China's Changing Disease Pattern and Epidemiologic Transition

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Epidemiologic transition constitutes the underlying factor of demographic transition, as the cause structure of death is closely associated with the levels of mortality and average life expectancy. During this process the proportion of deaths from acute infectious diseases decreases along with a decline of mortality rates, whereas the proportion of deaths from chronic degenerative diseases increases. In the transition from high to low mortality different causes of death have made varying contributions to declines in mortality. Research has shown that in the developing countries roughly 80 per cent of the total drop in the crude death rate is attributable to declining mortality from acute infectious diseases, led by respiratory diseases and in descending order of importance followed by tuberculosis (TB), other acute infectious diseases, and diarrheal diseases.[1] While deaths from infectious and parasitic diseases prevail among the young population, degenerative disorders mainly afflict the middle- and older-age groups. Thus changes in the disease pattern have been accompanied by mortality reductions primarily among infants, children and young adults.

This article examines China's changing disease pattern from the founding of the People's Republic of China (PRC) in 1949 up to the present. In the 1970s, chronic degenerative diseases are shown to have replaced acute infectious diseases as the major causes of morbidity and mortality. The country's epidemiologic transition began in the very large cities, where it is currently approaching the disease pattern obtaining in the developed world. Even though the cause structure of death is now basically the same for both urban and rural areas, about twice as many people die from acute infectious diseases in the countryside. Present-day China is found to be plagued with lingering problems and comebacks of certain acute infectious diseases.

Leading Causes of Death: Acute Infectious Diseases

In old China, malnutrition often transformed relatively mild diseases into fatal events. Diseases of the respiratory system, infectious diseases, TB, and diseases of the digestive tract, in that order, were the main causes of death prior to China's epidemiologic transition more than three decades ago. The data for thirteen selected cities and areas including Beijing in Table 1 reveal that in 1957 these top four killers accounted for some 40 per cent of all deaths. The fact that the ten major causes of death add up to only about two-thirds of total deaths, leaving a substantial portion of ill-defined or unknown causes, displays a shortcoming typical of cause-specific mortality statistics in developing countries. Moreover, the figures for these few selected cities appear to be representative of the urban districts of major municipalities rather than China's urban area as a whole.[2] However, these are the only useful data available for the immediate post-1949 period. A sample survey for the rural areas does not even exist. It is

only since 1973 that special statisticians have been assigned in selected cities and counties to work full-time on ascertaining causes of death. This routine reporting has gradually expanded to cover an increasing number of surveillance points.[3]

Data from China's first national cancer mortality survey
reveal that during the 1973-75 period diseases of the respiratory system, acute infectious diseases, TB and diseases of the digestive tract combined contributed 38.9 per cent to all causes of death compared with the share of the chronic degenerative diseases of 35.8 per cent.[4] At that stage, the nation's cause structure of death still bore a strong similarity to that of the developing world, although the turning point had almost been reached. In fact, for some time prior to the 1973-75 period, chronic degenerative diseases had already been the major causes of morbidity and mortality in urban China. In the years between 1974 and 1978 they also became the principal health problems in most of the rural areas.[5]

New Leading Causes of Death: Chronic Degenerative Diseases

China's successful battle against acute infectious diseases has resulted in the emergence of new leading causes of morbidity and mortality, with chronic degenerative disorders becoming major concerns. Table 1 shows that by 1982, based on a sample survey of twenty selected cities and areas including Beijing, the once leading killers had become minor causes of death, contributing as little as 15.1 per cent to all deaths. Acute infectious diseases, the number two killer immediately after 1949, had been eliminated from the top ten list. In Beijing it fell from first place in 1951 to tenth place in 1983.[6] By contrast, the proportion of deaths from cardiovascular diseases (heart diseases), cerebrovascular diseases (strokes) and malignant neoplasms (cancer) increased from less than 20 per cent to more than 60 per cent between 1957 and 1982. In the city proper of Beijing, for example, 71.3 per cent of the total deaths in 1979 were caused by these three principal degenerative diseases.[7] In other words, mortality from modern diseases has been substituted for mortality from pandemics of infection.

The 1982 urban data are likely to be more reliable than those of 1957 for two reasons. Firstly, they stem from twenty selected surveillance points compared with thirteen in 1957, and secondly, the proportion of ill-defined or unknown causes of death has been reduced to a small percentage generally observed even in cause-specific mortality statistics in developed countries. Selective as it may be, the empirical evidence available for China illustrates the dramatic changes that have taken place in the relative ranking of causes of death which is due in part to an absolute decline in the mortality rate from the former four major killers, and in part to an increase in the mortality rate from degenerative diseases. This transformation is referred to as epidemiologic transition.

As shown in Table 2, the cause structure of death is now basically the same for both urban and rural China except that in the latter infectious diseases still occupy ninth place on the list of the ten top killers. It should, however, be noted that the rural statistics must be viewed with caution. They clearly are not typical of China's countryside, because they stem from forty-nine selected counties and communes in Shanghai and various provinces including Jiangsu, thus overrepre-

senting relatively well-off areas. There is likely to be little information of this nature in the remote border regions of the economically less developed Southwest and Northwest of the country. These areas, accounting for perhaps up to one-fifth of the nation's total population, are presumably only just beginning their epidemiologic transition. This uneven transformation across a vast territory is the reason why data on cause-specific mortality have not yet been aggregated at the national level.

As shown in Table 1 for urban China, the greatest contribution to declines in mortality has come from infectious diseases, in particular TB, followed by respiratory disorders. In 1957, out of every hundred deaths, there were fifteen people who died from infectious diseases including TB, but excluding respiratory and digestive diseases. By 1982, infectious diseases had been reduced to levels near zero in the cities, where they were not even listed any longer as a major killer. However, in the countryside they continued to be responsible for two to three deaths out of every hundred. People dying from TB accounted for 2.0 and 4.2 per cent of all deaths in urban and rural China respectively.

China's Cause Structure of Death in Global Perspective

China's epidemiologic transition began in the very large cities, first and foremost in Shanghai, Beijing and Tianjin. It is in these places that the process is currently approaching the stage obtaining in the developed world. Judging from the scanty empirical evidence, urban China appears to have entered the final phase of its epidemiologic transition. In fact, the present mortality pattern in highly industrialised countries, such as Japan, is remarkably similar. There, heart diseases, strokes and cancers accounted for 65.4 per cent of all deaths in 1982, compared with 63.9 per cent in selected cities in China. By contrast, 15.1 per cent and 23.9 per cent of total deaths were attributable to the former major killers of infectious diseases, respiratory diseases, TB and digestive diseases in Japan and China respectively.[8]

As more than 80 per cent of China's population lives in the countryside, statistics on rural rather than urban areas have been chosen in Table 3 to view the PRC's epidemiologic transition in global perspective. A comparison with Sri Lanka, Japan and the United States shows that, while China's current cause of death structure fits in between that of the undeveloped and developed countries, it clearly bears the characteristics of the latter rather than the former. Although TB continues to contribute an exceptionally high share to total deaths and the proportion of respiratory diseases in all deaths continues to be relatively high, the fact remains that also in rural China mortality from chronic degenerative diseases has been substituted for mortality from acute infectious diseases.

Disease Problems of the Past and some Comebacks

In the 1950s, the Chinese government launched nationwide campaigns aimed at the control of selective communicable diseases, one of the first being venereal diseases (VD). They used to be most serious in the minority nationality areas,

where they continuously decimated the population. Great success was soon achieved by giving those ethnic people free medical care. There was also a high prevalence of syphilis and gonorrhea among the prostitutes in the cities. The ban on prostitution proved to be an effective measure taken in the antivenereal campaign.

But more than 20 years after its 1964 claim to have virtually stamped out VD, China has had to renew its efforts to combat these sometimes fatal diseases. The main reasons for the re-emergence of VD are claimed to be in part the influx of tourists having brought the virus into China, and in part the occurrence of promiscuous behaviour in the country.[9] Most sufferers are said to be under the age of twenty,[10] and more than 70 per cent of the patients are male, according to a survey by the National Research and Consultancy Committee for Prevention and Treatment of VD.[11] Deng Xiaoping is reported as equating these problems with flies that enter a room when a window is opened by arguing that "you can put up with the flies, but you cannot do without fresh air."[12] However, since it has not made investigatory and medical studies of VD for about 20 years,[13] China is ill-prepared to cope with these particular re-emerging health problems.

A number of deadly infectious diseases were almost completely eliminated by the end-1950s. In early 1983 China claimed to have effectively prevented and controlled plague since 1955.[14] In fact, there were no plague deaths in 1984, but three years later the disease killed two people and affected another five in inland China.[15] Even places where plague has not existed for 20 to 30 years, such as Heilongjiang Province, are seeing a comeback of this endemic disease.[16]

Smallpox, which probably had an incidence of 200 per 100,000 population before 1949, was eradicated in 1960, with the last cases cured in Xizang Autonomous Region (Tibet) and Yunnan Province[17] - long before it was eliminated from the world in 1977. Cholera has been basically wiped out, with only two cases of mortality reported in 1979.[18] Relapsing fever and typhus are still occasionally found in some places.[19] There were one and two deaths from typhus in 1980 and 1981 respectively, as shown in Table 4.

In old China, TB was the greatest single cause of death among adults, especially in densely populated cities, with a mortality rate exceeding 200 per 100,000 population. This may explain why, although an infectious disease of the respiratory system, it has invariably been listed as a separate primary cause of death. The prevalence of TB had earned China the nickname "sick man of the East." Following the establishment of the PRC, a nationwide control network of anti-TB organisations was set up to combat the disease. Measures have included regular mass chest examinations, BCG vaccinations and treatment programs. As a result, TB mortality declined during the three decades after 1949 by 80-90 per cent in the cities and about 50 per cent in the countryside.[20]

The biggest progress in TB prevention and cure has been registered in Shanghai, Beijing and Tianjin. In urban Beijing, TB deaths as a proportion of total deaths dropped from 16.3 per cent in 1949 to 1.7 per cent in 1981[21] which indicates a disproportionately high contribution of this particular cause of death to mortality decline. During the 1949-79 period, mortality from TB in the entire municipality fell from 230 per 100,000 population to 10 per 100,000.[22]

However, since more than 80 per cent of the Chinese population lives in the countryside, urban statistics are misleading. A national sample survey of TB infection carried out in 1979 revealed that this disease is still a major health

concern in modern China. A morbidity rate of 717 cases per 100,000 population by far exceeded that of any other infectious disease. While Shanghai, Tianjin and Beijing had substantially lower levels, in Xinjiang Autonomous Region, Tibet, Heilongjiang and Ningxia Autonomous Region they were markedly higher.[23] By implication, at that time China still had about 7 million TB patients. The disease has become a national priority, and a second survey was completed in 1985. While the number of reported TB cases was down to 5.7 million, the mortality rate had risen to 34 per 100,000 population,[24] compared with 28.3 in selected counties in 1982.[25] But according to Cui Yueli, then Minister of Public Health, TB could be brought under control by 1995 if medical facilities were built and upgraded in the minority areas.[26]

The reduction in TB mortality has brought about two interesting changes in the mortality pattern of the disease. Firstly, there are now substantially more deaths from TB among the peasants than among the city dwellers. As Table 2 shows, in 1982 TB was the 7th and 8th leading killer in rural and urban China respectively. Secondly, the highest TB mortality is now in the older age groups. In Beijing, for example, the average age of death from the disease rose from 28.5 years to 66.8 years during the 1949-79 period.[27] In a similar vein, in Shanghai County most deaths from TB now occur above age 50, accounting for more than 80 per cent of the total mortality from the disease.[28]

China's National Program for Agricultural Development 1956-1967 included the elimination of the five most menacing parasitic diseases leishmaniasis (kala-azar), malaria, schistosomiasis (snail fever), filariasis and ancyclostomiasis (hookworm).[29] However, unlike in the case of the other most serious infectious diseases, their downward trend was gradual.

The bulk of kala-azar victims used to be children less than 10 years of age,[30] with a fatality rate among the 1-10 age group of 50 per cent in 1950.[31] As shown in Tables 4 and 5, the disease has been basically wiped out in China, while according to a report released recently by the World Health Organisation the number of patients suffering from kala-azar has risen in most countries where the disease is endemic.[32]

In 1950, when the antimalaria campaign was launched, about 30 million people are estimated to have been infected with malaria which was endemic in 70 per cent of China's territory.[33] The disease was at its worst in 1960 and 1961, when about 40 million Chinese had it. By the early 1980s, the number of cases reported had dropped to just over 3 million, and in 1986 there were only 364,000 malaria patients. The total number of people suffering from the disease is estimated to have decreased by 30 per cent between 1986 and 1987 to the lowest level ever.[34] Most importantly, as shown in Table 4, mortality related to malaria has been reduced to a negligible level.

Snail fever, which used to affect 11 million people, is no longer such a great danger. By the mid-1980s, 10 million of its victims had been cured,[35] and of the 372 counties and cities which were infested by the fever about 124 had eliminated the disease and another 154 had fundamentally controlled it.[36] In other words, snail fever had been virtually stamped out in some 75 per cent of the troubled areas. However, according to a recent report, China has launched a new anti-snail fever campaign. The disease has made a comeback in South China as a

result of the country relaxing its efforts to combat it and the growth of water conservancy facilities.[37] Investigations across the country show that the epidemic area of snail fever is continuously expanding.[38]

In over 80 per cent of the originally affected counties and cities filariasis, spread by mosquitos, has been eliminated.[39] By 1990, China plans to bring under control nationwide endemic diseases including filariasis.[40].

Improved environmental sanitation has presumably wiped out hookworm, since it is no longer listed among China's major parasitic diseases.[41]

Finally, leprosy, although neither a main cause of death nor highly contagious, should be mentioned in view of its drain on the country's health system. Treatment includes the care for ulcers, reconstructive surgery of deformities and the making of protheses. China's nationwide leprosy preventive and treatment program was established in 1957.[42] Within three decades the number of patients suffering from the disease declined from 500,000 to about 70,000.[43] By 1980 the morbidity rate had dropped to 14 per 100,000 population. The tasks faced by the antileprosy campaign in the future consists in preventing a relapse of the disease and finding the very few undiscovered cases.[44] China aims to eliminate this scourge of mankind by 1997, the centenary of the first International Leprosy Meeting.[45]

Current Target Diseases: Childhood Diseases

Children are most vulnerable to infectious diseases and even when they have already developed an adequately functioning immune system, they are still predisposed to them. On first exposure to a virus, the child may or may not contract the disease. In either case, children develop a permanent immunity to any further exposure and progressively gather protection against viral infections as they grow older.

After the founding of the PRC, child health care has made significant progress as a priority program in health. China now boasts an impressive record on morbidity and mortality reductions of the six main childhood diseases - poliomyelitis, pertussis (whooping cough), diphtheria, measles, neonatal tetanus, and TB - which is reflected in the striking decline in child mortality levels. In Beijing, for example, the child death rate dropped from 124 per 1.000 births in the 1950s to 10 in 1985.[46]

Great strides have been made in disease prevention work in reducing morbidity by artificially inducing resistance to infections. Pediatricians and immunologists immediately set to work to produce vaccines and sera to prevent childhood diseases. A comprehensive immunisation program sets out strict stipulations for each age group. Every child has a health card which is kept by the health care department of the respective hospital. Immunisations have reduced the risk of dying at the age of maximum disposure to infectious diseases. But China has perhaps been equally successful in reducing the case fatalities of illnesses that did occur. Death from some of them is relatively easy to prevent by seeking early hospitalisation or proper medication. Dissemination of information on how to overcome highly fatal diseases has greatly contributed to the increased survival rates of sick children.

At a national planning immunisation meeting held in Hubei Province in September 1982 under the auspices of the Ministry of Public Health China adopted a 1982-90 national immunisation planning program.[47] Under this program the PRC is committed to immunise 85 per cent of children under one in every province by 1988 and 85 per cent in every county by 1990 in order to control and eradicate the six main childhood diseases which are vaccine-preventable.[48] In fact, they represent the target diseases of the World Health Organisation Expanded Program on Immunisation (EPI).[49] Shanghai, Beijing as well as the provinces of Jiangsu, Jilin and Zhejiang have achieved the goal a year ahead of schedule, while in the remote minority areas and old revolutionary bases EPI still lags behind.[50]

Morbidity of TB among children, the second highest next to measles, has dropped steadily. In Shanghai, for instance, it fell from 120 per 100,000 population in 1957 to 50 in 1965 and to 20 in 1972.[51] In Beijing, TB mortality among the 0-4 age group decreased from 271 per 100,000 in 1949 to zero in the 1970s, with the increase in the percentage of the newborn given BCG vaccinations.[52] In 1985, there had not been a single child under the age of fifteen to suffer from TB or a single child under the age of fourteen to die from the disease in the municipalities of Shanghai, Beijing and Tianjin for five years in succession.[53]

Before 1949, neonatal tetanus constituted a major cause of infant mortality in China. Due to maternal vaccination during pregnancy and improved methods of childbirth this fatal disease has become a rarity. According to data from the health departments in Shanghai's Luwan urban district, out of every hundred deaths among newborn babies in 1952 there were nine who died of tetanus. But by 1978, the disease had entirely disappeared from the list of major killers. Statistics for numerous cities and provinces are claimed to be similar.[54] Especially in the rural areas, where barefoot doctors have become responsible for modern methods of delivery, the incidence of neonatal tetanus has been decidedly lowered.[55]

As in the remainder of the developing countries, measles used to be the most important cause of childhood morbidity and mortality in China. Mass vaccination began in 1969, when the incidence was about 3,000 per 100,000 population.[56] In Shanghai, the number of infections dropped to 2.1 per 100,000 in 1983,[57] whereas at the national level it has remained constant at 200-300 cases per 100,000[58] in spite of the regular immunisation of children. However, due to a marked decline in the fatality rate from 6.5 per cent in 1950[59] to a small fraction of one per cent in 1980-81[60] it has ceased to constitute a major cause of childhood mortality.

Poliomyelitis is the major cause of lameness in many developing countries, with a fatality rate as high as 10 per cent.[61] In 1978, about 50 per cent of the infections occurred in the provinces of Jiangxi, Fujian and Zhejiang. Shanghai reported twelve and twenty-seven cases in 1978 and 1979 respectively.[62] The disease has been gradually brought under control, with a morbidity of 0.16 per 100,000 population reported for 1984.[63]

Among vaccine-preventable diseases, whooping cough ranks second only to measles as a cause of serious childhood illness in developing countries.[64] As shown in Tables 4 and 5, although morbidity of whooping cough has been reduced far below that of measles in China, there are now more deaths from the former than from the latter due to its higher fatality rate.

By 1984, diphtheria infection in China had fallen to 0.33 per 100,000 population.[65] In 1982, Shanghai reported that it had not experienced a single case of morbidity since 1978.[66] In a similar vein, in 1983 Tianjin claimed to have had no cases of the disease since 1977.[67] But due to a fairly high fatality rate of nearly 10 per cent diphtheria continues to be a major public health concern.

Lingering Problems of Infectious Diseases

Despite the shift in the cause structure of death from acute infectious to chronic degenerative diseases certain infectious diseases remain national health problems, affecting more than 15 million people.[68] Even though deaths from respiratory diseases have declined drastically, Table 2 shows that they were still a major health concern in the early 1980s with some ten deaths out of every hundred. In spite of China's efforts at pollution control the problem of air-pollution-related respiratory illnesses appears to be growing.[69]

Intestinal disorders, in particular dysentery and viral hepatitis, have been lagging behind the general downward trend of morbidity. The total number of reported cases increased during the 1974-81 period, and it was only due to a decline in the fatality rates that the death toll dropped.[70] As shown in Tables 4 and 5, in 1981 dysentery was the most frequently reported communicable disease with the highest number of deaths. But with improvements in drinking water sanitation and better management of human excreta further reductions in the morbidity of infectious enteric diseases are likely to be achieved. In fact, in the two years following the first national health and epidemic conference in 1983 the number of patients suffering from dysentery, viral hepatitis and typhoid are said to have dropped significantly.[71]

However, starting in 1986 various places, including Xinjiang, Tianjin and Shanghai, have been reporting the spread of viral hepatitis to epidemic proportions.[72] Especially since the beginning of 1988 epidemic diseases of the digestive system, generally closely connected with food sanitation, have apparently become serious both in the countryside and in the cities.[73] This goes to show that fecal-born diseases are a lingering health problem in China

The Emergence of Chronic Degenerative Diseases

For most of the past, the emphasis of China's public health program has been on the control of acute infectious and parasitic diseases and on improved prenatal and postnatal care of mothers and infants. But as the result of the changing pattern of the cause structure of death the focus has been gradually shifting to the treatment of the chronic degenerative diseases of older age, especially heart diseases, strokes and cancer. As shown in Table 2, heart diseases have become the leading killer in rural China, while more people die from strokes in the urban areas. Interestingly enough, as shown in Table 3, mortality rates of stroke in China are higher than those in the United States of America but close to those in Japan. Cancer is now the third leading cause of death in both the countryside and the cities. The increase of those man-made diseases has been attributed largely to the improvement of living standards and improper diet habit, the worsening of industrial pollution and the growing tension of modern life in China.

Heart diseases and stroke: The four major categories of heart disease in the PRC are hypertension, coronary heart disease, rheumatic heart disease and pulmonary heart disease. Great attention has been paid to hypertension because of its positive relationship with the incidence of strokes and heart conditions. China has 30 million people suffering from the disorder.[74] The incidence of hypertension varies considerably across the country, generally being much higher in the North and Northeast than in the South which is attributed to the saltier northern diet and the heavier physique of the northern worker.[75] According to data collected from a nationwide hypertension screening conducted in 1979-80, the highest morbidity was in Tibet and Beijing, and the lowest in the provinces of Qinghai and Guizhou.[76] In Tibet, the high incidence is apparently due to an excessive salt intake.[77] Urban populations tend to have a higher rate rising markedly in the 35-45 age group, while this rise is delayed for ten years among the rural population.[78] In 1959, the total hypertension rate was 5.11 per cent, compared with 7.73 per cent in 1979-80,[79] implying a 50 per cent increase during the 20-year period. Hypertension is now the first or second most frequent reason for medical consultations or sick leaves.[80]

A national survey has yet to be carried out to determine the relative proportions of China's four major categories of heart disease. Microlevel investigations suggest that developments tend towards the pattern obtaining in industrialised countries, where coronary heart disease is the leading cause of death, while rheumatic heart disease has become less common.[81] In China's major cities, namely Beijing, Shanghai and Tianjin, coronary heart disease is clearly on the increase, although morbidity and mortality rates are still comparatively low.[82] According to statistics from fifteen cities, Tianjin has the highest death rates among patients with coronary heart disease.[83] In Shanghai, the leading position of rheumatic heart disease was substituted by coronary heart disease a few years ago.[84]

Cancer: The results of a nationwide study on the distribution and mortality of fourteen kinds of cancer among China's population over the 1973-75 period, released by the Institute of Oncology under the Chinese Academy of Medical Sciences, revealed cancer as the second leading cause of death for males and the third for females.[85] As shown in Table 6, the total cancer mortality rate for women was only 54.27 per 100,000 population, compared with 80.17 for men. In each of the sites, mortality is greater in men than women, but the latter also suffer from cervix and breast cancer. In the early 1980s, seventeen provinces, autonomous regions and municipalities including Shanghai, Nanjing, Guangzhou, Dalian and Hangzhou reported cancer even as the prime killer.[86]

The national survey revealed higher overall cancer mortality rates in cities than in rural areas, and the bigger the city, the higher the percentage of people dying from the disease. Urban China has markedly higher death rates than rural China for lung cancer, led by Shanghai, Beijing, Tianjin and the three economically highly developed provinces of Northeast China[87] which indicates a correlation between mortality from lung cancer and industrialisation. The geographic distribution of cancer in China's population has distinct epidemiological characteristics. Each type tends to have its own distribution pattern, with some commonly occurring throughout the country and others displaying substantial regional variations.

The high risk areas for stomach cancer, the leading killer for both males and females, are the northwestern and coastal regions. Esophageal cancer, second and third in mortality for males and females respectively, has a high prevalence in the area at the convergence of Henan, Hebei and Shanxi Provinces in North China. Liver cancer, the third and fourth leading causes of death for males and females respectively, is concentrated along the southeast coast, especially in Shanghai.[88] Carcinoma of the nasopharynx occurs mainly in the south of Guangdong Province, with mortality decreasing northwards.[89] These four regional types are believed to be environmentally influenced and directly related to local eating habits[90] and therefore potentially controllable.

After the 1974 International Cancer Congress, China established a system of site-specifity whereby a city specialises in the type of malignant tumour which has a very high incidence in the area.[91] As cancer is believed to have a multiplicity of causes which cannot be easily identified, Chinese doctors concentrate on early detection rather than prevention.[92] However, even in Shanghai, where facilities for cancer control are among the best, the rate of early diagnosis remains low.[93] The Chinese admit that their country is poorly equipped for the early detection as well as the treatment of many cancers. Since China's cancer research still centers around the major cities, only a small number of cancer patients receive proper treatment. For a country the size of China, twenty-one tumour hospitals in the mid-1980s was far from enough.[94]

The past ten years have seen little change in the death rates from stomach, esophagus and liver cancer, but there have been increases in cancer of the lung, intestines and breast.[95] The incidence of lung cancer appears to be rising throughout the country. In Beijing it has become the number one cancer killer, while in Shanghai it ranks second.[96] In Guangzhou, which has the highest lung cancer mortality rate in China, the growing number of deaths from the disease has been attributed to smoking and pollution from increasing coalburning.[97]

The overall cause-specific mortality from cancer has gone up substantially since China's first national cancer survey was conducted in 1973-75. The PRC was thought to have 900,000 deaths from the disease annually in 1987, compared to 700,000 in the mid-1970s.[98]

Finally, in 1985 China added acquired immune deficiency syndrom (AIDS) to the list of communicable diseases.[99] Two years later, the three AIDS cases found in China were two foreign tourists and an overseas Chinese, and in Zhejiang, four Chinese were infected through imported contaminated blood.[100] If the following words of a Chinese medical professor are any guide, at that stage China still appears to have been optimistic about AIDS: "We are very traditional, thus have little chance of being infected."[101] However, more recent data paint a less rosy picture. Towards the end of 1989, thirty-two AIDS patients and virus carriers had been detected in China, six of whom were Chinese.[102]

A sudden increase in the disease was revealed shortly afterwards by an AIDS serum inspection conducted among drug addicts in the border areas of Yunnan Province, where 146 people were infected. This was the first time for China to trace AIDS cases in remote areas. Early this year, the Ministry of Public Health announced that a total of 191 Chinese in ten municipalities, provinces and autonomous regions were infected by the AIDS virus. Medical experts in the PRC are now concerned that the deadly disease may spread fast if not dealt with promptly and effectively.[103]

Prospects for the Future

While the most menacing of the infectious diseases in China have been eradicated or brought under control, some remain national health problems. Young people, more than any other age group, continue to be severely threatened by viral infections. A large proportion of the deaths among infants and children is still due to disorders of the respiratory tract and infectious diseases. Out of every hundred deaths in 1982 in China there were as many as twenty-four people who died from respiratory diseases, digestive diseases, pulmonary TB and infectious diseases, in that order, compared with fifteen in Japan and eleven in the United States.[104] However, with China's epidemiologic transition not yet fully completed, further reductions in mortality from the former major killers are likely to occur.

As the country is nearing the completion of its epidemiologic transition, the disease profile has moved away from acute infectious diseases towards chronic degenerative diseases. This change in the disease pattern is admitted to have created a problem, namely, how to use out-of-date medical instruments to treat modern diseases.[105] On the other hand, the predominantly vegetarian diet of the Chinese people may minimise the long-term heart disease impact on the aging population.[106] Microlevel investigations in the PRC have demonstrated that effective control of hypertension markedly reduces the death rate from stroke and heart disease.[107] Moreover, if diagnosis and treatment of some major cancers have indeed approached or surpassed advanced world levels - as claimed in an official Chinese source - [108] cancer mortality in China may never reach the high levels obtaining in the developed countries.

Reductions in mortality from the chronic degenerative diseases will largely depend on the degree to which medical progress against the new leading killers can counterbalance the rise in the proportion of deaths associated with an aging population. China is set to develop traditional medicine and expects breakthroughs in the theory of Chinese medicine in treating modern diseases.[109]

Table 1: Cause-Specific Mortality in Selected Cities in 1957 and 1982

1957*

Rank Order	Cause of Death	No. of Deaths per 100,000	% of Total Deaths
1	Respiratory Diseases	120.3	16.86
2	Infectious Diseases	56.6	7.93
3	Pulmonary Tuberculosis	54.6	7.51
4	Digestive Diseases	52.1	7.31
5	Heart Diseases	47.2	6.61
6	Strokes	39.0	5.46
7	Malignant Tumours	36.9	5.17
8	Neurologic Diseases	29.1	4.08
9	External Injuries & Poison	19.0	2.66
10	Other Types of TB	14.1	1.98
	Total		65.57

1982**

Rank Order	Cause of Death	No. of Deaths per 100,000	% of Total Deaths
1	Strokes	124.44	22.26
2	Heart Diseases	117.70	21.05
3	Malignant Tumours	115.15	20.60
4	Respiratory Diseases	48.50	8.67
5	Digestive Diseases	24.44	4.37
6	External Injuries	18.14	3.25
7	Poison	11.57	2.07
8	Pulmonary Tuberculosis	11.34	2.03
9	Newborn Baby Diseases	514.41***	1.63
10	Urinary Diseases	9.03	1.61
	Total		87.54

Notes: * Data stem from 13 selected cities and areas including Beijing
** Data stem from 20 selected cities and areas including Beijing
*** Figure represents infant deaths per 10,000 births

Source: *Renkou yu Jingji* (Population and Economics), No. 3, 25 June 1984, pp.14-20, Joint Publications Research Service, No. 84075, *China Report, Political, Sociological and Military Affairs,* p.48, Table 5.

Table 2: Cause-Specific Mortality in Selected Cities and Counties in 1982

Selected Cities*

Rank Order	Cause of Death	No. of Deaths per 100,000	% of Total Deaths
1	Strokes	124.44	22.26
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	Total		87.54

Selected Counties**

Rank Order	Cause of Death	No. of Deaths per 100,000	% of Total Deaths
1	Heart Diseases	159.32	23.70
2	Strokes	103.52	15.40
3	Malignant Tumours	102.97	15.32
4	Respiratory Diseases	77.27	11.49
5	Digestive Diseases	38.25	5.69
6	Poison	28.48	4.24
7	Pulmonary Tuberculosis	28.30	4.21
8	External Injuries	19.96	2.97
9	Infectious Diseases	16.83	2.50
10	Newborn Baby Diseases	655.37***	1.65
	Total		87.17

Notes: * Data stem from 20 selected cities and areas including Beijing

** Data stem from 49 selected counties and communes in Shanghai and various provinces including Jiangsu

*** Figures represent infant deaths per 10,000 births

Source: *Renkou yu Jingji*(Population and Economics), No. 3, 25 June 1984, pp.14-20, Joint Publications Research Service, No. 84075, *China Report, Political, Sociological and Military Affairs,* p.48, Table 5.

Table 3: China's Cause-Specific Mortality in Global Perspective
(Number of deaths per 100.000)

Cause of Death	Sri Lanka[a] 1980	China[b] 1982	Japan[c] 1982	USA[d] 1982
Heart Diseases	96.9	159.3	124.4	351.9
Malignant Tumours	27.9	103.0	143.3	187.4
Strokes	12.2	103.5	124.3	68.1
Respiratory Diseases	47.1	77.3	50.6	55.1
Accidents	31.8	20.0	24.6	40.6
Digestive Diseases	14.4	38.3	31.4	31.4
Infectious Diseases	41.5	16.8	5.0	7.8
Pulmonary Tuberculosis	7.6	28.3	4.3	0.6
Other Conditions	347.8*	113.5**	91.9	110.0
All Causes	617.2	660.0**	599.8	852.9

Notes: * 'Senility and ill-defined conditions' account for a large proportion of 'other conditions'.

** The total number of deaths per 100,000 is not available. The figure of 660.0 has been derived from the crude death rate of 6.6 per 1,000 population in 1982 (*Beijing Review*, 14 November 1983, p. 23). 'Other conditions'were obtained by subtracting the listed causes of death from 'all causes'.

Sources: a.World Health Organisation, *World Health Statistics Annual,* Geneve, 1985, pp. 20813.

b.The figures were taken from Table 2 (representing rural China).

c.World Health Organisation, *World Health Statistics Annual,*Geneve, 1984, pp. 184-89.

d.World Health Organisation, *World Health Statistics Annual,*Geneve, 1985, pp. 160-65.

Table 4: Mortality from Selected Communicable Diseases in China in 1980 and 1981

Disease	1980 No. of Deaths	1980 Fatality Rate	1981 No. of Deaths	1981 Fatality Rate
Dysentery	4,231	0.1	4,385	0.1
Influenza	3,862	0.7	1,274	0.3
Viral Hepatitis	1,153	0.2	1,164	0.3
Diphtheria	914	9.4	838	9.9
Whooping Cough	356	0.1	478	0.2
Measles	556	0.02	363	0.02
Encephalitis	4,590	4.2	197	0.3
Poliomyelitis	172	2.3	192	4.1
Malaria	64	0.002	70	0.002
Typhus	1	0.1	2	0.2
Cholera	0	-	0	-
Kala-azar	0	-	0	-

Note: Tuberculosis data are not available for 1980 and 1981. However, based on an incidence of 717 per 100,000 population reported for 1979 (Dean T. Jamison, John R. Evans, Timothy King, Ian Porter, Nicholas Prescott and Andre Prost, *China, The Health Sector,* A World Bank Country Study, World Bank, Washington D.C., 1984, p. 140, Table B-16,) and a death rate in rural China of 28,3 per 100.000 population (see Table 2, rural China) in 1982, the fatality rate for tuberculosis would be about 4 per cent.

Source: Adapted from *China, The Health Sector,* p. 127, Table B-9. The data were provided to the October 1982 World Bank Rural Health and Medical Education mission by the Chinese Minister of Public Health.

Table 5: Morbidity of Selected Communicable Diseases in China in 1980 and 1981

Disease	1980 Reported Cases	1980 Incidence per 100,000	1981 Reported Cases	1981 Incidence per 100,000
Dysentery	2,874,255	293.4	3,454,741	348.5
Malaria	3,300,349	336.9	3,059,635	308.6
Measles	2,937,931	299.9	2,043,289	206.1
Influenza	570,037	58.2	485,934	49.0
Viral Hepatitis	474,601	48.4	431,016	43.5
Whooping Cough	316,206	32.3	269,871	27.2
Encephalitis	108,774	11.1	67,373	6.8
Diphtheria	9,767	1.0	8,481	0.9
Poliomyelitis	7,442	0.8	4,634	0.5
Typhus	704	0.07	856	0.09
Cholera	88	0.009	78	0.008
Kala-azar	38	0.004	56	0.006

Note: Tuberculosis data are not available for 1980 and 1981. However, based on an incidence of 717 per 100,000 population reported for 1979 (*China, The Health Sector,* p. 140, table B-16), tuberculosis would top the list.

Source: Adapted from *China, The Health Sector,* p. 127, Table B-9. The data were provided to the Oktober 1982 World Bank Rural Health and Medical Education mission by the Chinese Ministry of Public Health.

Table 6: Age-adjusted Mortality Rates and Relative Frequency of Malignant Neoplams, 1973-75

Males

Rank Order	Site	No. of Deaths per 100,000	Percentage of all Cancer Deaths
1	Stomach	20.93	26.11
2	Esophagus	19.68	24.55
3	Liver	14.52	18.11
4	Lung	6.82	8.51
5	Colon & Rectum	4.08	5.09
6	Leukemia	2.79	3.48
7	Nasopharynx	2.49	3.11
8	Brain	1.43	1.78
9	Lymphoma	1.35	1.68
10	Bladder	0.80	1.00
	Penis	0.39	0.49
	Other	4.89	6.10
	Total	80.17	100.01

Females

Rank Order	Site	No. of Deaths per 100,000	Percentage of all Cancer Deaths
1	Stomach	10.16	18.72
2	Cervix Uteri	9.98	18.39
3	Esophagus	9.85	18.15
4	Liver	5.61	10.34
5	Lung	3.20	5.90
6	Colon & Rectum	3.03	5.58
7	Breast	2.61	4.81
8	Leukemia	2.23	4.11
9	Nasopharynx	1.27	2.34
10	Brain	1.07	1.97
	Lymphoma	0.96	1.77
	Bladder	0.27	0.50
	Choriocarcinoma	0.23	0.42
	Other	3.80	7.00
	Total	54.27	100.00

Source: The Editorial Committee for the Atlas of Cancer Mortality in the PRC, *Atlas of Cancer Mortality in the PRC*, China Map Press, Shanghai, 1979, pp.19-20.

Footnotes

1) Samuel H. Preston, "Causes and Consequences of Mortality Decline in Less Developed Countries during the Twentieth Century," in Richard A.Easterlin (ed.), **Population and Economic Change in Developing Countries**, The University of Chicago Press, Chicago and London, 1980, p.300, Table 5.3.
2) In 1957, the crude death rate in urban China was 8.47 (Ling Ruizhu, "A Brief Account of 30 Years' Mortality in Chinese Population," **World Health Statistics**, Vol.34, No.2, 1981, p.131, Table 1). But all causes of death in Table 1 yield a crude death rate of only 7.15. In fact, the crude death rate in 1957 in the city districts of Beijing was 7.1 (**Chinese Medical Journal** (hereafter, **CMJ**), Vol.78, No.1, January 1959, p.27, Table 1).
3) Gu Xingyuan and Chen Mailing, "Vital Statistics," **American Journal of Public Health** (hereafter, **AJPH**), Vol.72, No.9, September 1982, Supplement, p.19; Dean T.Jamison, John R.Evans, Timothy King, Ian Porter, Nicholas Prescott and Andre Prost, **China, The Health Sector, A World Bank Country Study**, World Bank, Washington, D.C., 1984, p.119, Table B-1, footnote a.
4) **China, The Health Sector**, p.121, Table B-3.
5) Ling, p.132, Table 4 and p.133, Table 5.
6) **Xinhua**, in English, 28 February 1984, **BBC Summary of World Broadcasts Far East** (hereafter, **SWB**), FE/W1277/A/1.
7) **Xinhua**, in English, 27 September 1980, **SWB**, FE/W1103//1.
8) For Japan see Table 3; for urban China, see Table 1 or 2.
9) **China Daily** (hereafter, **CD**), 21 February 1987, p.1.
10) **CD**, 5 September 1988, p.1.
11) **Beijing Review** (hereafter, **BR**), 30 May 5 June 1988, p.8.
12) **The Australian**, 25 October 1988, p.10.
13) **CD**, 14 April 1987, p.4.
14) **Xinhua**, in Chinese, 22 March 1983, **SWB**, FE/W1231/A/4.
15) **CD**, 16 January 1988, p.3.
16) **CD**, 12 October 1988, p.3.
17) **China, The Health Sector**, p.16.
18) Ibid., p.127, Table 8-9.
19) **BR**, 10 June 1985, p.4.
20) **CMJ**, Vol.3, No.4, July 1977, pp.218-20; **CMJ**, Vol.94, No.10, October 1981, p.662.
21) **Xinhua**, in English, 7 April 1982, **SWB**, FE/W1182/A/1.
22) **CMJ**, Vol.94, No.10, October 1981, p.685, Table 1.
23) **China, The Health Sector**, p.140, Table 8-16.
24) **CD**, 27 July 1988, p.1.
25) See Table 2.
26) **CD**, 10 November 1986, p.3.
27) **CMJ**, Vol.94, No.10, October 1981, p.686, Table 2.
28) Han Jiajing and Yang Shengji, "Tuberculosis Control," **AJPH**, Vol.72, No.9, September 1982, Supplement, p.48.
29) **National Programme for Agricultural Development 1956-1967**, Foreign Languages Press, Beijing, 1960, Art. 28.
30) **China, The Health Sector**, p.128, Table B-10.
31) **CMJ**, Vol.78, No.1, January 1959, p.55.
32) **BR**, 16-22 November 1987, p.9.
33) **China, The Health Sector**, p.14.
34) **CD**, 9 January 1988, p.3.
35) **BR**, 10 June 1985, p.4.
36) **CD**, 12 May 1987, p.3; **BR**, 16-22 November 1987, p.9.
37) **CD**, 1 September 1987, p.1; **CD**, 11 December 1987, p.3.
38) **CD**, 12 October 1988, p.3.
39) **BR**, 16-22 November 1987, p.9.
40) **CD**, 12 December 1985, p.1; **CD**, 18 January 1988, p.1.

41) **BR**, 16-22 November 1987, p.8.
42) **BR**, 27 January 1986, p.18.
43) **BR**, 4-10 April 1988, p.8.
44) **BR**, 5 December 1983, pp. 26-27.
45) **BR**, 4-10 April 1988, p.8.
46) **CMJ**, Vol.98, No.8, August 1985, p.597.
47) **Xinhua**, in English, 27 September 1982, **SWB**, FE/W1205/A/1.
48) **BR**, 22 December 1986, p.6.
49) **Population Reports** (hereafter, **PR**), No.5, March-April 1986, L-165, Population Information Program, The Johns Hopkins University, Baltimore, Maryland.
50) **CD**, 28 July 1988, p.5.
51) Chinese Medical Association, **American Journal of Chinese Medicine**, Vol.2, No.2, 1974, p.150.
52) **CMJ**, Vol.3, No.4, July 1977, p.222.
53) **CD**, 15 October 1985, p.1.
54) **Renkou yu Jingji** (Population and Economics), No.3, 25 June 1984, pp.14-20, Joint Publications Research Service, No.84075, **China Report, Political, Sociological and Military Affairs**, p.49.
55) Chinese Medical Association, p.151.
56) **China, The Health Sector**, p.132, Table B-10.
57) **CMJ**, Vol.97, No.4, April 1984, p.256.
58) See Table 5.
59) **China, The Health Sector**, p.132, Table B-10.
60) See Table 4.
61) **PR**, March-April 1986, L-162.
62) **China, The Health Sector**, p.17.
63) **CD**, 1 June 1985, p.1.
64) **PR**, March-April 1986, L-159.
65) **CD**, 1 June 1985, p.1.
66) **CMJ**, Vol.95, No.12, December 1982, p.911.
67) **Tianjin Ribao** (Tianjin Daily), 12 November 1983, **SWB**, FE/W1266/A/1.
68) **CD**, 31 December 1986, p.1.
69) **BR**, 20 July 1987, p.33
70) **China, The Health Sector**, p.127, Table B-9.
71) **CD**, 12 December 1985, p.1.
72) **CD**, 3 April 1987, p.3; **CD**, 26 January 1988, p.3; **CD**, 10 February 1988, p.3; **CD**, 30 March 1988, p.3.
73) **CD**, 8 February 1988, p.3.
74) **CD**, 22 November 1986, p.3.
75) **CMJ**, Vol.95, No.2, February 1982, p.103; **Xinhua**, in English, 12 July 1983, **SWB**, FE/W1246/A/1;
76) **CMJ**, Vol.95, No.2, February 1982, p.101, Table 1.
77) **CMJ**, Vol.96, No.3, March 1983, p.204.
78) **CMJ**, Vol.95, No.2, February 1982, p.104.
79) **CMJ**, Vol.95, No.2, February 1982, p.107.
80) **CMJ**, Vol.92, No.10, October 1979, p.666.
81) **CMJ**, Vol.98, No.3, March 1985, p.155.
82) **CMJ**, Vol.96, No.3, March 1983, p.201; **CD**, 18 May 1985, p.3.
83) **CD**, 21 May 1986, p.3.
84) **CMJ**, Vol. 98, No.3, March 1985, p.151.
85) The Editorial Committee for the Atlas of Cancer Mortality in the PRC, **Atlas of Cancer Mortality in the PRC**, China Map Press, Shanghai, 1979, p.V.
86) **Xinhua**, in English, 26 May 1983, **SWB**, FE/W1239/A/1; **BR**, 10 February 1986, p.26.
87) **BR**, 5 May 1980, p.29.
88) **BR**, 9 September 1985, p.21; **Atlas of Cancer Mortality in the PRC**, p.VII.
89) **Atlas of Cancer Mortality in the PRC**, p.VI.

90) **BR**, 4 August 1980, p.27; **BR**, 23 March 1981, p.30; **BR**, 1 February 1982, p.22.
91) Henry S. Kaplan and Patricia Jones Tsuchitani (eds.), **Cancer in China**, Alan R. Liss, Inc., New York, 1978, p.52.
92) Ibid., p.56.
93) **CD**, 10 March 1987, p.1.
94) **BR**, 10 February 1986, p.26.
95) **CD**, 10 March 1987, p.1.
96) **BR**, 13 April 1987, p.26.
97) **CMJ**, Vol.98, No.3, March 1985, p.222; **CD**, 30 November 1985, p.3.
98) **CD**, 10 March 1987, p.1.
99) **CD**, 9 April 1987, p.3.
100) **BR**, 28 September 1987, pp.32-33; **BR**, 8-14 February 1988, p.7.
101) **CD**, 1 December 1987, p.3.
102) **Xinhua**, in English, 2 December 1989, **SWB**, FE/WO 107/A/2.
103) **CD**, 8 February 1990. p.1.
104) The figures were calculated from data given in Table 3.
105) **CD**, 22 January 1988,. p.5.
106) For a discussion of the composition of the Chinese diet, see Erika Platte, "The State of Nutrition in China," **Asien**, No.20, Juli 1986.
107) **CMJ**, Vol.94, No.4, April 1981, p.236.
108) **BR**, 6 April 1987, p.23.
109) **CD**, 9 March 1988, p.3.