

A Critical Review of Public Health in China

by

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Summary

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I. INTRODUCTION

“Public health is the science and art of preventing diseases, prolong life and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of the community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventive treatment of diseases and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health” (Winslow, 1920).

“It is vulnerable populations in China who need to be empowered, protected from risks, informed and educated, and encouraged to participate in health activities. Second, public health regulations need to be established and enforced. Third, public health infrastructure needs to be in place to reduce the health impact of emergencies and disasters. All this needs to be done through a public health system that is transparent and accountable. Thus, the government have responsibilities beyond the provision and financing of health services to improve health outcomes.” (Wagstaff, The Millennium Development Goals for Health, Rising to the Challenges, 2004)

II. POLICY CONTEXT AND BACKGROUND

The Chinese government is examining its roles and responsibilities in public health as part of its overall health reform agenda. The fundamental questions posed by the government are: What are the core government functions in public health? What should the government prioritize in order to strengthen the health system and its public health functions, programs and institutions? SARS and other emerging and re-emerging health problems have resulted in a growing recognition that the economic gains made by the country in recent years must be balanced with strong social development, including health. With a view to inform and support the health sector reform agenda, this paper reviews some of the current issues, based on the available literature. It provides the rationale for a focus on selected public health functions and reviews the status of some of those that are critical for maintaining health gains and for preventing, controlling and monitoring new threats to health and a healthy economy. This paper has benefited from concurrent policy analysis by the government and inputs from WHO, UNICEF and other partner agencies.

Overall, China has done well compared with other countries at the same stage of economic development. People are living longer and healthier lives now than fifty years ago. The average life expectancy has reached 71 years and from 1970 to 2000, the infant mortality rate fell from 61 to 33, as shown in Table 1. These national averages, however, mask considerable regional and economic disparities. For example, surveillance of maternal and child mortality showed marked urban: rural differentials in 2002, in under-five mortality (urban 14.6; rural 39), neonatal mortality (urban 9.7; rural 23.2) and maternal mortality (urban 53.8; rural 71.6/100,000). Areas in the coastal regions showed a slight decrease over the two year period while

rates increased in remote inland areas. The cause-specific mortality rates also showed marked differences between rural and urban areas (Ministry of Health 2003).

Year	GDP per capita (Chinese Yuan)	Crude Mortality 1/1000 population)	Infant Mortality 1/1000 live birth
1949		20	265
1950	119*	18	195
1955	150	12.3	179
1960	218	25.4	121
1965	240	9.5	81
1970	275	7.6	61
1975	327	7.32	51
1980	460	6.34	47
1985	853	6.78	42
1990	1634	6.67	38
1995	4854	6.57	36.4
2000	7078	6.43	33.1

Sources: 1. GDP per capita: China Statistic Yearbook, 2000 (National Bureau of Statistics 2000) 2. Health indicators: The Achievement and Its Prospect of Chinese Public Health System (Ministry of Health 2000; Yin 2000)
* 1952 data

Recent analysis of the Millennium Development Goals (MDGs) for health in China shows a slowing down of the pace (United Nations and Ministry of Health 2004). Except for the maternal mortality ratio, all the other health related indicators are lagging behind what is required to reach the MDGs. Trends analysis suggests that the main reasons for the gap in progress of the health indicators are the regional and urban/rural disparities and the low efficiency of the public health services. It is the health status of poor people in rural areas that is slowing down the overall pace. The health and development section of the MDG report also notes that non-communicable disease constitute a large problem with increases in diseases related to lifestyle, i.e., cardiovascular disease, smoking-related diseases, and hypertension.

China's overall disease profile largely resembles that of a country in epidemiological and demographic transitions with over 90 percent of deaths due to non-communicable diseases and injuries. The leading causes of deaths and in disability adjusted life years (DALYs) are shown in Table 2.

Table 2. Leading causes of death and disability-adjusted life years, China, 2000

Condition	% total deaths	Condition	% total DALYs
1 Cerebrovascular disease	17.7	1 Cerebrovascular disease	6.5
2 Chronic obstructive pulmonary dis	13.8	2 Unipolar depressive disorders	6.2
3 Ischaemic heart disease	7.5	3 Chronic obstructive pulmonary dis	6.1
4 Stomach cancer	4.4	4 Conditions arising during the perin	5.8
5 Lower respiratory infections	4.4	5 Lower respiratory infections	4.9
6 Liver cancer	3.4	6 Road traffic accidents	3.6
7 Trachea, bronchus and lung cance	3.3	7 Self-inflicted injuries	2.8
8 Conditions arising during the perin	3.1	8 Ischaemic heart disease	2.6
9 Self-inflicted injuries	3.0	9 Alcohol use disorders	2.5
10 Tuberculosis	2.8	10 Congenital anomalies	2.5
11 Road traffic accidents	2.7	11 Hearing loss, adult onset	2.1
12 Oesophagus cancer	2.4	12 Stomach cancer	2.0
13 Hypertensive heart disease	2.4	13 Falls	2.0
14 Cirrhosis of the liver	1.5	14 Tuberculosis	1.9
15 Diabetes mellitus	1.4	15 Liver cancer	1.9
16 Drownings	1.3	16 Osteoarthritis	1.9
17 Colon and rectum cancers	1.3	17 Drownings	1.8
18 Nephritis and nephrosis	1.2	18 Schizophrenia	1.8
19 Congenital anomalies	1.1	19 Bipolar affective disorder	1.6
20 Rheumatic heart disease	1.1	20 Trachea, bronchus and lung cance	1.5

Source: Global Programme for Evidence in Health Policy, WHO

The rising affluence and the demographic transition has also accelerated China's nutritional transition. The changes in per capita annual consumption of major food commodities are shown in Table 3. The evolving consumption pattern is characterized by: the highest tobacco consumption in the world; unhealthy diet and lifestyle changes; and, explosion in urban housing and vehicle density increasing household and other environmental pollution and traffic related injuries. These major risk factors are basically unregulated and unchecked to date. The aging of China's population is also a major challenge that remains to be effectively addressed.

Table 3. Per capita annual consumption of major food commodities, 1981-1999, China

Food commodities	1981	1985	1990	1995	1999	1999 as % of 1981
Urban						
Grain (kg)	145.44	134.76	130.72	97.00	84.91	58.4
Vegetables (kg)	152.34	144.36	138.70	116.47	114.94	75.4
Cooking oils (liter)	4.8	5.76	6.40	7.11	7.78	162.1
Pork (kg)	16.92	16.68	18.46	17.24	16.91	99.9
Beef and Mutton (kg)	1.78	2.04	3.28	2.44	3.09	173.6
Poultry (kg)	1.92	3.24	3.42	3.97	4.92	256.3
Eggs (kg)	5.22	6.84	7.25	9.74	10.92	209.2
Fish and shrimps (kg)	7.26	7.08	7.69	9.20	10.34	142.4
Sugar (kg)	2.88	2.52	2.14	1.68	1.81	62.8
Liquor (liter)	4.38	7.80	9.25	9.93	9.61	219.4
Rural						
Grain (kg)	248	257.45	262.08	258.92	247.45	99.8
Vegetables (kg)	142	131.13	134.00	104.62	108.89	76.7
Cooking oils (liter)	1.96	4.04	5.17	5.80	6.17	314.8
Meat (kg)	5.76	10.97	11.34	11.29	13.87	240.8
Poultry (kg)	0.25	1.03	1.26	1.83	2.48	992.0
Eggs (kg)	0.8	2.05	2.41	3.22	4.28	535.0
Fish and shrimps (kg)	0.84	1.64	2.13	3.06	3.82	454.8
Sugar (kg)	0.73	1.46	1.50	1.28	1.46	200.0
Liquor (liter)	1.22	4.37	6.14	6.53	6.98	572.1

Sources: China Statistical Yearbook 2000, China Statistical Bureau

Among the infectious diseases in all age groups, hepatitis B (the main cause of liver cancer), tuberculosis and acute respiratory infections, still account for significant mortality and DALYs. And, infectious diseases still account for the major disease burden in children, particularly children in poorer regions of the Western provinces. Sepsis, pneumonia, diarrhea, measles, meningitis, tetanus and Japanese encephalitis remain important childhood endemic diseases in China., while unintentional injuries – including drowning, falls, traffic accidents, poisoning and burns -- account for more than 10 percent of childhood deaths overall (United Nations Theme Group for Health 2004).

In addition to the unfinished agenda of infectious diseases, in particular among the poor, the emerging infectious diseases – such as HIV/AIDS and SARS – are important public health challenges because of their epidemic potential, disruption of the health services, threat to the economy and negative impact on social stability (United Nations Theme Group for Health 2004). The economic transition, structural adjustment and social change have brought about a high speed in the growth of the economy, but also caused a series of social problems, especially in health, which in turns, exerts a negative influence on economic development. These challenges are not limited to new infections such as SARS. Importantly, ancient health risks that China has managed to successfully control in the past fifty years, are now re-emerging due to rapid economic development and environmental changes. The case of schistosomiasis (snail fever)

serves to illustrate re-emergence of a major public health problem and its close relationship to economic development and environmental policies, and the specific vulnerability of the rural poor.

In China, schistosomiasis is a health problem of great suffering, premature death, and stunting and cognitive defects in children, that has existed for centuries until systematic control programs began in the 1950s (Chen and Bunge 1989; Yuan 1992). The problem is mainly distributed along the Yangtze River and down to the south of the River including 404 counties/cities in 12 provinces putting 100 million people at risk. In July 2003, the vice-premier Yi Wu ranked schistosomiasis next to SARS and AIDS as one of China's main public health challenges. Since 1985, the rural Chinese economy has been boosted but the prevalence of *S. japonicum* and its associated morbidity have risen in focus areas (Yuan 1992), not only affecting man but the domestic livestock, adding to the economic burden in these endemic areas.

The termination of World Bank loan assistance to China for mass treatment contributed to a reduction in treatment rates and to a dramatic increase in the prevalence of schistosomiasis in the endemic areas, with wide-scale resistance as a new challenge, and severe "rebound" morbidity. In addition to limited resources and lack of effective treatment, the achievements made by the national control program are undermined by several other underlying factors:

- *Ecological* -- the consequences of the serious flood in the Yangtze River valley in 1998;
- *Relocation policies* -- the adopted policy on anti-flooding 'returning cultured land to the lake and relocation of farmers to newly established towns'. This policy may contribute to an increase in snail habitats on a large scale and in the number of people living in close contact with infested water.
- Major constructions projects and their social and environmental impact-- the construction of the giant Three Gorges Dam across the Yangtze river. The drainage from the river provides the great corridor of parasitic disease in China. Expected to be filled by 2009, the dam and the 600 km long reservoir it will create, will have a serious global environmental impact on the transmission and geographical distribution of schistosomiasis both above and below the dam.

A major irrigation program to divert water from the Yangtze River in the south to very dry parts of northern China (mainly to the basins of the Yellow, Huaihe and Haihe rivers) has commenced. There are major concerns with this project too in that it could lead to serious spread of schistosomiasis. (Guo and et al 2004).

It is against the background of rapid economic development that we are examining the capacity of the current health system to deal with emerging and re-emerging microbiological threats as well as the unfinished agenda of reproductive and child health, nutrition and communicable diseases, and the rapidly increasing burden of non-communicable diseases and injury.

III. OVERVIEW OF ANALYTICAL AND POLICY ISSUES

This overview focuses on issues related to core public health functions that make up some of the government's responsibilities for health. Core public health functions cover a wide range of areas: policy, planning and management capacity to support public health; the steering role of the national health authority (cross-sectors and within sectors); public health financing, including payment/incentives; public health regulation and enforcement; health situation monitoring and analysis; surveillance; health promotion; social participation and empowerment of citizens in health; human resource development and training in public health; evaluation and promotion of equitable access to necessary health services; ensuring the quality of personal and population based health services; research, development and implementation of innovative financing and public health solutions; reducing the impact of emergencies and disasters on health. There are several approaches to research and evaluation of public health functions that have been successfully used to inform policy and planning in countries in the East Asia and Pacific region (Malaysia, Vietnam and Fiji) and in the Latin American region. In this paper we focus only on a few of those core functions that have been discussed in the literature. We also draw on the experiences of disease control programs and public health initiatives in China and internationally to highlight elements of success and to identify the major systems issues that undermine the programmatic effectiveness and efficiency of available interventions across diseases, conditions and risk factors. This analysis has drawn in part on earlier analysis of public health systems in China by Wang and Cai, especially the sections on organization and management, public health legislation, regulation and law enforcement, surveillance, and health promotion (Wang and Cai 2003), and from current background work on public health resource allocation (Hu and Gong 2004).

2.1 Issue: Organization and management of public health

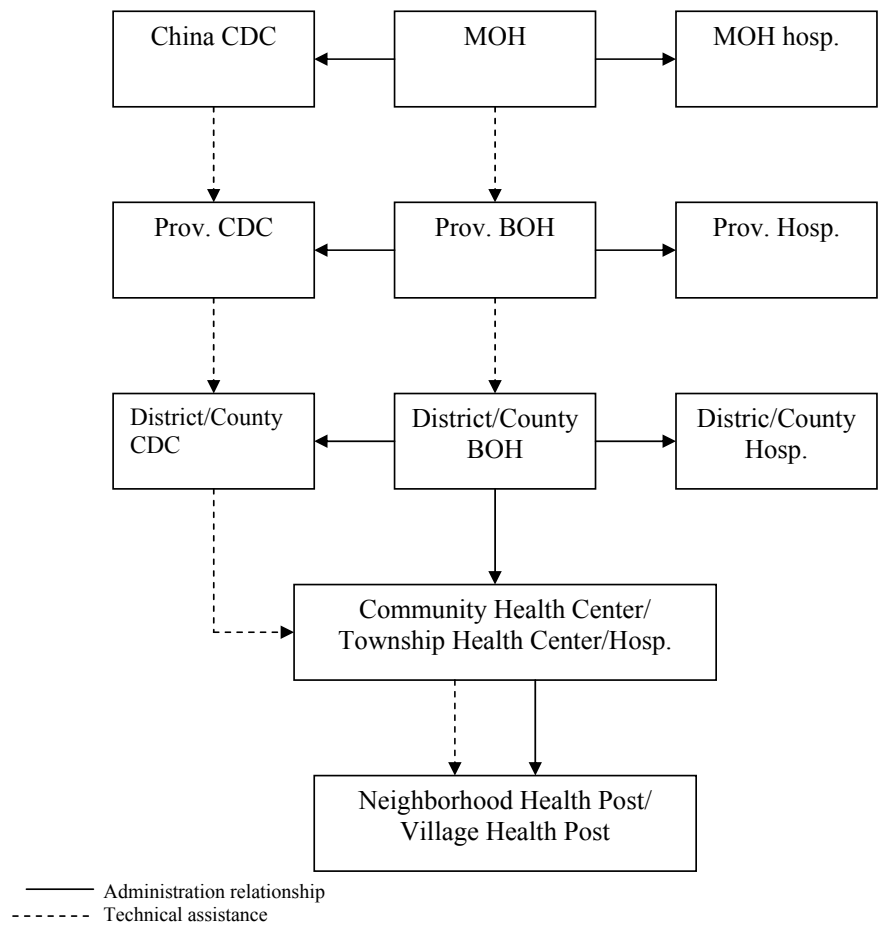
The public health infrastructure. The public health infrastructure in China was adopted from the pattern of the former Soviet Union in the 1950s with a three-tier public health system: provincial, city or prefecture and county levels. In 1954, The Ministry of Health issued a code of Epidemic Prevention Stations (EPS) which defines the responsibilities of EPS: the prevention, supervision and the administration of infectious diseases. By the end of year 1965, all 29 provinces and municipalities had established the EPS system, with parallel EPS systems run by the railway, large enterprises and mining industry. In addition, several special disease control institutes were established to deal with plague, malaria, schistosomiasis, tuberculosis, leprosy, etc. At the end of the 1990s, the EPS was gradually reorganized into the Centres for Disease Prevention and Control (CDC). Along with the establishment of the CDC in Beijing in January 2002, a four-tier disease prevention and control system was established at central, provincial, prefecture or city and county levels.

The management of public health. With the organizational changes came also decentralization of the management and financing of public health. All public health institutions at decentralized levels came under the leadership of the local health authority, while the central CDC at national level has only a technical assistance role. All the human resource issues, including the hiring and firing of staff, are decided on by local government. As Figure 1 shows, there are several challenges with the new management structure including overlapping roles and responsibilities between the CDC at central level and local health bureaus, and the lack of

functional links between the CDC system and the hospital administrations; only at the community health centre level do the medical and preventive arms of the disease control system come together.

By the end of 2002, there were 3463 centres of disease control (former EPSs), among them, 2519 CDCs were at county level (72.7%). In addition, the total number of special disease control institutions was 1839.

Figure 1. Organization & Management of Public Health



Inefficiencies in the management of public health. First, the re-organization, financing and management of public health services have led to increased inefficiencies, partly due to the lack of clarity in functions and duplication between the tiers. The overlap of roles and responsibilities is in particularly evident in those activities that generate user charges. Second, because of decentralized management, the CDC at each level only implements the policies set by the affiliated government authority at that same level, as shown in Figure 1. The national CDC

has no administrative supervisory mandate for the subordinated provincial CDC. Third, a major challenge is the low quality of staff in the CDC system which leads to inefficiencies in operations as evidenced during crisis, such as SARS. The fourth hurdle is the incompleteness of reimbursement mechanisms. Along with the decline in government inputs into the disease control system, there is no incentive to provide free public services. In order to survive, the CDC institutions focus mainly on the fee-for-service activities – giving less attention to other core public health functions. This is the main reason for the occurrence of a series of critical public health problems, such as the declining coverage of the expanded program of immunization, the re-emerging infectious diseases and the lack of preparedness in dealing with new public health risks.

Although the separation of preventive services from curative services could potentially ensure an emphasis on public health – which has been the rationale for separate maternal and child health services, for example -- it can also create conflicts, inefficiencies and undermine disease control efforts. For example, in the EPS/CDC system, the TB treatment facility has been established to control and prevent further spread of the disease. The TB patients, after being diagnosed by the hospital, are expected to be referred to the TB prevention and treatment institution. However, due to economic disincentives, the hospital often opt not to transfer those patients to the TB treatment facilities so that they can continue to obtain the revenue from treatment of the TB patients. This common (mal)practice has raised the question of how to allocate the limited resources more efficiently and effectively for the prevention and treatment of TB patients.

Policies and plans for disease control are usually developed by the central government agency and the Ministry of Health. These policies and plans provide directives and guidance for the lower level agencies that are responsible for developing their own plans. Although planning procedures are carried out annually by government agencies and health institutes, many plans remain on paper. There is often a disconnect between planned activities and resource allocation. Monitoring and evaluation of performance and results are not in place that could ensure that plans are being carried out effectively (Wang and Cai 2003)

The technical assistance function of the CDC system is top-down and faltering. For example in the urban areas, the provincial EPS/CDC is expected to provide the technical support and training of the city EPS/CDC, and the city EPS provides these functions to the District/County EPS. However, these previously close technical assistance relationships have been relaxed since economic reform. The fixed government budget and the user charges create disincentives for the EPS/CDC to provide technical assistance, training and monitoring support to lower level institutions since this will just strengthen the lower level competitiveness vis-a-vis the higher level institutions for the same business opportunities (Wang and Cai 2003).

Although the upper level public health institutes are supposed to provide technical support and guidance to the lower level public health institutes, there is no administrative accountability between them. The separation between the technical guidance on the one hand, and the monitoring from an administrative empowered agency on the other hand, makes the supervision and monitoring systems vulnerable and inefficient (Wang and Cai 2003).

2.2 Issue: Financing of public health

Public Health Expenditure. There are several challenges in trying to track funding for public health functions and not just disease specific programs and preventive services. One problem is that “public health” is traditionally defined as the activities of the administrative authority of public health and the institutions that provides public health services, and does not include the components of public health that involves other sectors, the community, schools, enterprises and mass media. While the efforts of other sectors will contribute to a healthy working environment, improve health knowledge etc, in China, “public health infrastructure ” remain narrowly defined as the centers of disease prevention and control, health supervision, and institutions of maternal and child health, special disease prevention and curative programs (TB, leprosy, endemic diseases, etc.), environmental protection, and family planning. The resource allocation for these public health services, e.g., facilities and human resource come largely from government budget and social health insurance. The public funding includes the direct subsidy to health facilities – public and private -- such as buildings, equipment, personnel salaries, etc.

Before 1978, all expenditure for the development of the public health system, capital investment in equipment and facilities, personnel salaries and operation cost were supported by the government. The government has established special accounts for the control of some disease control programs. Since 1978, the central finance system has gradually decentralized to local government, and after 1994, the financial system has further devolved. It exposes the following issues.

Devolution of financing and management. With the financial decentralization, most of the spending on health comes from local government finance. It has lead to imbalances in public health inputs between urban and rural, with widening inequalities in public spending as shown in Table 4. The share of central finance in health expenditure is declining yearly 4. Compared with 1991, the proportion of central finance has declined by 1.1 percent, and this scarce resource is mainly spent on hospitals(89%) (Gong 2004).

Table 4 Proportion of government spending on health by level (%)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Central finance (%)	2.59	2.42	2.15	2.16	2.01	2.01	2.00	2.08	1.61	1.49
Provincial & local finance (%)	97.41	97.58	97.85	97.84	97.99	97.99	98.00	97.92	98.39	98.51

Sources: Gong Xiangguang (2004).

Diminishing inputs to the grass-root public health system. With the reform of the economic and financial system, especially the reform of the rural economic system and its infrastructure, the township health center and cooperative medical system have lost their economic base. Since 1984, the management of some township hospitals (health centers) has changed from the county bureau of health to the township government. The county bureau of health gives only technical assistance to the township hospital. This has caused inequities in financial inputs between different townships with no transfers between them. The reform of the rural collective economic system has caused the collapse of the cooperative medical system. Village doctors (former barefoot doctor) lost their compensation from the collective economy and became private doctors, with a deterioration of the preventive services in the rural areas.

Immunization provides an example of how efforts were made to solve the shortage of public spending on disease prevention and control, and to maintain the stability of rural public health organization and personnel. Since 1984, an immunization contract system was gradually carried out in many provinces. Although this policy has solved the compensation of this public health service in rural areas, the responsibility of the government has been shifted to the individuals. The problem of sustainable financing of immunization remains a critical issue, as discussed below.

It is expected that the 11th Five year plan will articulate the policy orientation of the public sector. As a result of the greater attention being given to public health among policy makers, a variety of policy options are being considered. This includes the financing arrangements of the CDC and EPS, and possible adjustments in the financing of core public health functions and services from central to provider levels. Such changes will affect a wide range of public health programs, including immunization, tuberculosis prevention and control etc.

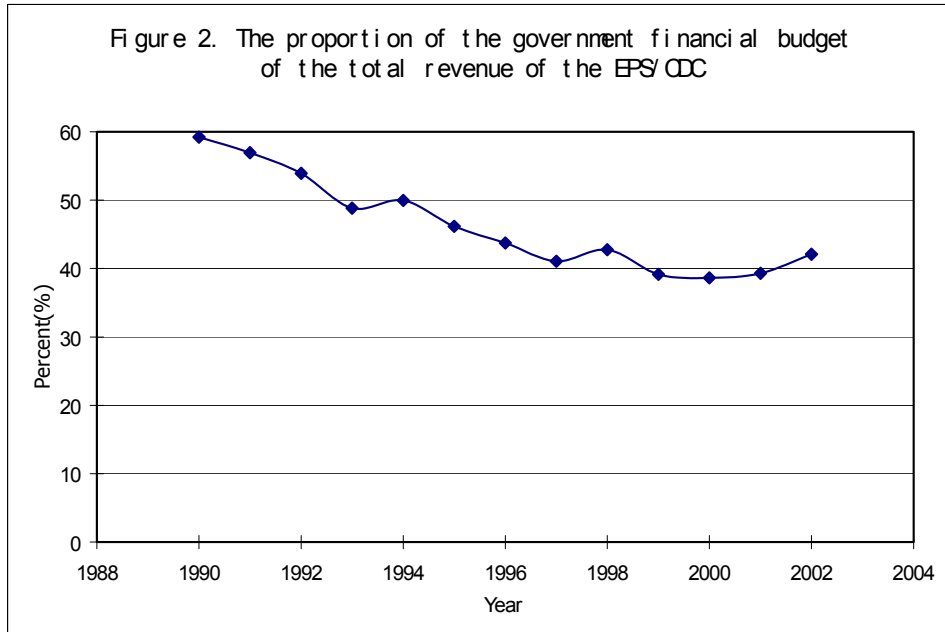
Although immunization is a small part of the overall public health system, it is a critical intervention. Gains have to be sustained and key challenges addressed (i.e., differentials in coverage, quality assurance and expansion of vaccines included in the routine schedule)

The Ministry of Health's Department of Disease Control with cooperation from the Ministry of Finance and the National Development and Reform Commission are carrying out a financing assessment and policy review, focusing on one of the priority public health programs, immunization. It is hoped that this ongoing study will provide not only policy-relevant information about the cost and financing of immunization but also inform future orientation of financing policies of public health programs in general within the context of changes in the overall public health system. The assessment will consider policy and programmatic options that apply to immunization specifically, and to the broader public health system, for example, changes in remuneration of local health care providers/village doctors (World Bank 2004).

Although the rural doctor gets a limited amount of payment depending on the financial status of the local government (i.e., the poorer the county the less payment but the larger the problems) to do certain key prevention activities, such as immunization and selected maternal and child health care, there is no incentive for them to play a very active role in the activities of environmental sanitation, vector control, and health education. How to ensure these public health services under the new economic structure has become a very critical challenge in rural areas.

Multiple sources of financing of public health. In the middle of the 1980s, the financial status of public health institutions changed from being fully budgeted to partially budgeted by the government. Therefore, since 1985 the EPS were allowed to apply user charges for certain services (inspections of food industries, restaurants, hotels, and industries which discharge pollutants and have risky working conditions, primary schools, etc.) to compensate for the shortage of public financing. Following the reform in the sectors of education and science and technology in 1989, the State Council encouraged public health institutions to expand their user fee services to supervision and laboratory examination so as to increase the public health professionals' income and living standards. Following the introduction of the user charge system, EPSs have prioritized those services which can generate more revenue in order to keep up with

operational costs. This has resulted in critical weaknesses in the public health system and its core functions, with less attention given to routine immunization, surveillance, health promotion activities etc. From 1990 to 2002, the proportion of government financial budget of the total revenue has declined from 59.21% to 42.08% (Figure 2). The payment from users charge has gradually become the main revenue of the EPS/CDC.



Source: Gong Xiangguang (2004)

The results of the National Health Services Survey in 1998 (Ministry of Health 1998), which included 130 EPSs, show that only about 38% of EPS's revenue came from the government budget in 1997 (slightly lower than what is shown in Figure 2). It also shows that 58 percent of EPS's revenue comes from their services charge, which include physical check-ups for the people who work in food industries, health monitoring and inspection, and other health services. With these additional charges, the EPSs were able to recover their costs and have an average surplus of about 86,000 Yuan per institute per year.

However, since the public health services have been divided into user charge and non-user charge categories, it has created incentives for EPS to over-supply those services that can bring additional revenue to the institutes such as sanitation inspections and to under-supply those services that do not bring additional revenue to the institutes such as routine immunization and monitoring of diseases (Liu and Mills 2002).

The relative shortage in public spending on disease control. Although the government input to the public health budget has increased yearly in absolute term, from 458 million yuan in 1980 to 540.8 million yuan in 2002, and the preventive care expenditure per capita from 0.46

Yuan (RMB) in 1980 to 4.21Yuan (RMB) in 2001, the share of public health spending has gradually declined over this time period.

The relative shortage in private spending on disease control. In China, apart from the government input in public health, there are also inputs from individuals and society, such as donation, international cooperation program and out of pocket payment. The contribution from society has also declined in recent years (Table 5). This can be partly explained by new innovations in drugs and technology that has diffused rapidly in clinical services, but are lacking in the field of public health, with a corresponding increase in demand for and investment in clinical services. And, since most public health services are public goods or quasi-public goods, few people are willing to pay for those services.

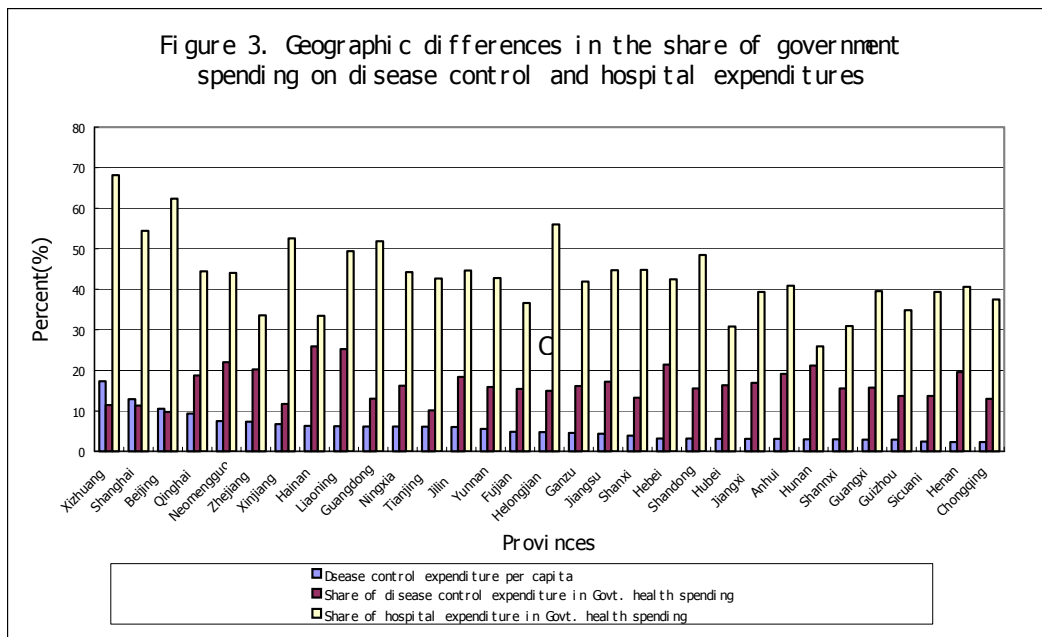
Table 5. The proportion of total health expenditures by clinical and preventive services

Year	Medical expenditure (%)	Public health expenditure*(%)	Other expenditure (%)
1990	77.00	6.54	16.46
1991	77.39	6.24	16.37
1992	78.13	6.28	15.59
1993	75.53	6.24	18.23
1994	77.28	5.83	16.89
1995	78.59	5.50	15.91
1996	76.47	5.26	18.27
1997	76.43	5.45	18.12
1998	76.09	5.88	18.03
1999	76.85	5.16	17.99
2000	78.51	5.07	16.42
2001	77.02	5.21	17.77
2002	81.12	6.29	12.59

*The public health spending includes spending on sanitation, disease control, maternal and child health care.^[27]
 Source: National health economics research institute.2003. *The report on the total health expenditure in China*

Geographical differences in disease control expenditure. Apart from the significant decline in government spending on disease control, there are significant geographical differences in disease control expenditure as a result of the financial decentralization. The inequitable distribution of funds is a result of the decentralization of the government fiscal system, as discussed above. As part of the general decentralization of the government authority, the structure of government health care financing has been changed so that each level of government is directly responsible for maintaining the health institutions under its administration (Henderson, Akin et al. 1994). For example, the central government finances only the national hospitals, research institutes, and medical schools. Each province or county is responsible for its own public services, including health care education and welfare, thus, a prosperous locality is able to provide generous health care and a poor locality has to settle for less (Hsiao 1984). It is estimated that in 2001, Shanghai's (highest next to Tibet) budget for preventive health was 6.7 times higher than Chongqing (lowest) (Figure 3).

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Source: (Gong 2003).

Innovate financing mechanisms. Innovative financing mechanisms have been applied to the control of TB in addressing the under provision of basic public health service to poor populations. The distribution of TB cases showed higher rates of TB in rural compared with urban areas. TB is closely related to poverty; poor people have limited access to care and pay a larger proportion of their income for the treatment if no free TB care is provided. With the introduction of free DOTS services for smear sputum positive cases in poor counties have led to significant increases in coverage in those areas (World Health Organization 2004).

Under the direction of the Ministry of Health, the CDC has taken the task of maintaining DOTS coverage where it has been introduced and of expanding DOTS to other parts of the country. In areas where DOTS is implemented, patients diagnosed with smear positive are given free treatment (no user fees) under supervision of village doctor or township medical staff. In areas where DOTS has not yet been implemented, the majority of patients must pay for diagnosis and treatment, as for other conditions. As a result, the TB prevalence is higher in the non-program areas than in the areas covered by DOTS—these are project areas financed by the World Bank in partnership with DFID, WHO and other partners. The partnership ensures access to free treatment through a “buy-down” financial mechanism.

In addition to user fees, the major constraints to achieving the TB targets in all areas of the country are insufficient political commitment by some provincial governments resulting in inadequate local funding for DOTS; insufficient staff to implement DOTS; poor referral; weak institutions in impoverished areas; weak multisectoral response and monitoring and evaluation – all these constraints are examples of critical gaps in core public health functions (World Health Organization 2004).

Lack of predictability and sustainability of financing for public health. During the period of the SARS outbreak, seven billion Yuan were invested from various levels of the government, for SARS control and prevention. This figure is about 1.5 times as much as the total government budgets for the overall public health, which showed the government's commitment to a specific public health issue when an emergency happens. However, the sustainability of this emergency fund is uncertain. How to build a sustainable financing mechanism to ensure that the routine core public health activities are carried out as well as emergency response actions is still a critical issue in the performance of public health in China. The study of the financial sustainability of the immunization program currently being carried out by the Ministry of Health is likely to provide useful information and data also for other public health programs, as discussed above.

Disconnect between investment in health programs and services and the health problems affecting rural poor. Since equitable access and use of basic services is a core public health function, it remains a concern that there is still in some places, a disconnect between priority health problems and investment in services that will address those problems. The independent review of the government's health reform project for the provision of basic services (Wang, Claeson et al. 2001) showed that few provinces that were part of the health reform project had identified the main health problems of the poor, that data was lacking to support the analysis for a prioritization of diseases and conditions, and that coverage of cost-effectiveness, feasible and appropriate interventions remained low, especially those addressing the problems of child health and nutrition, injury and tuberculosis – problems that disproportionately affect the poor. While the disease burden of the poor was only marginally affected by the health reform project by the time of the review (mid term, 2001), the potential impact on the conditions of poverty would be great if existing cost-effective, feasible and appropriate interventions would be scaled up and made readily available. Indeed, a significant progress toward the MDG related health problems and the major non-communicable diseases in all income groups could be attained, as discussed below.

According to the China BOD analysis using 1990 data, poverty related diseases contributed to 23 % of the overall disease burden. The independent review of the health reform project (Health VIII) found that while lower respiratory infectious diseases (5.7% total disease burden), diarrheal diseases (1.8%), nutritional disorders such as vitamin A, iron deficiency anemia, iodine deficiency and protein-energy malnutrition (4.8%), injury (12.9%) and tobacco (3.9) were estimated to contribute a large share of the total burden of diseases (around 20%), no counties covered by the project had chosen to prioritize the financing and management of programs and interventions addressing these problems, through increased access to treatment of sick children (integrated management of childhood illness), micronutrients, injury prevention or tobacco/smoking reduction.

Comment [w2]: Reference is not listed in the end note.

Basic services were not reaching the poor due to the flawed prioritization and selection process, the lack of planning, weak management and health infrastructure for the delivery of priority interventions, and the problematic design of the insurance and medical assistance (CMA and MFA) schemes. The problems in the design of the insurance scheme for the poor included the findings that: no township had designed an insurance benefit package for the poor with a well defined set of services corresponding to the priority problems in the area; some MFA only covered hospitalized care and catastrophic illness and not outpatient care or preventive services; low reimbursement rate was given for hospital inpatients: the up front payment, which poor households can not afford, and; the frequent lack of perceived benefits by the poor. The question

posed by the critical review was: “is the health insurance scheme designed for the rural poor or as a marketing strategy for township hospitals?”

The strategic options proposed by the review team were to: enhance effectiveness of existing programs and interventions; identify the gaps and pilot test the feasibility of low cost innovative approaches to injury control, non-communicable diseases (health promotion for hypertension, etc), and; increase efficiency by better coordination and integration between public health programs, line ministries, and project components (Wang, Claeson et al. 2001). Enforcement of functional linkages between programs were recommended by putting mechanisms in place to forge coordination between programs at different levels and between different departments. Since the mid term review in 2001, actions have been taken to address some of these issues, and the experience provides valuable insights into the realities of reaching the poor in rural areas with basic services.

In summary, some of the critical issues in the financing of public health are to: ensure the appropriate amount of government financing to cover essential public health functions, programs and services; development of sustainable financing mechanisms, and implementation of a transfer payment mechanism to ensure equity in resource distribution to core public health functions and services at decentralized levels. Also, to ensure a link between health reform efforts and improved outcomes of the poor in rural areas, including the selection of “best buys” in public health.

2.3 Issue: The multisectoral nature of the major public health problems.

Common to most of the major public health problems facing China today are the magnitude of the multisectoral risk factors, the high cost of inaction, and the intersectoral nature of the policy options for dealing effectively with them. Because of the complexity of actions involving several sectors, effective public health interventions are lagging behind the economic development. Road safety provides a good example of this problem.

In China in 1999, injuries caused the loss of 12.6 million potentially productive life years (Zhou, Baker et al. 2003). Young people make up 46% of all deaths and 60% of morbidity associated with injuries. The annual economic cost of injury has been conservatively estimated to be as high as US \$12.5 billion, with road crashes accounting for 25% of this loss. Productivity losses from injury more than offset the total productivity of new entrants to the labour force each year. The most vulnerable road users are pedestrians (26%), motor cyclists (17%) and bicyclists (16%). World Bank projections indicate that if present road safety policies and practices continue into the future, road crash deaths in China will rise from about 10 per 100,000 people in 2000 to over 16 per 100,000 people in 2020 (Kopits and Cropper 2003)

China has no official safety targets, monitoring or regular analysis of road safety (Bliss 2003). Road engineering standards and rules focus on creating a high-speed, free-flow environment for cars and trucks. This generates high risks for more vulnerable users in mixed traffic/mixed speed situations. A stronger focus on meeting the safety requirements of pedestrians, cyclists, motorcyclists, low-speed agricultural vehicles and special purpose vehicles is required, if future deaths and injuries on a large scale are to be avoided. Road safety

enforcement is needed, using modern deterrence techniques, coupled with education initiatives focusing on high risk behaviours. These actions require collaboration across sectors.

Useful lessons have been learnt from several provincial reviews carried out by the transport sector, regarding the need for safety audits and road data bases. A priority is to build a more inclusive approach to road safety at the country strategic level in China, a change from the current situation where road safety goals are seemingly excluded from national development aspirations. Another priority is to identify opportunities to invest in large-scale, integrated stand-alone multisectoral road safety programs, replacing the current small-scale road safety components embedded in larger highway project investments (Bliss 2003).

Another example of a major multisectoral public health problem that requires a balance between economic development and health consequences, and active involvement of several sectors, is the reduction of tobacco production and smoking. Smoking is a major risk factor for the rapidly growing burden of non-communicable diseases, which calls for actions across sectors, as discussed below.

China accounts for nearly one third of all cigarettes smoked each year around the world. According to WHO, there are an estimated 350 million of smokers in China, nearly one-third of the world's 1.3 billion smokers at risk of cardio-vascular and respiratory diseases and lung cancer. Total cigarette consumption in China has increased dramatically over the decades -- from 224 billion pieces in 1940 to 1722 billion cigarettes in 2003. This tremendous increase can be explained partly by the population growth, and partly by the increasing prevalence and intensity of smoking (Beyer, Kollars et al. 2004).

In China, as elsewhere, poor people are more likely to smoke than any other group. For poor families, money spent on tobacco is diverted away from other possible uses, such as food, shelter, education and health care. A survey of 3,400 households in three provinces/municipality in southwest China (Sichuan and Guizhou and Chungqing) found that 80% of rural households had at least one smoker, compared to 44% of urban households (Hu, Mao et al. 2004). Moreover, rural smokers consumed between 14-19 cigarettes per day on average, compared to 11-12 cigarettes per smoker per day in urban areas. There was little variation in this smoking intensity by income group in rural areas, but in urban areas, smoking intensity increased with income. The poorest rural households spent over 11 percent of their total household budget on cigarettes; households having one or more smokers spent less on food, education, housing and clothing than non-smoking households.

It is predicted that tobacco deaths will increase by 2 million each year by 2025 (Niu, Yang et al.). A recent estimation of direct costs (Jiang and Jin 2000) used data on one million deaths in 1998 and estimated that at least 514,100 deaths in China that year were premature deaths from smoking-related illnesses, resulting in a productivity loss of 1.146 million person years. The study used 1998 national health services survey data, and estimated that direct medical costs attributable to smoking amounted to 22.9 billion yuan, accounting for about 347 million outpatient visits and 1.52 million inpatient admissions. This amounted to about 6% of total health care costs in China in 1998.

The dilemma faced by the Chinese government is to balance the public health benefits of smoking reduction and the potential negative economic impact of tobacco control policies on tobacco farmers and the tobacco industry. The challenge is to proceed boldly with policies that reduce smoking, while mitigating the adverse impact on vulnerable people and areas in China that are heavily dependent on tobacco. China has signed the Framework Convention on Tobacco Control in November 2003 and effective control measures include tobacco regulations and laws, public information and pricing.

China has engaged in health promotion through some educational programs and smoking-free public areas in selected cities. The price of cigarettes is a powerful determinant of consumption. It is estimated that every 10 percent increase in cigarette price will reduce total consumption by about 5 percent in China and increase government tax revenue (Mao, Xiang et al. 1997; Hu and Mao 2002). Tax revenue has risen, and provides about 10% of all central government revenue. Tobacco is also an important source of revenue for provincial and local governments, and of cash income for farmers in some of China's poorest provinces. Comparison between monetary gains and losses in the agricultural and industrial sector and the additional revenues that could be generated from increased tobacco taxes is critical information for government policy makers. Hu and Mao argue that an increase in tobacco taxes can be a win-win policy that improves the health of the population while increasing net tax revenues enough to offset possible losses in the agricultural and industrial sectors (through subsidies, crop substitutions, transfers or other government spending).

China's WTO entry may have a negative impact on the domestic cigarette market share and may also induce higher levels of smoking consumption among current smokers or increase the prevalence of smoking through aggressive advertising by foreign cigarette companies. Previous experiences in Asian countries, notably Japan, South Korea, Taiwan and Thailand, have shown that market share of cigarettes produced by multinational tobacco corporations increases dramatically within one year after reduction in tariffs on foreign cigarettes (Chaloupka and Laixuthai 1996), and swift large increase in cigarette consumption especially among young people (Hsieh, Hu et al. 1997). Strong tobacco control measures, especially a complete ban on all tobacco advertising and promotion could do much to avoid this outcome. The policy implications of these case studies on road safety and tobacco control are first and foremost to incorporate health objectives in broader economic development policy objectives. Public health has to be an integral aspect of economic development, i.e. public health action should not be considered just as a "counter measure" but as an integral part of the development agenda, and of policies related to roads and transport, industries and agriculture, energy and environment.. Severe public health consequences can be minimized through multisectoral involvement in planning and development. Some public health problems are largely neglected – specifically key underlying risk factors, such as indoor air pollution among rural poor, road traffic injuries and other injuries (occupational), tobacco and smoking--and need to be brought into the forefront through information dissemination and advocacy.

Several other problems could have been chosen to highlight the intersectoral nature of government action, including indoor air pollution, environmental health and sanitation, schistosomiasis (discussed above), HIV/AIDS and SARS. Common to all major health problems and major risk factors is the call for (pro-)active involvement of multiple sectors and strong

interagency coordination. The Ministry of Health has a key stewardship role to play in all these efforts.

The Ministry of Health has also a stewardship role to play in ensuring the quality of public health services provided by other sectors than health. Several industries have their own public health services for their employees. The participation of industry in the provision of public health services brings extra resources, however, it also creates difficulties in terms of management of these services including responsibilities to report and exchange communicable disease information. However, the Ministry of Health does not have the authority to supervise and monitor their performance.

2.4 Issues: Public health legislation, regulation and law enforcement

Among the pressing issues is the need for legislation to be developed in support of regulatory actions, for example, to reduce occupational hazards in the work place environment. At the same time, more effective enforcement of existing public health laws and regulations are needed, as in the case of blood safety and the regulation of pharmaceuticals.

Public health legislation & regulation. Since 1949, China has established 8 health laws issued by National Congress, more than 20 health regulations issued by State Council, and more than 400 health administrative rules by the Ministry of Health (Wu 1999; Wu 2001). Most of them have been developed since China started its economic reform in the 1980s.

One of problems of the regulatory process is the fact that many of these laws and regulations are not detailed and clear enough for easy implementation, monitoring and evaluation. It is also not always clear what the scientific evidence base is in support of the regulation. A recent example is the hygiene regulations and guidelines for the control of SARS infection in China. Hand hygiene is a very important measure to prevent the spread of infection within institutions. China developed half a page of guidelines for hand hygiene, compared with the US CDC guidelines that have more than 40 pages with detailed scientific evidence supporting detailed recommendations, which made them convincing, easy to adopt, and effectively implemented and evaluated.

Law enforcement. The Department of Health Law Enforcement and Inspection in the central MOH and in the Health Bureaus at different levels of government are responsible for the administrative law enforcement, while the recently established Centers for Health Monitoring and Inspection (CHIS) at different levels are the implementation entities of other health laws, regulation and enforcement.

Before the establishment of the CHIS, law enforcement in public health was the responsibility of EPS and of other specific disease control and prevention institutes. Licensing to restaurants, for example, under the “Regulation of Sanitation Maintenance in Public Spaces” released by the State Council in April 1987, and the “Executive Guideline for Regulation of Sanitation Maintenance in Public Spaces” released by Ministry of Health in March 1991 (effective on June 1, 1991) a restaurant shall be inspected by the local office of EPS before opening. The local EPS official was supposed to do the health examination of the employees of the restaurant and issue a “Health Qualification Certificate” to qualified employee. This

certificate shall be renewed annually. The local EPS official was also supposed to do regular sanitation inspection of the business site and issue "Certificate of Sanitation Approval" to qualified restaurants. The certificate shall be renewed every two years. These two certificates by public health officials are required for a restaurant. Other requirements from other governmental agencies include a license from the Bureau of Industry and Commerce Administration and a certificate from Bureau of Tax Administration.(State Council 1987; Ministry of Health 1991).

Since these tasks have not been implemented effectively, the government established a new system, the Centre for Health Inspection and Supervision (CHIS) system in 2002, as an executive organization for supervision and law enforcement. Since this system is part of the government (which gives the system more authority) and is fully funded by the government (they are not allowed to apply user charge measures to generate fund), it is expected that this system will be able to enforce the law more effectively.

However, this separation brings a series of new challenges and problems. First, there is shortage of skilled manpower for CHIS – at least in the short term. Based on a study by the China Health Economic Institute and Harbin Medical School, the estimated staff that are needed to do the health inspection and supervision is about 55,000 (Liu and Zhao 2001). However, there are still very few qualified staff working in this area (Zhou 2001).

Second, the enforcement of the law has become more complex. Previously, EPS played both of the roles of monitoring/supervision and of law enforcement. The monitoring results could be used as evidence for law enforcement. After the separation, EPS/CDC still has the responsibility of monitoring performance, but does not have the power to enforce the law, while CHIS has the power to enforce the law but does not have the ability to do the monitoring and lab tests. The collaboration between EPS/CDC and CHIS has become a central issue for health regulation and law enforcement; CHIS's law enforcement measures have to be backed up by the monitoring results that are provided by the CDC. However, there is a risk of duplication, with CHIS creating its own laboratory system for monitoring to support their law enforcement, so that they do not need to rely on monitoring results from CDC (Chen 2002). Since the CHIS is a new system, the transition from the previous system (law enforcement within EPS/CDC system) to the new system has not been completed in many areas and the regulations and working procedures are not set up completely. This new system and the transition need to be assessed in the near future.

2.5 Issue: Surveillance and health information

The central role of surveillance and data for decision making has gained attention since SARS, and an elaborate surveillance system is under development. To date, health care information generated by the existing system includes disease and administrative information flowing from the bottom to the top of the health system. In the Infectious Disease Surveillance Network for example, the community doctor or rural doctor at Neighborhood/Village Health Post has the responsibility to report the communicable disease information to the Resident Street Hospital/Clinics or Township Hospital/Health Centre, which in turns gather the information from lower level and their own information and report to the District/County level EPS/CDC. The information finally flows upward to the national CDC (or previously to the Academy of Preventive Medicine).

The development of the national information and surveillance system has gone through several stages (Zeng 2002). The first stage was the development of the communicable disease reporting system. This system was established at the same time as the EPS, at all three levels throughout the country in the 1950s. In the 1960s, this network had covered the whole nation. The second stage was the development of the disease surveillance network, which included 71 monitoring sites and covered a 10 million population. This network was initiated by the Epidemiology Institute of the Academy of Preventive Medicine in 1980. The information collected by the network was mainly on communicable disease, but chronic disease information has been added since then. The third stage is the development of the health behaviour surveillance system, which focuses on chronic disease and AIDS and STD. This system was initiated in 1990s.

There are several challenges facing this information system, that an enhanced system would have to address:

First, failure to report. Currently both passive and active surveillances are carried out on communicable diseases. In general, the prevalence rates derived from active surveillance are higher than the rates from passive surveillances. A study from Anhui Province showed that the failure to report were 80% for diarrhea, 73.4% for pertussis, 85.7% for typhoid fever, and 50% for diphtheria (Zeng 2002). This high rate of incomplete reporting is caused by: lack of (agreement on) clear clinical symptoms in some communicable disease and lack of lab exam equipment or techniques at the lower levels, such as village health post and township hospital, in order to confirm cases.

Second, there are information gaps related to population groups or special events. The mobility of people, including the urban migration and “floating” populations are increasing. The current information system has not been able to pick up adequate disease information from the floating populations. Further, trade across borders have increased dramatically and natural disasters are still very frequent, but the monitoring system is not able to promptly and accurately identify the potential problems related to the risk of spread of communicable diseases in these situations (Yin 2000).

Third, information sharing between different levels and types of health insurance is the exception and not the rule. The information collected by each institute becomes their property and they are reluctant to share the information with each others. A reason for this lack of information dissemination and sharing, is the reluctance to acknowledge and report problems and to take on the responsibility for problems and issues. Another reason is the self-interest of researches, specifically in the development of innovative techniques, which could result in academic as well as economic benefits

The quality and completeness of the data constitute one set of problems -- how data generated by the existing surveillance networks are used for local problem solving, to inform policy and decision making at the different levels, and analyzed, shared and fed back, is an even more critical issue. A concerted effort is required to develop a strong surveillance and health information system, with a solid infrastructure and enhanced capacity to deal with the broad range of data and information needs – routine as well as emergency --, and a system that generate

timely data for policymaking and rapid response. This is an essential step toward, building a strong public health foundation for an economically advancing nation.

2.6 Issue: The public health workforce

The issues of human resources for public health are the following: competencies and skills of public health staff; adequate numbers of staff available at each level; and, the geographical distribution – ensuring competent public health specialists in rural areas.

In early 50s, there were only 20,000 health workers in the public health field nationwide. After 50 years, this figure has increased to 283,868 persons by 2000. Per capita public health employee has also increased from 0.036 per 1000 population in 1952 to 0.224 per 1000 population in 2000 (Ministry of Health 2000).

After 1949, six medical universities established public health specialties. The graduates from these medical universities formed the backbone of China's public health system. Currently, there are 36 medical universities that have established public health specialties, graduating about 2400 students with 5-6 years training each year. In addition, there are 69 "middle health schools" that have also established public health specialties to train mid-level public health professional who work at district/county or resident/township hospitals. The duration of training in middle health school is 3-4 years. There is also in-services training for staff without formal training in public health but who work in this area.

A problem with the current public health curriculum is that the training is very much medical/clinical services oriented. Public health students spend most of their time in school studying the medical literature, which does not differ much from the literature of medical students. After graduation, the students who graduate with a public health major are also able to find jobs in the hospital as doctors. Very little training in sociobehavioral sciences, management, economics and epidemiology are offered to the students. Another human resource problem is that very few public health specialists, roughly only 1% of the total professional staff working in the public health institutes, get a masters or other degree. MPH programs have started recently in some of the schools of public health. As a result, lack of high quality personnel is one of the major barriers to the provision of high quality public health services.

In addition to the public health professionals who work in the public health institutes, there are about 1.2 million rural doctors and health assistants who work in rural villages in clinic practice and in the management of other public health services. The rural doctors – who are the frontline health workers and the first line of contact with the health system at community level -- usually graduate from middle level medical schools or the equivalent. They have to pass the qualification exam in order to get the rural doctor's certification. Their knowledge related to public health, such as diagnosis of communicable diseases, is very weak. In addition, due to lack of economic incentives, public health services are not emphasized by those rural doctors, now mostly serving as private practitioners

Provider payment and incentives and the effect on public health human resources and performance. Before economic reform, the wages of health professionals working in the public health institutes were covered by the government and were set at a very low level by the

government based on working years, position, occupation, and education, to meet the basic needs. After the economic reform, bonus wages, in addition to the standard wages set by the government, have been introduced as economic incentives to improve doctors' and other medical staff's performance. The bonus wages come from the profits of the health institutes. In the public health domain, i.e., in institutions such as EPS/CDS, since the bonus are generally linked to the amount of money that a division can bring in, staff who work in the departments that provide services such as surveillance and information collection, they are the spenders rather than the revenue generators. Therefore, staff in those departments generally get much lower bonus (3-5 times lower) than people who work in the divisions that provide services with user charges, such as the food sanitation division. These differences create conflicts among the staff members, influence their work attitudes, and in turn influence their performances and results. And, in order to maximize the economic benefits, the scarce resources given to and generated by these public health institutes are often allocated more to those departments that can generate more revenues. (Wang and Cai 2003). This is one explanatory factor for the neglected areas of core public health functions, including surveillance, monitoring and evaluation and health promotion.

2. 7 Issue: Ensuring equitable access to basic services to migrant populations

After the rural economic reform, the productivity of farmers has increased dramatically. The surplus of the labour force in rural China flood into the urban areas in order to find better paid jobs. It is estimated that there is a floating population of about 100-140 million people in urban areas since 1997 (which include both people from rural to urban and from one urban area to another). This floating population serves as one of the major labour forces for urban development. However, the rise in this population has created a series of social problems. They are not integrated into the urban health care system and do not have health insurance coverage or access to community health services. Casual and commercial sex is prevalent in this population, putting individuals at high risk for sexual transmitted disease and HIV/AIDS, and they risk becoming the "bridge population" transmitting these disease to others (Wang 2004). How to provide public health services to those massive floating population is a great challenge to the current public health system. The situation for migrant women and children has been analyzed by the Ministry of Health (2004)

The conditions of most women in the migrant population are characterized by low income and, poor living conditions (lack of winter heating in the north, small living area per person). Their primary concern is how to survive under these simple living conditions. A survey in Beijing of their attitude towards seeking healthcare, and their ability to receive medical assistance and healthcare, show that only 3.5%-21% express a need for knowledge on disease prevention, contraception and family planning, sexually transmitted diseases, antenatal and maternal care, prevention and treatment for gynecological disorders and healthcare of their children (Ministry of Health 2003). The service card provided for pregnant women by the Ministry of Health and antenatal examinations are seldom utilized by these women. Migrant pregnant women in Beijing, Wuhan and Shenzhen had at least one prenatal examination rate of 50-70%, and hospital delivery rate of 50%; their preferred option is delivery by private clinic "doctors" or townspeople serving as midwives. Illegal midwifery has a severe negative impact on the health and wellbeing of these pregnant women of the migrant population; illegal midwifery is the number one killer of migrant pregnant women. Of the migrant women in the survey conducted in Beijing, approximately 40% have 2 children.

Currently, an agency called “migrant population management” has been set up in Beijing and Wuhan (jointly administered by the government and the public security bureau). The government and the public security department manage the migrant population by issuing temporary residence permits. About 70-80% of the people surveyed have acquired the residence permit. The survey shows that none of the four cities had designated health services specifically to serve the migrant population.

2.8 Issue: Health promotion and behavior change interventions

China has a history of successful public health campaigns, mass movements and social mobilization for disease control and prevention. Health promotion, information, education and communication (IEC) and behaviour change interventions are often thought of as “mass movement and social mobilization” while failing to recognize that new approaches are required to promote lifestyle changes, improve family practices in child health and nutrition, and influence individual practices related to HIV/AIDS prevention. A recent study of rural behaviours illustrate the urgent need for effective behaviour change interventions to promote better health in all population groups (Son, Yu et al. 2002).

A study to examine the status of health-related behaviours among rural residents and the factors influencing the practice of such behaviours was conducted among one thousand and ninety subjects aged 15 years or over in a rural community, in Anhui Province. Information on health behaviour included smoking, drinking, dietary habits, regular exercises, sleeping pattern and oral health (Son, Yu et al. 2002). The results showed that the prevalence of smoking and drinking in male subjects was 46.5% and 46.9%, respectively. There was a positive significant association between smoking and drinking. Only 8.3% of all subjects ate three regular meals a day regularly. Among subjects who ate two meals a day, 89.7% did not have breakfast. Only 1.7% of subjects took part in regular exercise. Only 38.4% of the respondents had the habit of hand washing before eating and after using the lavatory. Further analyses showed that 64.8% of subjects had 3-5 items of positive health behaviours out of 8 items and only 16.9% had six or more items. Logistical regression analyses suggested that better health behaviour was affected by sex, age, years of education, income and health knowledge.

A reason why China could achieve rapid improvement in population health with very limited resources in the 1950-60s were the social mobilization and mass movements. The Patriot Health Campaigns, for example, were initiated in 1952. The committees were composed of members from 21 ministries and unions, including the ministries of planning, finance, construction, industries, commercial, agriculture, water resources, chemistry, culture, education, health, environmental protection, security, military, civil affairs, workers union, youth union, and women’s union, and etc, and they were led by a very senior leader from the central government. The first well-known campaign was the “elimination of four pests”. The education campaign was carried out to educate people about the importance of eliminating these four pests, to control communicable diseases, and methods included demonstration to increase the effectiveness of the health education (Horn 1971; Sidel and Sidel 1982). Another well known campaign efforts were “two controls and five changes” (“two controls” refers to the control drinking water and human feces and “five changes” refers to change sanitation status of well, toilet, cattle-sheds, cooking fire, and living environment (Chen 1985).

As the Chinese market economy has developed in the 1990s, the Patriot Health Campaign became linked with economic development efforts. Communities have been motivated to improve their environment and maintain good health to enhance productivity and to attract external investments. Since 1989, the Patriot Health Committee proposed “Healthy City” mass movement in the urban areas (The Patriot Health Campaign Committee 1989). The purpose of this activity is to try to create a healthy working and living environment for the urban residents. The Healthy Cities movement in Shanghai, is an example of such a broadbased health promotion initiative:

Shanghai is the largest economic-center city in China. There are about 16.4 million residents and millions of people move in and out of Shanghai every day. How to protect the city environment and the residents’ health status require hard work and a long-term perspective. In the recent decade, the health status of Shanghai residents and the environment status have made significant improvement. The life expectancy at birth has reached almost 80 years old, the infant mortality rate, 5.7 per thousand, and maternal mortality rate, 8.9 per 100,000 (Yang, 2003). A three-tier health service system has been established, which includes a high-level municipal hospitals, regional medical centre and community health service centre. More than 7 million employees have jointed the urban basic medical insurance scheme. A township-level employee’s medical insurance system has also been started. Almost all villages have conducted rural cooperative medical system. The public spending on public health, preventive care, rural health and medical emergency and treatment has increased yearly. The “greening” of the urban environment has covered 37% areas in central city; the air quality has improved and the centralized treatment of urban sewage has reached 70%. The coverage rate of running water is almost universal, as is health education in high school and the expanded program of immunization. Contributing to these results is the establishment of the “Healthy Cities” programme in Shanghai, with the following features (Yang 2003):

- A human-oriented concept of urban planning, construction and management;
- An urban development model emphasizing the integration of healthy population, healthy environment and healthy society;
- Sustainable collaboration in economic, social and environmental development;
- Strong support by the regulatory system. In addition to national regulation and legislation, Shanghai has formulated dozens of local regulations and management rules. For example, the city environment and health administration rule, the management rule of Patriotic Health Campaign, the managerial regulation of eating raw sea food, the health care regulation of migrated population, etc.;
- A community networking system led by Shanghai municipal government, jointly with non-government organization and community participation.; and
- The scientific evidence base supporting the Health Cities programme, including many research-based projects. In the recent decade, Shanghai has cooperated with international organizations on the control of environment pollution, changing environment quality, reproductive health, community health, HIV/AIDS prevention, health promotion, and on human resource development.

The task force is made up of social organizations and Shanghai citizens and they are responsible for the “three-year action plan”.

In addition to government financing of these health promoting activities, the main means of financing of these community based activities have been to mobilize individuals and local communities to spend their own time and money to achieve the goals. However, this kind of mobilization of individuals is becoming increasingly difficult with the overall economic reform, and changes in the Chinese social values and culture. Social capital, traditional social networks, collectivism and collective action is weakened. This puts new demands on effective approaches and methods for individual behaviour change, effective information dissemination and incentives mechanisms. The changes in social values also increase the cost and difficulties to mobilize population to conduct public preventive activities, such as environmental protection, sanitation, and health education.

IV. INTERNATIONAL PERSPECTIVES ON THE CRITICAL ISSUES IN PUBLIC HEALTH

3.1 Analysis of core government functions in public health.

The critical issues in public health discussed above focus on some of the core government functions in public health: the organization, management and financing of public health, the intersectoral actions for better health, public health legislation, regulation and enforcement, surveillance, the public health workforce, ensuring equitable access to basic (public health and clinical) services and health promotion. Why are these functions key responsibilities of the government? What is the rationale for a focus on these core functions?

First, there is an element of market failure of each of these public health functions. Without some form of government involvement, a free market will produce an outcome that is inefficient. Second, in many of these functions, there are also elements of externalities and public goods. Set immunization as an example. The benefits of immunization is not only on the immunized person but also on the whole society. Surveillance, data collection, analysis, monitoring and evaluation are all examples of public goods; benefits to some do not diminish the benefits to others. Third, externalities provide an important rationale for intersectoral approaches to health. For example, investments in water, sanitation and indoor air pollution not only enable households to improve their hygiene and reduce the risks of contracting communicable diseases but also reduce the risk to others. The government has a major steering role to play in promoting intersectoral actions for better health. Externalities call for government subsidies; surveillance activities will continue to be inadequate without a strong government role and responsibility for it. Finally, the government has a key role to play because of the inequity and poverty aspects of public health, specifically, ensuring equitable access to basic services and reducing the information asymmetry.

It should be noted that public health functions, as discussed here, are complementary to and supportive of more traditional, vertical approaches. They provide important mechanisms for monitoring and evaluating specific efforts, for identifying core competencies, and for developing effective strategies to address the problems of poverty and equity.

Several countries have recently undertaken assessment of core public health functions in order to identify gaps and to strengthen their public health infrastructure. For example, assessments have been carried out in Indonesia with a focus on decentralization, in Hungary with a focus on health promotion and non-communicable diseases, in Russia as part of a process of consensus building around core public health functions, in most Latin American countries as part of their health reform agenda, and in India to better understand governance issues related to public health. There is also a study ongoing in China, undertaken by the Ministry of Health, to assess essential public health functions in eight provinces. Data were not available at the time of this review, but a rapid survey of key informants at the central CDC, revealed the need for further in-depth analysis of each of the core functions.

In the East Asia/Western Pacific region, a three-country study of essential public health functions was carried out in Viet Nam, Fiji and Malaysia, with the primary purpose to identify options for the structure and sustainable delivery of essential public health functions (World Health Organization 2003). These countries undertook a self-assessment to describe the essential functions, their governance and stewardship, to identify proposals for restructuring public health system, and to identify the impact of such re-structuring. Although a common structure, each country made country-specific adaptations. There was a common concern that triggered the study – a concern for the public health systems to protect, to promote and to improve the health of the communities. In Malaysia, the study enabled the government to define and identify the functions, tasks and practices that are judged essential in the delivery of public health services in the country. The findings helped inform the reform process, their “Future Health System”.

The Pan American Health Organization carried out a similar initiative in the region, “Public Health in the Americas”, with each country conducting a situation analysis on the health authorities’ performance in each essential public health functions, as part of the overall health sector reform agenda. The processes included promotion of a common concept of public health, a framework for measuring the performance of the essential public health functions and support for self evaluation, laying the foundation for a program to strengthen the infrastructure and improve public health practices in the 41 participating countries. The analysis has laid the foundation for improving public health practices in these countries. The focus on core functions helped them identify core competencies that are needed to strengthen the public health system.

In India, an assessment of essential public health functions (EPHFs) have been carried out at national, state and district level (the latter two in the state of Karnataka), and also a survey on the governance of public health in Karnataka, at state, district and field levels (Das Gupta, Khalegian et al. 2003; Das Gupta and Rani 2004). The EPHF analysis has been instrumental in influencing policy in Karnataka. The Karnataka government is aiming to radically restructure their public health system with clear focus on enhanced disease control and it is developing a new World Bank health sector loan to support this reform. Other states, such as West Bengal, are interested in learning from this and applying the lessons to their own context. The national-level study is only just completed. The tools used for assessment of the functioning of India’s public health system at the federal level were adapted from these developed by the US Centers for Disease Control and the Pan American Health Organization for assessing essential public health functions, and the governance toolkits were developed by the Poverty Reduction and Economic Management unit of the World Bank.

A question often being asked is whether the proposed focus on core government functions in public health -- or essential public health functions -- provide any value added to the traditional focus on disease control, programs and public health services. With the changing epidemiological and demographic scenario, the rapid increase in non-communicable diseases and injuries, the rapid transmission of microbiological threats that respect no boundaries, and other consequences of globalization and economic development, and with the need to increase the efficiencies of public health services delivery -- the traditional focus on disease specific programs and the vertically organized and financed public health services delivered by the health sector will not work as recent public health crisis have demonstrated.

Countries with strong public health infrastructure and core public health functions have the flexibility to prevent, control and rapidly respond to the changing environment. A review of successful public health programs in China and in other countries point in the same direction, as discussed below.

3.2 Analysis of the elements of success in public health in China and internationally

What has worked well and why, in China and elsewhere? An international working group has recently reviewed what works in global health applying strict criteria for impact evaluation of success: large scale implementation, a problem of public health significance, measurable impact on the health of a population, duration at least five years, and cost-effectiveness of program or intervention (Center for Global Development 2004).

Out of the many major public health successes globally, two were documented from China: the prevention of iodine-deficiency disease and the control of tuberculosis. The introduction of iodized salts in 1995 reduced the incidence of goiter among children from 20 to 9 percent and created a sustainable system of private provision of fortified salt, while the implementation of the DOTS approach reduced the TB prevalence by 40 percent and dramatically improved cure rate in half of China's provinces.

Although each public health story is unique, specific to time and place, there are some common features that make for success:

- *Political leadership and champions* -- for example, strong government commitment at the Ministry of Health contributed to the success of salt iodization. The MOH responded to research showing that iodine deficiency compromised the intellectual potential of children.
- *Coordination and collaboration across agencies, large-scale success through public action, strong management, effective use of information, participation of the beneficiary community and effective use of adequate financial resources* characterized these public health efforts that have been found successful through impact evaluation.

- *Technological innovation* – the salt fortification, for example, applied a simple technology, salt factories were upgraded, bulk packaging systems established and modern machines introduced.
- *Stakeholder consensus* – for example, China revamped its ineffective strategies to combat tuberculosis and introduced directly observed treatment short (DOTS) course strategy.

V. LINKS WITH OTHER THEMES

The examination of public health functions have strong linkages with all the other themes of the critical review. For example, public health expenditure reviews and the financing of public health are closely linked; rural and urban health insurance schemes and sustainable financing of public health services, and defining the best buys are interrelated; health services delivery and the delivery of public health services overlap and are not mutually exclusive – an integrated package and delivery strategies for basic (public health and clinical) services need to be defined.

VI. GAPS IN THE LITERATURE AND WHAT IT MEANS FOR POLICY, ANALYSIS AND RESEARCH

This brief review of public health functions in China, identified first of all the lack of consensus on the definition of public health and core government functions. Secondly, there are knowledge gaps in each of the areas of public health reviewed here. More information on the “know-how” is needed, starting with a consensus and agreement on “what” the core functions are in order to then better identify “how to” strengthen each of these inter-related public health functions. Further analysis is needed to respond in-depth to the questions raised by the government:

- What are the core government functions in public health and how do they perform?
- What should the government prioritize?

There is plenty of ongoing analysis of the health sector in China – the challenge is to move beyond problem description to solutions. To fill the gaps in the public health literature, an in-depth analysis of core public health functions are proposed as the next step. Further analysis can go hand in hand with learning by doing; strategic options exist in each public health domain that need testing. For example, providing subsidies for public health services that are pure public goods, defining and disseminating information on the best buys in public health, improving collaboration between the monitoring and law enforcement arms of the CHIS and CDC, applying quality assurance to public health services and accreditation of CDC, and active dissemination of health information and incentives for complete routine reporting – all these options could be subject to operations research and impact evaluation.

In summary, what does this mean for policy, analysis and research?

- Policy: A process of consensus building around core government functions in public health is proposed as a next step, starting with agreement on the criteria for government involvement and investment. Such a process would lead to agreement on what the core government responsibilities for public health are in a market economy. It would inform priority setting in public health, guide financing and define the competencies needed.
- Analysis and research: Further in-depth gaps analysis -- self-assessment and situation analysis -- of core public health functions and public health infrastructure is advocated, drawing on available experiences and methodologies applied in other countries, but tailored for and by China.
- Actions: Build awareness, knowledge and technical capacity in each of the core public health functions – not waiting for further analysis and policy formulation – but learning by doing in parallel, in order to more effectively prevent and respond to acute public health emergencies. Defining and implementing “public health best buys” should be part of the health reform process -- linking actions with a strong “know-how” research agenda. In neglected areas of public health, development of strong intersectoral programs, for example, on road safety, occupational health, health promotion and lifestyle changes. Make monitoring and evaluation integral components of any existing and new public health program.

This means a shift in the focus of policy, analysis and research:

- *from* infrastructure hardware needs *to* people and their competencies;
- *from* narrowly defined services and service delivery *to* broader intersectoral actions for better health in addition to strengthening of health services delivery;
- *from* vertical disease specific program solutions alone *to* horizontal cross cutting problem solving;
- *from* clinical services alone *to* dealing with the root causes and underlying risk factors of the major health outcomes;
- *from* dealing with health as a sectoral issue alone *to* health as a key development issue;
- *from* aggregate analysis *to* disaggregate analysis of problems by income, geographical area *and to* the application of other methodological tools for policy research and analysis that help target the growing inequities of rural poor.

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