterparts.

³⁵ (Qichao, 2009)

³⁶ (Dr. Zhao, 2013)

³⁷ (Dr. Yang, 2013)

³⁸ (Qichao, 2009)

Despite the increased costs associated with coverage, as of 2009, nearly 300 million urban residents are covered by this system.³⁹

A fourth system, called Medical Assistance System (MAS) is designed for those individuals below the poverty line that cannot afford either the urban or rural systems.⁴⁰ This system functions much the same way that Medicare does in the U.S. By providing a basic fund for emergency medicine, the poorest groups of Chinese citizens can avoid the most serious inequalities of the medical system. However, the funds provided by this system generally do not cover most important aspects of health care such as regular checkups or regular medications, especially western medicines. These inequalities can cause serious detriments to public health in general, as the avoidance of healthcare is the quickest way to spread infectious diseases. These three systems have vastly improved coverage to the average Chinese resident. Fig. 1 shows the growth of the health industry in the last several years, largely caused by the increased focus and incentives in the healthcare field. However, despite growth, difficulties and problems remain.

³⁹ (Qichao, 2009)

⁴⁰ Ibid.

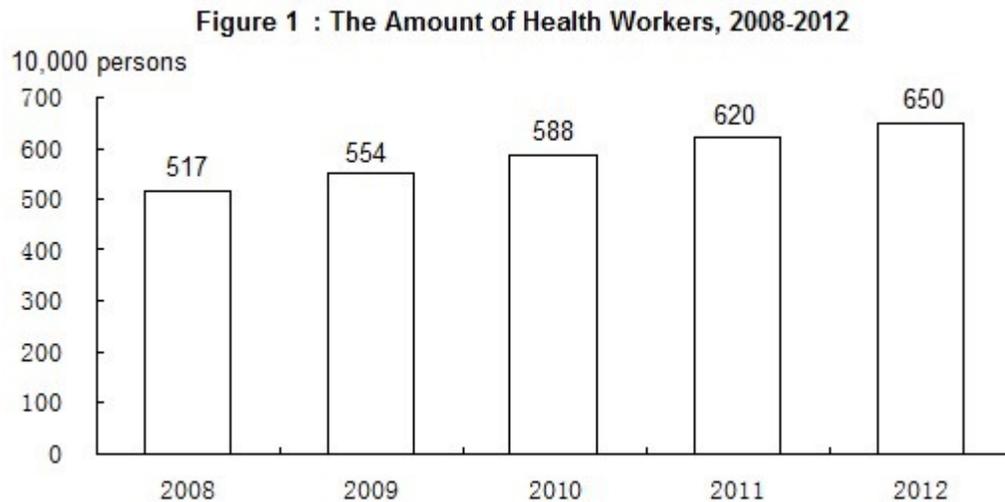


Fig. 1 The total number of health workers in Chinese institutions in a five year period. The numbers are in 10,000 people. In 2012, there were 6.50 million health workers in China.⁴¹

Infectious diseases have come to the forefront of Chinese public health since the mismanagement of the SARS outbreak in 2002-2003. The ministry of health has modeled a Center for Disease Control system with county, provincial and central government seats which have more access to complicated tests for infectious diseases and require reporting of every case of a certain class of diseases.⁴² There have been local CDC's in existence since the 1950s, albeit in a much more limited and less connected capacity. The current CDC system started to modernize in 2002 and now has a modern monitoring and treatment system.⁴³ Currently, China requires the reporting to the CDC of nearly 25 infectious diseases divided into three classes. Class A includes diseases such as Cholera and plague, class B includes less severe, but highly infectious diseases such as TB, and class C has influenzas and STDs.⁴⁴ This reporting system has been aided by the implementation of internet communication systems and other techniques to

⁴¹ (National Bureau of Statistics, 2013)

⁴² (Dr. Yang, 2013)

⁴³ (CSIS Freeman Chair in China Studies, 2009)

⁴⁴ (CSIS Freeman Chair in China Studies, 2009)

help implement Larry Brilliant's idea of 'early detection, early response.'⁴⁵ Although this system has significantly helped the monitoring and treatment of infectious diseases, there are still issues in getting patients to report to local clinics and to incentivize the reporting of these diseases. There are still advantages to not reporting infectious diseases, although these can be disastrous on a national or even global scale. The CDC system, like the rest of Chinese health care has come a long way since the public health in pre modern China, but significant problems remain.

PROBLEMS WITH CHINESE MEDICAL CARE

While these systems cover a large proportion of the population, there are about 8%-10% of Chinese people that have not enrolled in any system and do not have any medical coverage whatsoever.⁴⁶ This presents a problem for China. The reliance on up front user pay means that these people must keep large stores of cash in reserve for protection against accidents that could end up costing thousands of Yuan that must be paid up front, even for emergency treatment. Even rural residents enrolled in the healthcare system keep reserves of cash on hand for potential problems.⁴⁷ The healthcare reform has made major strides in covering a significant number of Chinese people who were previously at risk for most health issues, but leaves a large population uncovered, and lacks serious attention to those that have coverage.

⁴⁵ (Brilliant, 2006)

⁴⁶ (Qichao, 2009)

⁴⁷ (Dr. Zhao, 2013)

Primarily among the problems with the Chinese healthcare system is the inherent unfairness in health coverage for rural residents, compared to their urban counterparts.⁴⁸ Part of a larger issue in China, the wealth is concentrated in the cities and affects the quality of care in the other areas. With the healthcare system in the current setup, costs are determined by care and medicine, and savings are deducted as a percentage of the total costs. While rural coverage on paper pays for a higher percentage, rural patients often need to be transported to city facilities for more extensive treatment where percentage of coverage is less. (See earlier coverage breakdown.)⁴⁹ However, a procedure for a rural resident and an urban resident in the same hospital will cost the same, in terms of gross cost. Because this charge is a higher percentage of the rural resident's total income, this is a regressive scale that charges poorer residents higher percentages of their income than urban residents. Let us use a real world example;

Both an average urban resident and an average rural resident covered by their respective healthcare systems require an expensive but important hip replacement surgery. This type of surgery is not possible in local or even most county level hospitals.⁵⁰ This is also not a direct emergency treatment, but necessary for the longevity and health of the citizens. Both these citizens would attend a city level hospital and have similar coverage scales, let us estimate 40% for urban coverage and 60% for rural residents in an urban area, using interview data conducted in the field for rough estimates of coverage for types of disease and location of treatment.⁵¹ The National Bureau of Statistics in China report highlights the median income of the rural resident as 7,019 RMB and the urban resident at 21,986 RMB.⁵² A standard hip

⁴⁸ (Liu, Zhang, Lu, Kwon, & Quan, Aug 2007)

⁴⁹ (Dr. Yang, 2013)

⁵⁰ (Dr. Zhao, 2013)

⁵¹ (Dr. Yang, 2013), (Dr. Zhao, 2013)

⁵² (National Bureau of Statistics, 2013)

replacement procedure in Shandong China median cost is 1210 RMB before discount.^{53*} The rural resident will pay 484RMB while the urban resident pays 726 RMB. So to summarize, this procedure costs the rural resident of 6.9% their yearly income, while the urban resident pays only 3.3% of their yearly income. To be an entirely equal system, the rural resident must be covered by 80% of total healthcare costs to pay the same percentage of yearly income, while the urban resident continues to have 40% coverage. This would equal to both parties paying 3.4% of their total income. In this sense, this health care system functions as a regressive tax, putting a larger burden in their lifestyle on the poorest resident of society.⁵⁴ This is the problem with user pay oriented, percentage covered systems. This is why China is ranked 188th out of 191 countries for equality of health care systems around the world.⁵⁵

Apart from the issue with funding in Chinese healthcare, systemic issues in the structure of providing medical help to citizens seriously hamper efforts to improve the system. These issues stem, like income inequality, from larger issue in China. It is important to note that according to the annual press report of the Chinese National Bureau of Statistics reports medical costs as equal in rural and urban areas in the consumer price index despite quality of care, before discount.⁵⁶ The opening of the economic system to the western powers was a fantastic economic opportunity for China certainly allowed for the growth seen today. However, with this opening, a system of “Socialism with Chinese Characteristics” formed the basis for economic theory in China. This created a conflicting dichotomy of Adam Smith style ‘invisible hand’ market economy and a more Marxist state driven approach. In healthcare, this leads to issues.

⁵³ (Liu, Yuanli, & Chen, 2000) * Note that this price data is from the year 2000. The statistics on income are from 2012. This analysis does not account for monetary and cost inflation. It is merely a comparative example and provides the same comparative result. The percentage cost of yearly income is most likely a larger percentage today.

⁵⁴ (Liu, Zhang, Lu, Kwon, & Quan, Aug 2007)

⁵⁵ (Qichao, 2009)

⁵⁶ (National Bureau of Statistics, 2013)

The healthcare providers are government organizations that have a monopoly on the dues, operation, and coverage of health care. Competition, the principle that drives a free economy is non-existent in the Chinese healthcare system. This can cause serious inefficiencies and price fluctuations. While the government monitors costs of procedures in a 'yellow book', it is not uncommon for high technology and modern procedures to not have a fixed price and fluctuate wildly above costs while other procedures are outdated and charge well below cost.⁵⁷ These inefficiencies create large unpredictability and costs of medicine are often used to offset low profits, considering the average government funding for hospitals and health institutions is 8% of total income.⁵⁸

Along with the changing economic system of China, the opening of ideas and methodologies brought a stronger pull towards western medicine. Despite a continuing pressure on integrating the two systems of healthcare, TCM and western medicine often conflict in diagnosis, strategy and even basic theory. This can lead to a lack of coordination or other inefficiencies in clinical settings. For example, in the study of the Shaxi health clinic, Dr. Zhao and Dr. Yang both discussed the separation of the schools of thought. There are separate wings for diagnosing rooms and pharmacies for TCM and western medicine. Dr. Zhao discussed how patients entering the clinic have the option of choosing which wing, but the diagnosing doctor makes the ultimate decision. However, most doctors are trained in either one or the other school of thought, not both.⁵⁹ Dr. Yang had four years of western medicine schooling and is trained in epidemiology, but had little understanding of core theory behind TCM.⁶⁰ Qichao discovered the same phenomenon in other rural and urban centers.⁶¹ Despite diagnostic issues,

⁵⁷ (Liu, Yuanli, & Chen, 2000)

⁵⁸ (Wang S. , 2009)

⁵⁹ (Dr. Zhao, 2013)

⁶⁰ (Dr. Yang, 2013)

⁶¹ (Qichao, 2009)

TCM and western medicine have radically different catalogs of drugs. China lacks a nationwide Basic Medicine System (BMS). The WHO recommends a national BMS of at least 312 different medicines.⁶² These are only western medicines, and the inclusion of a significant portion of traditional Chinese medicines would easily double that number. This lack of a unified system leads to price gouging, as discussed earlier, and general inefficiencies in stocking and distributing medical treatments.

There are issues of incentive in Chinese healthcare as well. The government employees who monitor and report on infectious diseases in areas can succumb to pressure to misrepresent data. The CDC reporting system has come a long way from the origins in TCM medicine. Western medicine has reshaped the ideas about infectious diseases in China and has helped the monitoring and reporting of diseases. However, the local reasons for keeping a disease hidden can incentivize cover ups.⁶³ A recent development in the study of infectious diseases, particularly the H & N (Type A) influenzas common to southern China has directly tied the incubation, mutation, and transference through animals.⁶⁴ It is now easy to identify animal hosts that have contributed to the infectivity and spread of these diseases. However, the same factors that contribute to disease spread also are affected by the industry of farming and animal husbandry in poultry and livestock markets that dominate the region. One of the most effective strategies for control of epidemics is large scale 'culling' of livestock in these markets and farms to prevent the number of hosts and 'mixing events' that can result from livestock markets.⁶⁵ The reemergence of SARS in late 2003 could have been much worse than the initial outbreak if these policies were not enacted. The civet cat was believed and later confirmed as a strong link

⁶² (Qichao, 2009)

⁶³ (CSIS Freeman Chair in China Studies, 2009)

⁶⁴ (Day, Andre, & Park, 2006)

⁶⁵ (Quammen, 2013)

to SARS transmittance in humans.⁶⁶ In the late 2003 SARS reemergence, the Chinese government acted to stop this reemergence by culling 10,000 of these animals in urban or near urban areas.⁶⁷ This action is believed to have significantly impaired the spread of the virus and the same strategy has been implemented in recent cases of bird and swine flu. However, this causes a significant economic detriment to the area, as testing for the disease in each animal is far too time consuming and expensive, so all suspected animals must be slaughtered and disposed of properly. This provides incentives for officials to lie and take bribes from farmers, or to protect their reputation by claiming to have no cases of infectious diseases. A real world example is the large numbers of dead pigs found in rivers close to where the outbreak of H7N9 was believed to have originated from.⁶⁸ Despite lack of confirmation from the Chinese government and scientific evidence, many signs point to a cover up of the infected pigs.

A general factor that has shaped Chinese people's views on the subject of healthcare is a general mistrust of doctors. In a discussion with my rural translator and friend, Wang Yongfa, the incentives for the avoidance of medical treatment became a highlight. He discussed with me his views on the subject: "Doctors are just in it for the money."⁶⁹ This sentiment resonates with a larger population of Chinese in my experience and causes serious issues. In cities, this mistrust is directed towards primary care physicians. Primary care physicians play an important role in city health in that they can alleviate stress on hospitals. However, in China, patients will attend a large hospital for the most minor of reasons, often causing physicians in hospitals to see upwards of 30-40 patients in the first few hours a day, primarily for chronic diseases that primary care referrals would alleviate.⁷⁰ In rural areas, the mistrust of institutionalized

⁶⁶ (Quanlin, 2006)

⁶⁷ (Anderson, et al., 2004)

⁶⁸ (Garrett, 2013)

⁶⁹ (Wang Y. , 2013)

⁷⁰ (Qichao, 2009)

physicians is a much worse issue. Due to the concentration of epidemic disease centers in rural, but near urban areas, the origins of infectious disease are primarily a rural healthcare issue.

Reports in 2003 indicate as many as 48.9% of patients who should receive medical treatment do not. In preparing for infectious diseases, this is a serious issue. Both the CSIS Freeman Chair for China Studies and Rebmann concur that most crucial to preventing the spread of pandemics early is the surveillance, detection, isolation and treatment procedures to limit the possible number of cases.⁷¹ In a system where “public trust is not guaranteed”, the lack of attendance at hospitals and clinics poses a serious threat to national and global health.⁷²

⁷¹ (CSIS Freeman Chair in China Studies, 2009), (Rebmann, 2010)

⁷² (CSIS Freeman Chair in China Studies, 2009)

INFECTIOUS DISEASE IN CHINA

A primary component of healthcare and preventative health in China is a focus on infectious diseases. As detailed earlier, The CDC system has expanded and improved a lot in China. This effort primarily came about after the mistakes of the 2003 SARS epidemic which saw the dangers of pandemic level infections in a globalized world. The public health in rural China is vital to the control of the emergence and spread of these viruses that can have a global impact. Rural, South Eastern China sees more emergence of these diseases than any other part of the world. In order to help prevent these viruses from spreading out of control and emerging more frequently, it is vital to understand the pathology behind the emergence and mutation of these diseases that allow them to spread rapidly from animal to human to human. As seen in the current outbreak of type A influenza, H7N9, there has yet to be a confirmed case of human to human contact.⁷³ It is therefore important to understand how these viruses move from nonhuman sources to human hosts. Understanding the nature of these diseases is critical to understanding where Chinese healthcare needs to improve in order to help stem the outbreak of these diseases.

The WHO identified several problems to help prevent the spread of infectious diseases in China. These steps were examined and tested in relation to the SARS outbreak and have been successfully implemented in the current case of H7N9.⁷⁴ However, this has been a very costly campaign, costing around \$6.5 billion USD in losses.⁷⁵ Preventing, and especially eradicating these diseases are very costly measures. To date, the world has only eradicated one disease,

⁷³ (Feng, 2013)

⁷⁴ (Reuters, 2013)

⁷⁵ Ibid.

smallpox.⁷⁶ This was an extremely costly effort, and organizations like the WHO are constantly fighting for more funding to help control these diseases.⁷⁷ However, as seen in the case of preventing a disease that only infected 130 people, once these diseases have spread, putting them back in Pandora's box is often more costly. Strong measures taken for early detection and early response could keep these diseases from ever reaching international headlines and causing huge international costs.

RURAL PUBLIC HEALTH

Public health education is the first line of defense in preventing the spread of infectious diseases. In discussing this concept with the managing doctor of the Shaxi clinic, and a local party official, I was assured that Shaxi people have a very good understanding of public health.⁷⁸ I believe this to be true, as the Shaxi clinic is not an average rural clinic. This clinic certainly had significant funding, evidenced by the quality of the facility and additions and improvements year to year. Shaxi is an anomaly in rural public health however. Helped by the Shaxi rehabilitation project and tourism money entering the region, the Shaxi valley must have a higher quality of life and health than other, much poorer areas of Yunnan. The most cost effective way to prevent poor health habits is with public health advertisements and campaigns to educate the public on the importance of hand washing, bacteria and living tobacco free. While Shaxi does have public health education campaigns, other areas of rural China do not.⁷⁹ In this area of the world, arguably the most crucial aspect of public health is the interaction with animals.

⁷⁶ (Brilliant, 2006)

⁷⁷ (Brundtland & WHO, 2002)

⁷⁸ (Dr. Zhao, 2013)

⁷⁹ (Dr. Yang, 2013)

Animal husbandry, the use of domesticated animals in society as livestock, causes a close relationship with animals and humans. In rural China, this is a part of daily life. A large reason that the focus of epidemiological control is focused on this region of the world is based on the societal structure of southern rural China.⁸⁰ Phua & Lee strongly urge the continued study of this region due to the strong evidence suggested of the origins of the most dangerous epidemics.⁸¹ The CSIS Freeman chair sites this as a distinguishing factor in the emergence of pandemic level influenzas in southern China.⁸² On this subject, Jared Diamond has written extensively in *Guns, Germs and Steel*.

"The Major killers of humanity throughout our recent history: smallpox, flu, tuberculosis, malaria, plague, measles, and cholera- are all infectious diseases that evolved from diseases of animals"⁸³

This theory, as Diamond goes on to explain, is the reason that smallpox decimated Native American populations in the New World, as European immigrants exposed them to novel infections.⁸⁴ The natives did not practice animal husbandry and thus lacked the previous exposure to animal borne diseases. The European's had been exposed to cowpox from cattle, which mutated into smallpox, and spread from person to person in the cities of Europe. Diamond details the diseases of the last several hundred years and shows where these diseases originated from in Table 1:

⁸⁰ (Phua & Lee, 2005)

⁸¹ Ibid.

⁸² (CSIS Freeman Chair in China Studies, 2009)

⁸³ (Diamond, 1997)

⁸⁴ Ibid.

Human disease	Animal with related pathogen
Measles	Cattle (rinderpest)
TB	Cattle (cowpox)
Smallpox	Livestock with related pox viruses
Flu	Pigs and Ducks
Pertussis	Pigs, dogs
Falciparum malaria	Birds (chickens and ducks?)

Table 1. The emergence of epidemic diseases from animal husbandry. The close contact with animals in environments of animal husbandry leads to mutations in diseases to adapt to mammalian and human hosts.⁸⁵

DISEASE EPIDEMIOLOGY

It is important to understand how these diseases pass between animals and humans to further understand how to formulate public health strategies to combat the further spread. The unique environments of poultry and livestock markets in South East Asia lead to the presence of these diseases with many varieties of animals. The ‘bird flu’ and ‘swine flu’ panics of the last decade were not solely derived from avian origins. Among avian pathologists, there is a commonly accepted theory that influenza that has demonstrated human to human contact has passed through a mammal, particularly swine, host.⁸⁶ This theory is supported by the fact that pigs have a closer physiology to humans than avian sources. Day Et al. echo this idea and believe that the emergence of animal viruses in humans must have seen a mammalian intermediary.⁸⁷ Garrett uses this argument in her discussion of the latest outbreak of H7N9 and the connection to the mass of dead pigs found in the same region.⁸⁸ She cites the close

⁸⁵ (Diamond, 1997)

⁸⁶ (Perdue & Swayne, 2005)

⁸⁷ (Day, Andre, & Park, 2006)

⁸⁸ (Garrett, 2013)

relationship of pigs and ducks as the main catalyst to producing epidemic influenza.⁸⁹ They look at the emergence of the H and N proteins, and their effect on the infectivity in cross-species interactions. This theory is better understood with a stronger understanding of the types of influenza and the mutation patterns.

Avian influenza viruses are type A influenza. Type A influenza virus is found in a variety of species and is characterized by a RNA virus type. Type B and C viruses are more stable, and are generally confined to humans. The common seasonal flu for which vaccines are common is generally these type B and C flus. However, as type A influenza travels through a population, it often will return only seasonally, and with much less ferocity due to increased levels of immunity. RNA is much less stable than the DNA of type B and C viruses and is thus prone to mutation through 'genetic drift and shift'.⁹⁰ This susceptibility for mutation is the reason that RNA viruses are passed through animal to human hosts easily, as well as the difficulty in creating vaccines.⁹¹ The Type A viruses are further distinguished by the presence of H and N type proteins on their surface.⁹² Among many other protein markers, the reason H and N markers are very important is that those markers determine the ability of the virus to interact with human cells.⁹³ Essentially, these proteins determine the infectivity in humans. This is the reason that in 2009, during the swine flu outbreak, public health agencies were worried about the pandemic possibilities of H1N1. The H1 and N1 markers together on the virus were the same as those found on the 1918 Spanish influenza which killed 21 million people in 1918.⁹⁴ While Influenza is the most present and garners the most media attention, other diseases have similar pathology, the ability and type of infections, but different biology.

⁸⁹ Ibid.

⁹⁰ (Day, Andre, & Park, 2006)

⁹¹ (Diamond, 1997)

⁹² (Perdue & Swayne, 2005)

⁹³ Ibid.

⁹⁴ (Day, Andre, & Park, 2006)

SARS is categorized as a 'coronavirus' and stands for Severe Acute Respiratory Syndrome.⁹⁵ This disease was first spotted in South East Asia in the Fall of 2002, but not officially recognized as a coronavirus until months later.⁹⁶ Coronaviruses are also RNA viruses and thus prone to the same evolutionary advantages that allow Type A influenza to mutate quickly.⁹⁷ For these reasons, it is believed that SARS had passed through animal hosts in much the same way that avian and swine influenzas had, thus causing much more severe symptoms than coronaviruses generally do. The Civet cat was confirmed as an intermediary as well as avian sources that led to the infectivity of the virus.⁹⁸ The spread of SARS in 2003 was rapid and difficult to control. The infection had begun to become a global infection before serious measures were taken to stop the spread. Currently, there are news reports of a novel coronavirus (NCoV) in the Arabian Peninsula, similar to the epidemiology of SARS. This virus has seen 42 cases and 22 fatalities, indicating a high rate of fatalities in infected patients.⁹⁹ Thankfully, this disease has seen faster detection and response, largely due to the lessons learned from the SARS outbreak a decade ago.

One evolutionary advantage that both of these disease have is the incubation period, and especially relevant to china, minor symptoms initially that mask the true disease. The incubation period is the period after infection before any symptoms appear. At this stage, which can last three, four, even five days, and the patient is able to pass the disease onto other individuals. The first symptoms to appear often mimic the symptoms of a cold. Where this is a problem in China is the percent coverage for minor medical treatment. Only 45% is usually covered for minor hospital visits. This patient will use home remedies, rather than attending the

⁹⁵ (Anderson, et al., 2004)

⁹⁶ (CBC News, 2003)

⁹⁷ (Anderson, et al., 2004)

⁹⁸ (Quanlin, 2006)

⁹⁹ (Mahaptra, 2013)

hospital to seek treatment. This limits the effectiveness of the response by decreasing health clinics monitoring capabilities.

PREVENTING THE SPREAD OF INFECTIOUS DISEASE

Infectious disease control has become a large issue in China, since the mismanagement of the SARS epidemic in 2003. Early reports in October and November alerted early response ‘web-crawling’ systems designed to scan reports for clues towards emerging infectious diseases.¹⁰⁰ Eventually, reports reached the WHO, which in Feb of 2003 sent investigators to China to examine the threat and danger of this new disease.¹⁰¹ In March of that year, the WHO released an official document highlighting the dangers of this new ‘coronavirus’ and issued travel advisories. However, these investigators were not granted access to sites of possible SARS cases in China until late April of that year.¹⁰² The late access granted to investigators severely hampered actions to prevent the global spread of this disease. By the time these advisers were granted access, the disease had spread to Hong Kong and eventually other parts of the world, including North America.¹⁰³ There was a reemergence of SARS cases in China in late 2003, but by this time, China had learned several lessons from the mistakes of the first outbreak and was able to contain it.

The WHO outlines several important considerations that medical institutions must take in order to be prepared for, and respond to, an epidemic infection outbreak. These recommendations stem from recommendations at local levels, to global implications and strategies to prevent significant spread and mixing events. For the modern era, a majority of

¹⁰⁰ (Brilliant, 2006)

¹⁰¹ (CSIS Freeman Chair in China Studies, 2009)

¹⁰² Ibid.

¹⁰³ Ibid.

these ideas have been gathered from strategies used in the latest SARS and Avian influenza outbreaks. In general, strategies break down into two components. Preventing the spread of the initial disease through local protocols and large scale measures that affect global interaction and attempt to isolate affected areas of the globe. In theory, successful implementation of the first level of control should make the need for the second level irrelevant. However, this is dependent on the local clinics capacity to manage epidemic outbreaks.

The WHO detailed a strategy for combatting the SARS virus in 2003 at the local level that included: Identification of the agent that causes SARS, creation of a diagnostic test, development and assessment of treatment and isolation protocols, estimation of the key epidemic parameters that affect the spread of the disease, and the formulation and implementation of appropriate public health protocols to prevent the spread of the disease.¹⁰⁴ These goals are all aimed at preventing the initial spread of this disease. It is clear that the goals of the WHO are aimed at keeping the infection localized, as well as developing easy diagnostic and treatment techniques. This is the easiest and most cost efficient way to control epidemic diseases. Rebmann also details a strategy used by the CDC and other organizations recommendations. In this report, the goals are similar and include: detail unique aspects of individual diseases, a protocol for occupational exposure, surveillance and triage protocols for potential infected patients, sufficient laboratory supplies and staff, rapid turnaround in lab diagnostics and 24-7 coverage for employee exposures.¹⁰⁵ This report studied US clinics and found that many lacked a significant amount of very important equipment, rooms, and procedures for dealing with outbreaks. After the H1N1 outbreak in the U.S, only 60% of all clinics felt they were prepared for future outbreaks. A large challenge those clinics faced was

¹⁰⁴ (Anderson, et al., 2004)

¹⁰⁵ (Rebmann, 2010)

the lack of isolation of potential patients due to the wait in lab diagnostics or false-negatives in diagnostic tests. Many health professionals do not initiate isolation procedures without positive confirmation of infection due to the cost and difficulty of interacting with isolated patients.¹⁰⁶

These clinics were located in the United States, which for the most part, has very well equipped medical institutions. These same recommendations however must be used in China in order to prevent epidemic outbreaks.

CHINA'S CAPACITY TO MANAGE INFECTIOUS DISEASES

Other issues persisted in these clinics, such as a lack of respirators and anti-viral medication, as well as the need for education materials for patients. These issues, as well as the ones detailed above, are extremely relevant in China. In local clinics, access to antiviral medication, diagnostic tests, and respirators are severely limited. Even in the Shaxi health clinic, every patient suspected of having an epidemic level disease must be sent to the county CDC for diagnosis and treatment.¹⁰⁷ Despite the lack of local treatment, at least in Shaxi, the education and understanding of isolation procedures was well developed.

Dr. Yang, whose official title is Doctor of epidemiological control, is in charge of monitoring and updating procedures and equipment for the threat of epidemics.¹⁰⁸ Despite Yunnan province never having a case of one of the major epidemics of the past 20 years,¹⁰⁹ the clinic is remarkably prepared for isolation of a patient and transport to Jianchuan. Every doctor

¹⁰⁶ Ibid.

¹⁰⁷ (Dr. Yang, 2013)

¹⁰⁸ Ibid.

¹⁰⁹ (Dr. Zhao, 2013)

in the clinic carries a mask and uses them often. This may be one advantage over the west; the uses of face masks in China is extremely prevalent. Along with the face masks, there is a supply closet that contains isolation materials as well as one respirator, a key component for the interaction with isolated patients.¹¹⁰ One protocol stressed was the implementation of isolation procedures upon a suspected case of infectious disease. The clinic does not have the capacity for the testing of serious diseases, although they do have a control laboratory and cold storage room for samples. Therefore, a patient can remain in isolation while samples are transported for confirmation at the Yunnan CDC.¹¹¹ It appears that this emphasis on infected before proven healthy is a result of the lack of capabilities at these clinics, whereas the U.S. health centers rely on their own laboratories for quick confirmation, often after exposing several hospital and other patients. In my study of the clinic, no admitted patients were suspected of a highly infectious disease, although among the major diseases in Shaxi valley, TB was the most prevalent requiring notification of the CDC.¹¹²

Several other issues with local control of infectious diseases persist. A large problem is the coordination and consistency in health center protocol. The Shaxi clinic is a well-funded and organized clinic, but other rural clinics will not necessarily have the same quality of staff and supplies in order to implement protocols. Other counties and provinces may have other protocols that make the reporting and containing of epidemics challenging. According the CSIS Freeman chair, interagency cooperation at local levels remains difficult in China.¹¹³ This is a problem for controlling a problem like infectious diseases. Other problems with infectious disease protocols is the diversity of languages among the ethnic minorities in the rural areas of Yunnan and other provinces of China. A large part of preventing the spread of infectious disease

¹¹⁰ (Dr. Yang, 2013)

¹¹¹ (Dr. Yang, 2013)

¹¹² (Dr. Zhao, 2013)

¹¹³ (CSIS Freeman Chair in China Studies, 2009)

is education of the populace in what to watch out for and why it is important to go to the hospital. This is crucial when understanding the incubation period of diseases, which is a period where the patient may not show symptoms for up to three days, but will still be highly infectious. Among many of the older generation, the age group which is often most susceptible to infectious disease, Mandarin is not a first and often not a very prevalent language. In Shaxi, the local elders spoke Baizuhua, and often very little mandarin. It is difficult for a central government to publish universal education materials in all of the languages represented by the 55 nationality groups.

These issues are all irrelevant if patients do not even report to health clinics. The two core issues causing this problem are significantly related. They are the cost and inherent mistrust of the medical system. The mistrust of doctors generally extends from the cost associated with visits.¹¹⁴ As shown earlier, a trip to a large hospital will only cover %50-%60 of health care costs for a rural resident with a minor problem.¹¹⁵ As explained in relation to incubation periods, the disease will often present as a minor cold, which has a low priority and low level of coverage in hospitals. With most residents saving around 300 RMB in medical savings accounts,¹¹⁶ most residents cannot afford a trip to Jianchuan, Dali or the Yunnan CDC if they have a serious infectious disease. The Chinese government realized the inherent incentives of the populace to hide infectious diseases in the SARS outbreak, and implemented an AIDS response plan that brought significant subsidies for expensive AIDS treatment.¹¹⁷ This system took 15 years of denial of AIDS from the Chinese government, before proactive steps were taken. AIDS does not have the same pathology as these novel flu and coronaviruses. New viruses can become epidemics in the span of months, and denial of these problems can lead to global issues.

¹¹⁴ (Wang Y. , 2013)

¹¹⁵ (Dr. Yang, 2013)

¹¹⁶ (Dr. Zhao, 2013), (Wang Y. , 2013)

¹¹⁷ (Qichao, 2009)

Emerging epidemics are dangerous because they are so new, and the world population does not have immunities to them.

Immunity to diseases is important to prevent global outbreaks. New Type A influenzas have mutated significantly enough from generation to generation that there generally is a significant lack of inherent immunity in populations. Even if there is a sizable population with immunity, epidemics can still be global pandemics. Diamond explains this phenomenon in the reemergence of measles in the Faeros islands every several hundred years or so when a new travel would visit the local population, each time inadvertently causing a serious epidemic.¹¹⁸ The reason that measles was a novel infection each time the disease was introduced is that infections are unable to sustain themselves in small populations. It is estimated that in populations isolated to under half a million people, measles will die out.¹¹⁹ The problem with this theory today, is that globalization has nearly eliminated the idea of isolated populations. With the increases in ease of communication, trade and travel, the societies of the world are inextricably linked, and epidemic diseases ignore national borders.

¹¹⁸ (Diamond, 1997)

¹¹⁹ Ibid.

CONCLUSIONS

The Chinese healthcare system has come a long way since dynasties ruled this part of the world. The health care system has primarily mirrored the changes in political climate from the cooperative medical systems influenced by the great leap forward, to the combination of traditional and western medicine during the opening of Chinese economy. These changes have led to a modern system which has done the job it set out to do; cover the most amount of people, as efficiently as possible. While this goal has been accomplished, and only a small percentage of Chinese people remain without coverage, the problems with the system are problems that lead to global issues. Epidemic infections are becoming the biggest public health issue of the 21st century. Look at the past decade in news of healthcare; SARS in 2003, Bird flu in 2007, H1N1 in 2009, and H7N9 currently. These possible pandemics dominant the focus of international health. While a lot of this may be media hype, there is no denying the possibility and threat of global pandemics. These pitfalls in healthcare have been studied in hospitals in the developed west, as well as developing nations. However, in China, these problems are of greater importance. Due to the particularities of South Eastern China, the “early detection, early response” of infectious disease has a greater importance.

With a mistrust of the medical system, China has a problem with encouraging sick people to seek treatment. As many as 48.9% of sick people who should seek treatment to not attend a clinic.¹²⁰ This isn't only people with minor diseases. It is estimated that 30% of patients with TB do not seek regular treatment for their disease.¹²¹ This lack of attendance stems from the cost and inefficiencies of the health care system, as well as the mistrust of doctors and fear of reporting an infectious disease outbreak. This makes the detection of these diseases

¹²⁰ (Qichao, 2009)

¹²¹ (CSIS Freeman Chair in China Studies, 2009)

extremely difficult, until they are prevalent enough that the government must intervene to enact costly measures. The major linkage between healthcare and infectious diseases is monitoring capability. Health institutions cannot stop diseases they do not know about. This is especially crucial when such a large percentage of sick people do not seek treatment for minor conditions, because minor medical conditions are not covered to the same extent as serious diseases by the healthcare system. Because influenza has an incubation period, this disease will manifest first as a cold, thus allowing an infected person to spread the disease. If the patient believes they only have a simple cold, treatment would be extravagant. With the advent of greater levels of globalization, the control of epidemics has become a global public good.

The first step that governments initiate is the control of the spread by limiting travel and restricting access to the country. While effective in preventing the spread of disease, it is also very costly, as international business now dominates international travel. Tourism, business and trade suffer during periods of epidemics. Significant monetary loss is a general outcome of severe health problems, and with the costs of treatment as well as the cost of control, epidemics are some of the most costly health problems that nations can face. Because microbes do not respect international borders, every nation is affected by the spread of disease. This makes controlling the diseases a global public good.¹²² Fidler discusses this concept and describes the free rider problem which can cause a lack of cooperation among nations to control disease. Because every nation benefits from the control of these diseases, it is often difficult to incentivize the prevention of these diseases. Despite how much monetary or medical support a nation gives to fix this problem, they will undoubtedly see the benefit through increases in monetary incentives like trade or business, and the domestic help in the decrease of need for vaccination or large scale treatment. This is the reason organizations like the WHO struggle to

¹²² (Fidler, 1997)

receive donations, despite the high cost of preventing these diseases. It is also difficult to convince these nations of the cost benefit analysis of preventing the spread of disease before the outbreak and the cost of treating an epidemic. This is a global problem and requires global cooperation to facilitate a proactive response to prevent the next pandemic.

The problems in the Chinese healthcare system are derived from the larger social issues facing China. Income inequality, mistrust of institutionalized medicine and the problem of a dichotomous medical system contribute the difficulty China faces in controlling epidemics. Since the SARS outbreak in 2003, the government response has fixed many problems of large scale response. Even in the relatively small H7N9 outbreak, the culling of livestock caused an estimated 6 billion in damages, as well as uncounted damage from the thousands of swine that were killed as a result of the flu. To save costs, as well as human lives, the healthcare system must adapt to the problems facing primary care in rural areas. Fixing these issues can prevent the next global pandemic from even leaving the local village.

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RECOMMENDATIONS FOR FURTHER STUDY

This paper covers the current state of Chinese healthcare, and its problems that could affect the spread of infectious disease. It is important to continue to study this theory, as recommendations for the implementation and reform of health care protocols is crucial to the prevention of more epidemics from this region. Specific aspects I believe should continue to be explored include but are not limited to:

- 1) Comprehensive study of rural clinics across rural China and their capacity to manage infectious disease. The most important region for this would be in the South East China region. I was able to study the Shaxi clinic, which has helped informed the study of other areas, but
- 2) A study of the public education and public health campaigns in rural China. It is important to understand how much rural people understand about the risks of diseases and if there are any ways to improve awareness and encourage attending health clinics.
- 3) A cost benefit study of the implementation of subsidizing trips to health clinics under the belief of infectious disease exposure. Due to the high cost of controlling larger infectious, I believe that this will yield preferable to governments in terms of cost as well as saving human life.

This subject is crucial to global health and further study in the above areas and others involving public health and infectious disease are strongly recommended.