PRIORITIES AND STRATEGIES FOR HEALTH INFORMATION SYSTEM DEVELOPMENT IN CHINA

How Provincial Health Information Systems Support Regional Health Planning

Submitted by
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<td>Australian Bureau of Statistics (of Australia)</td>
</tr>
<tr>
<td>ACFDP</td>
<td>All-China Federation of Disabled Persons</td>
</tr>
<tr>
<td>ACFTU</td>
<td>All-China Federation of Trade Unions</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<tr>
<td>AIHW</td>
<td>Australian Institute of Health and Welfare (of Australia)</td>
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<tr>
<td>ALOS</td>
<td>Average Length of Stay</td>
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</tr>
<tr>
<td>BMU</td>
<td>Beijing Medical University</td>
</tr>
<tr>
<td>BOD</td>
<td>burden of disease</td>
</tr>
<tr>
<td>BSC</td>
<td>Balance Scorecard</td>
</tr>
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<td>British Broadcasting Corporation</td>
</tr>
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<td>Civil Aviation Administration of China</td>
</tr>
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<td>Chinese Academic of Social Science</td>
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<tr>
<td>CAST</td>
<td>China Association for Science and Technology</td>
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<td>CBA</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>Chinese Centre of Disease Control and Prevention</td>
</tr>
<tr>
<td>CCP</td>
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</tr>
<tr>
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<td>Central Committee of the Chinese Communist Party</td>
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<td>compact disk</td>
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<td>CD-ROM</td>
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<td>China Health Economic Institution</td>
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<td>CHMI</td>
<td>China Hospital Management Institution</td>
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<td>community health station</td>
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<tr>
<td>CHS</td>
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<td>Centre of Health Statistical Information</td>
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<tr>
<td>CIHI</td>
<td>Canadian Institute of Health Information</td>
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<td>Description</td>
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<td>----------</td>
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<tr>
<td>CIO</td>
<td>chief information officer</td>
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<td>CMB</td>
<td>China Meteorological Bureau</td>
</tr>
<tr>
<td>CMS</td>
<td>cooperative medical system</td>
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<td>CNPNGCG</td>
<td>China National Petroleum and Natural Gas Corporation Group</td>
</tr>
<tr>
<td>COPD</td>
<td>chronic obstructive pulmonary disease</td>
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<td>Chinese Population Information and Research Centre</td>
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<td>CPMA</td>
<td>Chinese Preventive Medical Association</td>
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<tr>
<td>CPU</td>
<td>central processing unit</td>
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<td>CT</td>
<td>computerised tomography</td>
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<td>disability-adjusted life year</td>
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<td>DOT</td>
<td>directly observed therapy</td>
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<td>DSPs</td>
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<td>EBP</td>
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<td>Description</td>
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</tr>
<tr>
<td>GP</td>
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<tr>
<td>ICT</td>
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<tr>
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<td>individual identification</td>
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<tr>
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<tr>
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<tr>
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</tr>
<tr>
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<td>MOCU</td>
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<td>Acronym</td>
<td>Full Form</td>
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<td>MOLR</td>
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</tr>
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<td>MPE</td>
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</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
<tr>
<td>MU</td>
<td>medical university</td>
</tr>
<tr>
<td>NBS</td>
<td>National Bureau of Statistics</td>
</tr>
<tr>
<td>NBF</td>
<td>National Bureau of Forestry</td>
</tr>
<tr>
<td>NBSM</td>
<td>National Bureau of Science and Mapping</td>
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<tr>
<td>NCD</td>
<td>non-communicable diseases</td>
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<td>NDPC</td>
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<td>National Development and Reform Commission</td>
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<td>National Economy and Trade Commission</td>
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<td>NIH</td>
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<td>NPC</td>
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<td>NPFPC</td>
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<td>NSW</td>
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<td>out-of-pocket</td>
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<td>Full Form</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>personal computer</td>
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<td>Prevention and Endemic Station</td>
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<td>State Council (central government of China)</td>
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<td>Description</td>
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<tr>
<td>SHS</td>
<td>Society of Health Statistics</td>
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<td>STD</td>
<td>sex-transmitted diseases</td>
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<td>strengths, weaknesses, opportunities and threats</td>
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ABSTRACT

China is moving towards a market economy. The greater use of market forces has made China richer, accelerated modernisation and increased productive efficiency but has created new problems, including, in the health sector, problems of inequity and allocative inefficiency. From 1997, the Chinese government committed to a national policy of regional health planning (RHP), as part of a broader commitment to harmonising social and economic development. However, RHP has been slow to impact on the equity and efficiency problems in health care.

Planning requires information; better health decision-making requires better health information. Information systems constitute a resource that is vital for the health planning and the management of the health system. Properly developed, managed and used, health information systems are a highly cost-effective resource for the nation and its regions. Bureaucratic resistance, one of critical reasons is that regional health planners gained insufficient support from information system. Health information needs to adopt into the new way of government health management.

The objective of the study is to contribute to the development of China’s health information system (HIS) over the next 5-10 years, in particular to suggest how provincial health information systems could be made more useful as a basis for RHP. The existing HIS is examined in relation to its support for and relevance to RHP, including policy framework, institutional structures and resources, networks and relationships, data collection, analysis, quality and accessibility of information as well as the use of information in support of health planning. Data sources include key informant interviews, a questionnaire survey and various policy documents. Qualitative (questionnaire survey on provincial HIS) and quantitative (key informant interviews) approaches are used in this study. Document analysis is also conducted.

The research examines information for planning within the macro and historical context of health planning in China, in particular having regard to the impacts and implications of
the transition to a market economy. It is evident that the implementation of RHP has been retarded by poor performance of information system, particularly at the provincial level. However, the implementation of RHP has also been complicated by fragmented administrative hierarchies, weak implementation mechanisms and contradictions between different policies, for example, between improved planning and the encouragement of market forces in health care.

To support RHP which is needs based, has a focus on improving allocative efficiency and is adapted to the new market development will require new information products and supports including infrastructure reform and capacity development. Provincial HIS needs to move from being data generators and transmitters to becoming information producers and providers. Health planning has moved to greater use of population-based benchmark and demand-side control. Therefore, information products should be widened from supply side data collection (in particular assets and resources) to include demand-side collection and analysis (including utilisation patterns and community surveys of opinion and experience). The interaction between users (the planners) and producers (the HIS) should be strengthened and regional networks of information producers and planners should be established.
STATEMENT OF AUTHORSHIP

Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis submitted for the award of any other degree or diploma.

Not other person’s work has been used without due acknowledgement in the main text of the thesis.

This thesis has not been submitted for the award of any degree or diploma in any other tertiary institution.

Hui Yang
CHAPTER ONE

INTRODUCTION

It is self-evident that information is a resource for decision-making and that access to appropriate health information is necessary for improving health care and creating the conditions for healthier populations (Nilsson and Ljunggren, 2003, page 2).

To develop the information systems upon which health planning and health system management are based is a basic task of stewardship for sustainable health development.

The research reported in this thesis is conceived as a contribution to this task. However, health information systems serve many purposes and include many different players at all levels from local to central.

The specific objective of this research is to evaluate the China’s health information system (HIS), insofar as it supports Regional Health Planning (RHP) and with a particular focus on functions and structures at the provincial level. The study identifies new directions and priorities for health information system development in China.

This first Chapter provides an overview of the research background, study design, and thesis structure. It includes a more personal account my background as a researcher and the origins of my interest in this field.

RESEARCH BACKGROUND

China’s transition from a planned economy to a socialist market economy (SME) commenced in the late 1970s. Market forces are playing an increasingly powerful role in economic and social development. It is widely believed that China has largely succeeded in transition. Incremental reform has brought significant and continuing economic
achievement. By 2003, GDP per capita exceeded US$1,000, a milestone in China’s progression from the status of being a low-income country.

Health status and health care have been undoubtedly improved over the last two and half decades. By 2000, the life expectancy at birth (LE) had reached 71.4 years, the infant mortality rate (IMR) had decreased to 28.4 per thousand live births, and the maternal mortality rate (MMR) had decreased to 53 per hundred thousand (MOH, 2003b).

Capacity for healthcare provision has been generally improved, especially in the urban areas. Total Health Expenditure (THE) as a proportion of GDP reached to 5.4% in 2001 up from 3.2% (of a much lower GDP) in 1980 (Du and Zhao, 2004). Compared with the situation in 1980, the numbers of hospital beds and health professionals increased by 70.3%, 43.5% and 48.2% respectively by 2002. Basic medical insurance for urban employees was initiated in 1994 and extended nationwide in 1998. In 2002, the number of insured urban employees is reached one hundred million.

China’s Communist Party and central government have prepared ambitious blueprints for the next 20 and 50 years. It is expected that China will be a ‘modernised, affluent, democratic and civilised socialist country’ by the centenary of the birth of communist China. By the 2020, Party and government will have ‘further developed the economy, improved democracy, advanced science and education, enriched culture, fostered social harmony and upgraded the texture of life for the people’(CCCPC, 2002). GDP per capita is expected to reach to US$3,000 (Ren, 2004). All people are expected to access basic medical insurance (Sociology Department of Tsinghua University, 2004).

However, opportunities always come with challenges. China is embarking upon a critical period of transition and the process of transition is subject to many influences and pressures. Health reform is becoming an urgent requirement for sustainable socio-economic development. Health administrators, providers and consumers are facing challenges caused by macro transitions. As viewed by researchers, policy makers and health care managers, China is facing a ‘double transition’: a macro transition (from
planned economy to the SME) and a micro transition of the health system (from rigidly rationed healthcare provision to marketised and cost-effective service).

There are costs associated with economic development guided by the principle of prioritising productive efficiency and encouraging groups and regions to become richer. These costs include widening gaps with respect to accessibility and equity among regions and population groups. Compared with the economic achievements, social programs (including health services) seem to be dropping behind. Equity is becoming a critical issue and a threat to social stability and further development. At this point in the transition, the old system has not been eliminated and the new system has not been perfected. Health reformers have to drive carefully in crossing this critical point.

Chinese decision-makers have recognised that the market should not be the only force determining national development and that economic prosperity cannot automatically bring social equity and welfare. At the national health conference in 1997, a health reform agenda was formally adopted. The government is seeking to find a balance between market and government forces and to clarify the government’s role in health management and service provision. As part of the agenda the central government decided to delegate responsibility for health planning to the provincial and lower levels in keeping with fiscal decentralisation and to enable practical health planning based on local circumstances. Regional health planning (RHP) was designated as a ‘methodology’ for health system reform and a tool for improving allocative efficiency. Two years later, the RHP Guideline was jointly released by three central ministries. Over the succeeding four to five years, the majority of provinces released the Provincial Standard for Health Resource Allocation, and many prefectures formulated their regional health plans.

However, regional plans have proved difficult to implement, and the hoped for outcomes have been rarely achieved. One of reasons is the lack of active, sufficient and quality information support at the provincial level for RHP formulation and implementation.

China’s information system was established 50 years ago in the context of a planned economy and information for planning was focused largely on resource statistics. Some
attention has been paid to HIS reform and development since the 1980s. The establishment (in 1989) of the Centre for Health Statistical Information (CHSI) was a starting point at the central level for a move towards population-oriented and evidence-based health planning. Advances in information technology have also contributed to the rapid development of hospital information systems, telemedicine, and health online.

However, provincial health information systems are facing critical challenges in terms of supporting regional health planning. The traditional function of provincial health information units and centres (PHICs) is extremely limited in comparison with the needs of contemporary health planners. Information produced under the previous centralised planning regime is far from meeting the new needs of decentralised regional planning. Shortfalls in the quality of health planning and implementation may be partially attributable to an out-date information system which is a legacy of the previous centralised planned economy. Health information systems at the provincial level have not been reformed as part of the new approach to regional health planning.

Obviously, health information reform is not a purely technical issue. It relates to decision-making styles (centralised or decentralised), structures of governance (fragmented or coherent), forces of resource allocation (government or market), and orientation of public health planning (people-centred or top-down). The interactions between information custodians and the decision-makers can contribute to improvements in both HIS and health policy. Monitoring and learning during health planning implementation provides feedback messages to both the planners and the information custodians for further improvement in both domains.

The health information system provides the foundation for health system building. With the decentralisation of health planning and other health reform policies there will be increasing demands on local health information providers. The provincial information system is expected to support the RHP of its subordinate prefectures. Successful health reform depends on the support of the information system. Informed and evidence-based health planning contributes to rational resource allocation and utilisation and eventually
to the people’s health. The performance of health information systems and their involvement in health planning has become critical.

Unfortunately, there have been very few studies of China’s health information system. The research reported in this thesis has been directed to understanding the ways in which health information systems, particularly at the provincial level, are contributing to regional planning and how they might do so more effectively.

PERSONAL PROFILE:
THE ROOTS OF MY INTEREST IN THE STUDY OF HEALTH INFORMATION SYSTEMS

I have lived in Beijing, the political and cultural centre of China, for almost 40 years. As a typical Beijinger, I see in Beijing a bizarre mixture of tradition and modernisation. The most brilliant bureaucracies are concentrated in the nation’s capital, constantly presenting political dramas, comedies and tragedies. Living in Beijing, for more than nine centuries the nation’s capital, I have observed that many Beijingers have a natural superiority complex, as their ancestors lived near to the Forbidden City and the emperors. Beijingers are a talkative group who discuss politics with the particular authority which comes from living in the political centre of China.

Beijing is barrel of gunpowder of contemporary China’s tragedies as well as revolutions. Patriotic and radical university students have always stood in the frontline of social and political movements, such as the May 4th Movement of 1912, the Cultural Revolution in 1966 and the June 4th Movement of 1989. Many of the leaders of ideological revolution have emerged from Peking University (PKU) which was established in the Hundred Days Reform in 1898 and renamed as Peking University in 1912. Hundred Days Reform: From 11 June to 21 September of 1898 (103 days), the Qing Guangxu Emperor ordered a series of reforms aimed at making sweeping social and institutional changes.

1 Beijing was selected as capital of Liao, Jin (1125-1234), Yuan (1271-1368), Ming (1368-1644) and Qing (1636-1911) dynasties. After October 1949, Beijing became capital of communist China.
2 PKU was previously named as Metropolitan University (jing shi da xue tang) built in duration of Hundred Days Reform in 1898 and renamed as Peking University in 1912. Hundred Days Reform: From 11 June to 21 September of 1898 (103 days), the Qing Guangxu Emperor ordered a series of reforms aimed at making sweeping social and institutional changes.
Days Reform, and Tsinghua University which was funded by the Boxer indemnity. Cai Yuanpei\(^3\) encouraged ‘freedom of thought’, and ensured that PKU developed as a university in the real meaning of the term (Zhang, 2000b). PKU is a pronoun for democracy, revolution and innovation in China. Seeking new ideologies and critical thinking, young teenagers collect on the PKU campus to attend the lectures of Mr. De (democracy). The Spirit of Tsinghua University (Tsinghua University, 2004)\(^4\) is to guide the nation on the path of scientific and technological achievement. Mr. Sai (Sciences) of Tsinghua University has made a major contribution to China’s modernisation.

My awareness of the big picture started with my early childhood experiences. The Cultural Revolution started just before I was due to attend school. Because my parents were sent to the countryside ‘to work and be changed’, I had to move also from Beijing to the countryside to live with my grandfather – a typical Chinese farmer. Away from the centre of chaos, I spent my childhood (1968-1972) with rural boys. This unforgettable experience was a great benefit to my later career. It gave me an understanding of China, especially the less developed rural areas and of the burdens carried at the grassroots. I identify with the spirit of the Chinese people – their industry, wisdom and forbearance, as well as their parochialism and selfishness.

The Cultural Revolution was a period of darkness for social science. After my return to Beijing, I became absorbed with physical science, especially radio engineering; physical science was seen as the key to modernisation and engineering would provide a stable and reputable career. I had plenty of time to carve circuit boards, surf cheap electronics shops and assemble electronic elements. I enjoyed making a TV sound receiver, my first ‘information tool’, which helped me access more information than most of my colleagues.

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\(^3\) First Minister of Education of the Republic of China and PKU Chancellor in 1917.

\(^4\) Tsinghua University was established in 1911 originally as Tsinghua Xuetang, as a preparatory school for students who were sent by the government to universities in the USA. Tsinghua scholars Wang Guowei, Liang Qichao, Chen Yinque and Zhao Yuanren renowned as the ‘Four Tutors’ in the Institute of Chinese Classics, advocated interaction between the Chinese and Western cultures, the sciences and humanities, and ancient and modern. After 1952, Tsinghua became national centre for training engineers. The philosophy of Tsinghua is to ‘train students with integrity’.
The fall of the ‘Gang of Four’ in 1976 symbolises the rebirth of China from social and economic chaos. However, the scratch line of China’s reform is 1978. The National Conference of Science and Technology (in March) and Argument on Criteria of Truth (in May) are two remarkable events. The Conference and the Argument not only clarified the ideology of China’s socio-economic development, but also signified the beginning of a new emphasis on science and technology – and away from class struggle. Two concepts were clarified, ‘science and technology drive productivity’ and ‘intellectuals are part of the working class’\(^5\). Intellectuals were no longer the dregs of communist society (Yang, 2002; Zhang, 2002a; Chen, 2003; Li, 2003b).

After gate of universities re-opened in 1977, I had the opportunity of being a university student (1979-1984) at Beijing Medical College (BMC)\(^6\). In spare time, I continued to play as an amateur in electronic technology. With the opening up policy, new information flooded into the university campus from the West. Many translations of Western authors could be found. Two of them captured me at once: The Third Wave, written by Alvin Toffler (Toffler, 1980)\(^7\), and Megatrends: Ten New Directions Transforming Our Lives, written by famous American futurist John Naisbitt (Naisbitt, 1982). The work of John Naisbitt (337 pages and a cover price of 0.95 RMB yuan\(^8\)) brought me to a new vision:

\[ \ldots \] We have to release this death grip on the past and deal with the future. We must understand this new information society and the changes it brings. We need to reconceptualize our national and global objectives to fit the new economics of information. (p.13)

\(^5\) Before 1978, the Chinese intellectuals were named as ‘capitalist intellectual’ - educated persons with thoughts of anti-socialism or anti-communism. After the 1980s, peoples who received higher education were called ‘intellectual’. Recently, the term is specified for those educated and with a social conscience.

\(^6\) This college was renamed several times: Medical School of Metropolitan University in 1903, Beijing Medical School in 1912, Medical College of Peking University in 1946, Beijing Medical College in 1952, Beijing Medical University (BMU) in 1985, and Health Science Centre of Peking University in 2000.

\(^7\) Futurist Alvin Toffler predicted that the then-emerging information age would be the ‘third wave’ of major evolution for civilisation, following the first two waves (the agricultural and industrial ages respectively). By emphasising the turmoil of the late 1970s, Toffler placed in stark contrast his vision of a more stable and peaceful information age society.

\(^8\) RMB yuan: Chinese currency unit. In November 2004, exchange rate of RMB yuan and Australian dollar is 6.48: 1, according to the Bank of China (http://www.bank-of-china.com/info/qpindex.shtml).
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In an industrial society, the strategic resource is capital [...] but in our new society, [...] the strategic resource is information. (p.15)

In the information society, we have systematised the production of knowledge and amplified our brainpower. To use an industrial metaphor, we now mass-produce knowledge and this knowledge is the driving force of our economy. (p.16)

In an information economy, then, value is increased, not by labour, but by knowledge. Marx’s ‘labour theory of value’, born at the beginning of the industrial economy, must be replaced with a new knowledge theory of value. (p.17)

During our agricultural period, the game was man against nature. An industrial society pits man against fabricated nature. In information society the game is people interacting with other people. (p.18-19)

Box 1-1 Megatrends: Ten New Directions Transforming Our Lives – John Naisbitt

I expended interest in information, not only on technology, but also on its theories and applications in health management practice. After graduation, I worked in BMU in social medicine and health care management, which sprang up in China in the mid 1980s. Health management, both academic and in practice, spurned the models and styles of the former Soviet Union and turned instead to the USA for inspiration. From 1987 to 1988, I undertook advanced study in the Johns Hopkins University (JHU). I was surprised to find how the development of information technology in Western countries was being utilised to support informed decision-makings.

I have been for many years inspired by my advisor, Professor Chen Yude (one of founder of Chinese social medicine and health management society, former dean of school of public health of BMU, and founder of the CHSII), who guided my adventure in health
management and health information study. With him, I believe that information is the
driver of productivity in improving of health management. Working with Professor Chen
and others, I have been involved in the National Health Services Survey (NHSS), which
aimed to generate information on the demand side (though household interview survey). I
conducted rural health studies (cooperative medical system (CMS) and village doctor
studies) because I believed that improvement of rural health is a precondition for
achieving health equity in China. I was involved in the study of the RHP and participated
in the transition from rational planning to practical planning. Communication with
officials and observation in rural China have helped me to understand the reality of health
bureaucracy and the health and living status of most of my compatriots.

During my teaching and research career, I have been very aware of the weakness of
health information systems in China. Researchers and administrators find it hard, often
impossible, to access relevant and quality information from the current information
system. Information is fragmented and its quality is strongly affected by political and
cultural factors. The collection of new information is costly, as is the analysis of
information which has been collected so data remain unprocessed and not utilised. The
interactions between information custodians and decision-makers are generally limited so
the processing, production and presentation of information does not meet the needs of
users. Health information infrastructure and capacity lag behind while managers and
planners face huge challenges in relation to system performance and responsiveness and
have urgent needs for better data. Meanwhile, decision-making in China remains strongly
political and centralised and often quite independent of relevant information. Many
policy initiatives do not achieve hoped-for outcomes and decision-makers complain
frequently about the uselessness of information reports and academic findings.

I seek ways of breaking through this conjunction. There are some chances. The
reunification of the PKU with BMU has provided new opportunities for researchers and
students. We have more chance to work with disciplines beyond health care and medicine.
We can integrate our knowledge of ‘medical science’ and ‘social science’ based on the
multidisciplinary principle (Wan, 2003). We can access research methods, especially
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qualitative methods, which are quite new for those of us who were brought up within the
traditions of health statistics and epidemiology (Chen, 2000a, pp.23-4).

Identifying priorities and strategies which result in improved health information systems
would contribute greatly to improving health policy, planning and management. In the
past, health management research in China has focused on ‘explaining’ national health
policies, ‘educating’ managers in the theoretical and formal procedures of management,
and ‘interpreting’ management theories and skills. However, I believe that we need to
train our students to use information for critical thinking and arguing current health
policy with conscience. We need to generalise our knowledge from experiences and
make recommendations for promoting informed and evidence-based health planning.

To solving the puzzle of HIS for better health planning is a strong motivation of my
research. To learn how policy analysis can be used for health reform is another drive in
my reversed role from teacher to student. Escaping from the role of ‘fire-fighter’, my
period of study at La Trobe University in Australia has been a wonderful opportunity for
reading, thinking and learning extensively and deeply discussing on confused questions.

I have struggled with fundamental issues in health policy, health management and health
information in China. I have concentrated on ways of improving health information for
better health planning. I hope that by contributing to HIS development and better support
for informed health planning, I may have made a small contribution to better health for
the Chinese people.

SUMMARY ON STUDY DESIGN

The main question addressed in this study is ‘what are the key priorities for the
development of health information systems to support regional health planning for the
next 5-10 years and what might be the best strategies for development?’ Health
information system here is not defined by an institutional system, an information office,
or a specific high-tech system; it is the totality of structures and functions which generate
information to support regional health planning.
A systematic approach is taken to describing and evaluating the nature and performance of the health information system. The procedures for health information production, the quality of data and information and system management are examined. The organisation, infrastructure and capacity of health information systems are discussed. The evolution of health planning, its current influences and future possibilities are analysed. Finally, health information development strategies for better regional planning are recommended.

Qualitative methodology has been used for describing, analysing and evaluating how the health information system works, why information products are inadequate, how internal and external determinants affect information production and utilisation. Key informants at multiple levels and multiple departments have been interviewed. The interview study is designed for understanding the processes and mechanisms of HIS performance and its support for RHP. Documentary review and analysis focus on the standards, regulations and policies governing both HIS and RHP. Field visits and national HIS conferences have provided opportunities for interviews and document collection. Relevant documents from the Government's online archive have also been reviewed and analysed.

Quantitative methods, in particular questionnaire survey and analysis, have helped to provide a general picture of PHICs around the country: their organisational structure, leadership, responsibilities and functions, and opinions on the quality and importance of different health databases for health planning.

The researcher transcribed and translated all interviews and coded the questionnaire returns. Further data processing has been computer-assisted using NVivo and the SPSS for managing and analysing qualitative and quantitative data.

**THE ORGANISATION OF THE THESIS**

The thesis contains twelve chapters. For describing the health information system nationally and exploring options for its further development, it is critical to understand its contexts in relation to its macro and microenvironments. Chapter Two, ‘Transitions in China – study background and orientation of study question’, introduces the macro
transition and health reform. The economic transition in China and the ways in which it has affected health planning and management are described as the macro background of the study. An overview of health policy reform in China follows including especially the evolution of regional planning. Finally, the rationale for the study question is discussed.

Chapter Three, ‘Objectives and methods’, provides details of the study design, including objectives and framework, study questions, research methods, study setting and sampling, as well data analysis strategies.

Study findings are presented from Chapter Four to Chapter Eleven. Chapter Four, ‘Organisation, infrastructure and functions of health information systems’, examines institutional settings, leadership characteristics, inter-departmental relationships and the functions of PHICs. The resources and infrastructure of PHICs are reviewed, including workforce, staff capacity, facilities and financial resources. Major functions of the PHICs are analysed. Information system policy and current priorities are examined and analysed.

Major sources of data of relevance to regional health planning are discussed in Chapter Five, ‘Information available in China’. The sources of information are classified as demographic, socio-economic, epidemiologic, health service resources, hospital and healthcare activities, healthcare cost and health.

Chapter Six ‘Quality of data for health planning’, Chapter Seven ‘Quality of health information’ and Chapter Eight ‘Quality of information system management’, evaluate health information system performance in terms of quality of data, quality of health information provided for RHP, and major issues of information system management.

My interest is in health information systems and how they support health planning. It is therefore necessary to evaluate health planning processes and to explore shortfalls in the health planning processes and the influences which shape these. In Chapter Nine, ‘Macro impacts on health planning and health information system development’, the researcher explored impacts of political and sociological factors on process of health planning and information system management.
Chapter Ten, ‘Future development of regional planning and implication for health information systems’, is based on the opinions of key informants and documentary analysis for policy projection. Trends in health planning policies point towards the directions and priorities for information system development.

Chapter Eleven, ‘Prospects for health information system development’, projects the directions in which HIS will develop and discusses strategies for development based on the opinions of interviewees. Evidence-based RHP will be realised with improved needs-based perspectives, better interaction between users and information custodians, infrastructure construction, networking, cooperation and partnership, and the appropriate application of information technology.

Although all chapters contain summaries, the final Chapter ‘Conclusions and Recommendations’ presents the major conclusions. Recommendations for further practical actions and academic studies are also provided in this Chapter.
CHAPTER TWO

TRANSITIONS IN CHINA – STUDY BACKGROUND AND ORIENTATION OF STUDY QUESTION

In this chapter the background to the study is presented, incorporating the results of a review of both the Chinese and International literatures. An overview of China’s planned economy is provided, including the evolution of health planning. The origins and progress of the economic transition are reviewed and the challenges arising for health management and planning are introduced. Policies for health sector reform are reviewed with a focus of the 1997 policy for regional health planning at the prefectural level. The chapter concludes with a summary of the case for moving towards evidence-based health planning and the need for health information systems which might support such a move.

ECONOMIC SYSTEM TRANSITION

PLANNED ECONOMY IN CHINA – A BRIEF REVIEW

ORIGIN OF PLANNED ECONOMY

The twentieth-century was a time of developing, testing and evaluating the theories and practices of the planned economy. The term ‘planned economy’\(^9\) is closely identified with the social systems of socialist regimes\(^10\), in particular the Soviet economic model with collectivised agriculture and state ownership (Pomfret, 1996, pp. 2-3). According to

\(^9\) Also named as central planning or socialist economy.

\(^10\) According to China Cyclopaedia, planned economy refers to a system of nation governing and fundamental feature of socialist countries. The fundation of planned economy is public ownership of product materials, while government manages and controls nation economy through command and directive plans.
classical Marxist (or Marxist Leninist) schools of socialism, the planned economy was a defining feature of socialism (Chinese Academic of Social Science, 2002).

The fully planned economy was firstly implemented in the Soviet Union, the first communist governed country in the world, following the Russian Revolution in 1917. Planned economies were established in many socialist countries in the following decades. These include the former socialist countries of central and east Europe and countries in the Asian region (Pomfret, 1996, p.1).

INEVITABILITY OF PLANNED ECONOMY IN CHINA

The leaders of the new China lacked any experience in large-scale industrial development (Zhang, 1992), while the experience of the Soviet Union showed the advantages of a planned economy during the early period of a new communist regime facing extreme shortage of resources in comparison with need (Dong, 2001; Wu, 2003b). The planned economy was widely recognised as the most suitable system for national reconstruction and post-war recovery (Chinese Academic of Social Science, 2002; Wu, 2003b).

The adoption of the planned economy also reflected the political ideology of the new leadership. Socialist politicians were committed to the feasibility of the planned economy in China. The ideology of the planned economy was part of the communist aspiration of the Chinese political elite (Zhang, 1992).

The international political environment also forced China to maintain the planned economy (Wu, 2003a). During the period of confrontation between the socialist and capitalist camps during the Cold War, the Soviet Union, China and other communist countries were isolated from outside assistance and threatened by external forces. National survival was the first priority of the Party and the government in the early years of young communist country. The centralised planned economy was a reasonable choice for mobilising limited social resources and helped to strengthen unity and defence capacity.
EVOLUTION OF PLANNED ECONOMY IN CHINA (1953-1978)

China’s planned economy commenced in 1953 and ended (at least the beginning of the end was) in 1978. After a short period of the ‘New Democratic Economy Transition’ (1949-1953)\(^\text{11}\), the planned economy was formally inaugurated in 1953 with the first Five-Year Plan (1953-1957). A rapid period of domestic construction followed based on the Soviet model (Zhang, 1992). China achieved impressive gains during this period: the value of industrial output grew at an annual rate of 18%, while the value of agricultural output rose by an average of 4.5% annually (Zhang, 1992, p.14).

These economic achievements strengthened the confidence of China’s leaders in the planned economy. The second Five-Year Plan (1958-1962) was also featured as the Great Leap Forward\(^\text{12}\) and the Movement of People’s Communes\(^\text{13}\) with higher expectation of the planned economy. The political argument with Khrushchev’s Soviet Union led Chinese leaders to view China as the flagship of the socialist world (Zhang, 1992, p. 14) aiming to progress rapidly towards a prosperous communist society. Unrealistic economic plans were implemented and 24,000 people’s communes were established in the countryside, with centralised accounting and hierarchical management aiming to achieve economies of scale and virtually eliminating the ‘private plot’ and income differences. However, the rash advance caused great disaster and 15 million people died of famine.

A substantial retreat was implemented from 1963 to 1965. A short-lived market economy transition was attempted with a view to improving the national economy by reforming central planning, improving ideological uniformity and strengthening the supplementary role of the market in order to achieve overall coordination and balance among economic sectors and geographical regions (Zhang, 1992, p.15). However, the attempt was aborted

\(^{11}\) Publicised capitalist’s property to state-ownership.

by another serious political movement, the disastrous Cultural Revolution. Government organs, socio-economic development plans, market mechanisms, legal systems, cultural traditions and moral forces were thrown into confusion.

Shortly after the chaos ended (in 1976), the successor of Mao Zedong continued Mao’s thought under the ‘two whatevers’ policy: ‘upholding whatever policy decisions Chairman Mao made, steadfastly carrying out whatever Chairman Mao instructed’. China was still in an era of planned economy until 1978.

GOVERNING AND MANAGEMENT UNDER PLANNED ECONOMY

The structures and practices of the planned economy are still reflected in many ways in the contemporary institutional structures and government activities.

Before 1978, the Chinese government positioned itself as ‘the tool of the proletariat in the context of class struggle’ (CCCPC, 1969, 1973, 1977). The major economic function of government was to quicken industrial modernisation (post-Leninism) with public ownership and central planning (Wu, 2003b, 2003a). Government management under the planned economy was centralised, hierarchical, fragmented and inefficient (Wu, 2003b). Mr. Deng Xiaoping, who was canonised as the ‘general designer of China’s reform’, criticised malpractices and deficiencies of government under the planned economy in terms of bureaucratism, excessively centralised power, patriarchal management, life-long position of leaders, corruption and peculiar interests (Deng, 1980).

State ownership and centralised planning enabled the state to control all productive materials and resources (Wolf, 1990). The central government, led by the powerful National Planning Commission and other authorities, developed dictatorial plans for the inputs and outputs of state-owned enterprises (SOE) involving countless micro-economic decisions (Chinese Academic of Social Science, 2002). The system was free from

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13 Movement of People’s Commune was launched by CCPC in August 1958, with ideology of transferring from socialist to communist country.

14 According to Marxism, economic infrastructure determines superstructure.
competition and involved excessive bureaucracy, inefficiency and waste (Zhang, 1992, p.14). All information required for planning (numeric targets, total salary budgets, and subsidies) and evaluation (often evaluating enterprise achievement of the targets of the plan) was communicated through a vertical up-down bureaucratic system.

Government activities were highly fragmented within the centralised framework. Departmental regulations often conflicted with each other as a result of officials seeking to protect or advance the interests of their department or of ‘their’ sector. There was a lack of coordination and cooperation among and within government departments. Some government regulations even ran counter to the Constitution. The departmental benefit-driven style of management was referred to as ‘restrict one’s activities to a designated area’ and multi-supervisor management. The vertical silos made effective government management impossible.

TRANSITION TO THE SOCIALIST MARKET ECONOMY

China introduced major reforms aimed at making the economy more market-oriented in 1978 (Pomfret, 1996, p.12), which was earlier than Gorbachov’s reform\(^{15}\) (a collection of reform policies listed in Appendix 3). A famous debate on ‘whether practice is the sole criterion for testing truth’ is now marked as the beginning of the ideological transformation of Chinese society (Zhang, 1992, p.19). Deng Xiaoping reaffirmed the importance of practice (over non-practicable theory), re-defined the meaning of socialism in terms of ‘socialism with Chinese characteristics’, and established the goal of Chinese modernisation as the top priority for the Party and government\(^{16}\). In place of ‘class struggle’ Deng introduced the concept of ‘economic democracy’ and challenged the

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\(^{15}\) Mikhail Gorbachov reformed the stagnating Communist Party rule and the state economy by introducing openness, restructuring and acceleration of economic development which were launched at the 27th Congress of the CPSU in February 1986.

\(^{16}\) The speech, titled ‘Emancipate the Mind, Seek Truth from Facts and Unite as One in Looking to the Future’, was presented at the closing session of the Central Working Conference which made preparations for the Third Plenary Session of the Eleventh Central Committee of the Chinese Communist Part that immediately followed. In essence, this speech served as the keynote address for the Third Plenary Session.
convention that socialism necessarily involved the progressive reduction of socio-economic inequalities. By 1981\textsuperscript{17}, ideological confusions were eliminated and common agreement on the philosophy of ‘seeking truth from facts’ was reached.

Reform activities started in rural China. The so-called ‘household contract responsibility system’ had a significant impact on the rural economy. However, the agriculture reform is widely recognised as being initiated by farmers’ spontaneous actions which were subsequently consented to by top decision-makers. The more strategic and planned economic reform started with the establishment of special economic zones in four coastal cities\textsuperscript{18} in 1979.

China’s economic transition has involved an incremental approach, compared with the ‘big bang’ approach in other countries (Lin, Cai and Li, 1996; Havrylyshyn and Wolf, 1999; Havrylyshyn, Wolf, Berengaut et al., 1999). Chinese leaders have negotiated the ideological contradictions involved in the transition very carefully. The new national economic system was vaguely defined as a ‘planned commodity economy’\textsuperscript{19} in 1984 and ‘socialism in the primary stage’\textsuperscript{20} in 1987. In 1992, Deng Xiaoping called for further reform in the course of a tour through southern provinces of China\textsuperscript{21}; the SME was firstly defined in 1992\textsuperscript{22} and detailed strategies were outlined in the CCCPC Decision of 1993\textsuperscript{23}.

The aim of the SME was to enable market forces to drive resource allocation (CCCPC, 1993, 2003) (see also Appendix 3). Three strategic steps were designed for the transition to a socialist market economy. The primary step (1978 to 1993) was to change direction from planned to a market economy, to build infrastructure, to double GDP and to let people ‘dress warmly and eat enough’. The second step (1993 -2003) was to establish the

\textsuperscript{17} The Sixth Plenary Session of the Eleventh Central Committee of the CCPC.
\textsuperscript{18} Four SEZs were established in coastal cities (Shenzhen, Zuhai, Shantou and Xiamen) in 1979. The number of SEZ increased to 14 in 1984 and 140 in 1988.
\textsuperscript{19} The Third Plenary Session of the Twelfth Central Committee of the CPC, 1984
\textsuperscript{20} The Thirteenth Central Committee of the CPC, 1987
\textsuperscript{21} Talks given in Wuchang, Shenzhen, Zuhai and Shanghai, 1992
\textsuperscript{22} The Fourteenth Central Committee of the CPC, 1992.
\textsuperscript{23} The Third Plenary Session of the Fourteenth Central Committee of the CPC, 1993.
The targets for this phase included the reform of the SOE, the development of small business and private enterprise and the non-public economic sector, the development of the market economy, improvement in the government’s macroeconomic control, the reform of government functions, the achievement of a well-off standard of living, and an improved social security system.

‘Crossing the river by groping for stones’. The incremental transition in China has brought significant benefits to the country and people (Pomfret, 1996). However, the process of China’s transition has also been represented as a ‘forward and backward’ process, with a fluctuating balance of different ideologies and stakeholders (Chang and Nolan, 1995, pp.7-8; Zhang, 1992). Some daring Chinese scholars have warned about the negatives of transition (He, 1998; Han, 2002), which governments will face and should face earlier rather than late. These include: continuing moral conflict between collectivism and individualism; growth constraints (such as population aging, restrictions on water and power supplies); unbalanced investment between economic and social sectors; contradictions between domestic and international markets; unemployment of former employees of SOE; and increasing disparities (Wang and Liu, 1999, p.259). In 2003, the Gini coefficient is estimated as ‘no less than 0.50’ (Sociology Department of Tsinghua University, 2004). Meanwhile, political system reform is critical, especially the process of decentralisation (World Bank, 1995; Xu and Zhuang, 1998; Lin and Liu, 2000). Therefore, the next two decades will be critical a period in China’s social and economic development towards a well-off society (CCCPC, 2000; Zheng, 2003).

IMPACTS OF THE SME TRANSITION ON GOVERNANCE

China’s transition involves system innovation. The transformation of the economic system imposes big challenges on government administration (Chi, 2003; Wu, 2003a). The two major directions of government reform are to release space for the market and to delegate power to local levels.
In order to introduce market forces, government functions have to be reframed in terms of indirect (arms-length) involvement, in order to ensure the healthy operation of the national economy (World Bank, 1998; Li, 2002a). Government functions are re-conceived as comprising macro economic regulation, market supervision, social administration and the provision of public services (CCCPC, 2002). The ‘space release’ process involves the conversion of two administrative systems (Xi, 2002; Wu, 2003a). The changes involve firstly a reorganisation of central government, with significant reforms in 1988, 1993 and 1998 (Li, 2002a). The National Planning Commission (NPC) is a good example. Releasing space for market forces involves the NPC stepping back from its previous extensive and detailed involvement in investment planning.

Government re-structuring corresponds to changes in government functions. In contrast to the older planning model, the role of planners now includes identifying rational strategies for national economic and social development including industry-specific and work force policies; economic projection and target-setting for macroeconomic control and key constructions. Government planning focuses on long-term programs, frameworks to coordinate government regulation and market levers.

Economic transition is also a process of decentralisation (West and Wong, 1995). The delegation of power to lower levels of authority is designed to mobilise local knowledge and enthusiasm. The CCCPC Decision 1993 states that, ‘Our nation is a populous and big country; we must delegate necessary authority to provinces, autonomous regions and cities’. However, decentralisation is a complicated process (Pomfret, 1996, pp.18-25) and responsibilities for planning have swayed between central and local government (Qian and Wu, 2003). The reform of the financing and taxation system in China is a significant step towards decentralisation (Jia, 2004). Central administration shares financial accountability and responsibility with other levels of governments. Meanwhile, local levels are encouraged to adopt their own legislation, policies and plans. However, there are strong arguments about decentralisation, including concern about the growing regional disparities which have emerged in both the economic and social sectors (West and Wong, 1995).
The relationship between efficiency and equity is another theme in arguments about the principle which should underpin government policy during the transition (Guo, 2002b; Hu, 2003a; Huang and Shi, 2003; Wan, Zhao and Fang, 2003; Wang, 2003; Song, 2004). Classical economic theory emphasises the role of the market in optimising outputs from scarce resources while moving toward equilibrium. The effect of these market dynamics is to shift resources from areas of lower to areas of higher productivity (Nolan and Croson, 1995, p.10). During the transition, social equity becomes a more critical issue than before (Huang and Shi, 2003). It is widely argued that government needs to strengthen its role in maintaining social equality along with market development. After two decades, government has shifted its principal policy directions from economic development to ‘socio-economic harmonised development’. Social security programs, transfer payment policies (Wang, 2002b), the West of China development project (State Council, 2002), and re-employment programs have been widely established and improved. Medical insurance and healthcare (regarded as social sector) have been placed on the urgent government agenda for reform and development.

To change government functions is not an easy job, especially in China, a vast country with a long history of centralised government and 50 years experience of centralised planning. Reformers can expect to confront strong resistance come from current power-holders (bureaucrats and managers). Strengthening market forces is another way of saying reducing the powers of government officials. In this sense, transition is a kind of deprivation, transferring power from the hands of government officials to the market’s invisible hand. Officials and bureaucracies will struggle to prevent the transition, particularly in their domain, at least in the short term.

The ideology of centralised planning is firmly entrenched in the minds of many decision-makers. They would not like to change their style of governance and perhaps might not know how. Their resistance needs to be addressed in implementing change.

Poorly structured and overstaffed institutions present a particular challenge in steering the reform process. One of the features of the socialist planned economy was the principle of
enterprise welfare and the associated principle of lifetime employment. However, the responsibility of providing housing, pre-school and medical care was a heavy burden on the SOEs as they were progressively exposed to market competition with enterprises which did not have such responsibilities. The principle of lifetime employment was also identified as a major barrier to the labour market flexibility that was a key to releasing the productivity of the new market economy (through greater labour mobility as well as shedding staff where necessary). Many workers were not enthusiastic about leaving the SOEs, including the benefits of enterprise welfare, in the absence of effective social security. The policy named ‘reduce volume of workforce while increasing efficiency’ was not welcomed by many in the workforce. In some sectors, the only effective strategy for reform was to allow for the failure of SOEs. Although the Chinese government introduced this policy as part of the ‘double developments’ principle, which refers to building the social security system at the same time as establishing the new market economy system, the development of the social security system has lagged behind the development of the market economy.

In short, China has achieved significant progress in terms of economic development. The transformation has been achieved largely through incremental change. However, it may be that, at this stage of the transition, strategies used successfully in early stages are no longer so effective as the reform process confronts the core issues. As of now, the transition has not been completed; government roles have not been fully transformed; while social and political contradictions have become more evident. The closer the process gets to the core of system reform, the more necessary it will be to use incremental measures guided by a clear vision (Qian and Wu, 2003). The transformation of government functions will be critical for healthy economic and social development.

These achievements and challenges constitute the context within which this study has been undertaken. The transformation of traditional approaches to health planning, including the reform of the information systems which support such planning, represent a case study of the wider challenges to the structures and functions of government which must be addressed for the continuing success of the transition.
The processes and products of information systems reflect the particular approaches to health planning that such information is supporting. Different styles of health planning need different kinds of support from differently structured information systems. Viewed in system terms, health information systems constitute a sub-system of health planning and management. It is impossible to evaluate and recommend for a HIS without having a clear understanding of the needs of the users it serves (Avison and Fitzgerald, 1988).

To describe and evaluate health planning is a troublesome task (Kroneman and Zee, 1997). Wide variations in planning styles limit any attempt to put together a general description of ‘Chinese health planning’ as whole. The strategy adopted in this research is to study both central planning style and local planning variations and to conduct a contextual analysis of both.

HEALTH PLANNING UNDER THE PLANNED ECONOMY

The Chinese health care system developed as an element of the centralised planned economy. Although the superstructure has changed dramatically, the infrastructure of current health management and healthcare provision reflects in significant degree the legacy of the planned economy (Cai, 2003; Yin, 2003).

HEALTH PLANNING BEFORE THE 1990s

Chinese health planners faced the challenge of an extreme shortage of healthcare resources. Health planners had to focus on strengthening the supply side and expanding service provision: ‘continuously increase provision in order to reduce the gap between supply and demand’\(^\text{24}\).

\(^{24}\) Temporary Regulation on Hospital and Clinics, issued by the State Council in 1951.
The evolution of health planning has entailed a seesaw struggle between centralisation and decentralisation (Wang and Chen, 2003). In the period of the First Five-Year Plan (1953-1957), health planning was conducted in a vertical-horizontal integrated system, as part of mainstream central planning. The procedure of planning was ‘two downwards and one upward’: central government issued the proposed plan, then local governments submitted proposals within the centrally determined framework; the final plan then was released by central government based on local feedback and nationwide adjustment. In 1958, a three tiered (central, provincial and county) finance and taxation system was established, in which financial responsibilities were clearly identified (Liu and Zhu, 1999, p.76). Under this arrangement, the responsibility for health planning was shared between the central and local levels. The county was recognised as the primary base of health planning and the provincial health bureau (PHB) as the regional health planner.

Unfortunately, this early attempt at decentralised health planning was not successful. The Great Leap Forward (1958) resulted in worse health resource shortages. From 1963 to 1965, known as the adjustment period, delegated powers were recalled to the central and provincial level (Liu and Zhu, 1999, p.77). Further centralisation was conducted in the Third and Fourth Five-Year Plan (1966 -1975), and reached their peak in 1968 (Liu and Zhu, 1999, p.77) when the central government retrieved all powers of health resource allocation and formulated all health plans and budgets.

The first five years after the Cultural Revolution (1976-1980) was the turning point, moving from extreme centralisation to incremental decentralisation (State Council, 1979). In order to mobilise social health resources, the State Council approved private practice (State Council, 1980) and authorised industrial and military sectors to provide health services to the public (State Council, 1985b). The authority of healthcare provision was shared between the MOH and industrial and military sectors and private practices. Four year later however, the MOH judged that healthcare provision was ‘out of control’, because of the absence of appropriate legal frameworks and problems with financial arrangement and corporate governance. Unbalanced resource distribution became more
serious and quality of care could not be assured. Therefore, the MOH resolved to ‘put social and private medical practices in order’ (MOH, 1989c).

The directions and style of health planning before the 1990s could be summarised as: (1) a focus on increasing the inventory of assets (institution, building, bed, equipment) and workforce in order to overcome the health resource shortage; (2) planning through centralised bureaucratic commands; (3) vertical and horizontal fragmentation of administration; (4) freedom from market mechanism; and (5) the domination of public ownership.

HORIZONTAL AND VERTICAL FRAGMENTATION IN HEALTH PLANNING

All health resources were publicly owned and government controlled. The central government controlled and allocated health resources on the basis of centrally formulated plans. Officials believed that was necessary to maintain equity and fairness at a time when health resources were in extremely short supply, and to fit the ideology of the Communist Party.

Nominally, health plans and budgets were jointly formulated by the planning, finance and health departments; however, the powers available to the health department to drive implementation were far from sufficient. The management of health care facilities in the SOEs was supervised by the government department which administered that industrial sector and by the level of government to which that SOE belonged. Health care facilities were controlled by different government departments and by different levels of government.

Vertically, health resources are divided into three administrative mainstreams: (1) social health resources managed by health authorities, (2) industrial health resources managed by other departments of government (such as the departments of textiles, coalmines, and railways) and (3) other health resources, such as military administration and private practitioners. In 1978, of 5,548 urban hospitals, 1,750 (31.5%) of them were administrated by the health department and 3,331 (60.0%) of them were administrated by
industrial and other government departments (MOH, 1989a). These sectional structure made plans and gained health resources independently.

Horizontally, each level of government had its designated responsibilities. Local governments and local branches of central departments focused on strengthening their own administrated hospitals.

Between these lines and blocks, clear boarders existed which isolated each from the other. A given hospital was administratively supervised by a specific department and a specific level of government. In urban areas, there might be mix of hospitals administrated by different sectors and levels of government. The combined efforts of these different authorities ensured that that health resources were over-supplied and over concentrated in urban areas and under-supplied in the rural areas.

The health department was in a dilemma. On the one hand, the health department was not authorised to allocate resources beyond the range of the health bureau. On the other hand, the health department at a given level would have limited influence on the plans of their subordinate and superior systems.

ASSETS-FOCUSED PLANNING APPROACH

To increase and maintain capital assets (hospital buildings and beds) and the workforce were the most important targets for health service development during the planned economy. Recurrent health budgets were based on capital assets, such as the number of physicians and hospital beds. Health achievement was assessed in terms of quantitative increases in hospitals, beds, doctors and nurses.

This asset building strategy was necessary when an absolute shortage in resources was a serious barrier to access. However, the continuing expansion of health service assets contributed to the development of large public healthcare institutions and inefficient service provision. The expansion of health care assets became a heavy burden of
government in terms of recurrent financing as well as presenting particular challenges now in terms of health sector reform.

In the last two decades, although the MOH has increased subsidies, total government expenditure on health as a proportion of total government budget has declined. Total health expenditure (THE) per person rapidly increased from the 1980s, from 13.4 yuan in 1980 to 233 yuan in 1997. However, government expenditure was a declining proportion of THE, while out of pocket payments accounted for more than half of THE. According to the MOH, government support for the capital and recurrent hospital budgets fell as a proportion of THE (8.4%, 8.1%, 6.2% in 1993, 1995 and 1997 respectively). The higher-level hospitals have less proportion of revenue from government budget. According to the CHSI (MOH, 2004), 92.2% of hospital revenue is generated from service activities, while this percentage is 92.6% in MOH affiliated hospitals.

CONSEQUENCES OF OLD HEALTH PLANNING

The legacies of health system management under the planned economy include on the problems of overstaffing and inefficiency and present a major challenge to reformers. Reform of the health planning system has been slower than the economic transition, and the information infrastructure and planning practices of the old system still shape contemporary health planning (Hesketh and Zhu, 1997).

OUTSPREAD OF HEALTH PROVISION IN URBAN AREAS

From the 1950s to 1970s, health assets and human resources significantly and constantly increased, even during the period of the Cultural Revolution. In 1949, according to MOH (MOH, 2002b), there were only 2600 hospitals, 84,600 beds, and 505,000 health professionals serving 400 million people. By 1978, the health system inventory has increased many times (MOH, 1989a). The number of hospital increased to 8,841 (including 2,363 county hospitals); the number of hospital beds increased to 1,856,391 (298,326 in county hospitals). 55,016 township health centres (THC) and 747,349 beds
were built in rural areas. The number of health professionals increased to 3,105,572 (1,571,466 in the rural areas).

The health resource inventory increased more significantly after the Cultural Revolution. The major task of health administration at the end of the 1970s and early 1980s was to retrieve the health system from chaos (State Council, 1979, 1985a). Adopted from the ‘four modernisations’ of socio-economic policy, ‘health modernisation’ was set up as the target of the health sector, which represented post-cultural revolution expansion of supply.

From the early 1980s, the health workforce and capital assets increased significantly. From 1980-1997, a total of 59 billion yuan was allocated by government budget as hospital construction subsides (summed for all levels of government). The number of hospital beds increased by 950,000 (an annual increase rate 3.47%) and reached 2.15 million in 1997 (Chen, 2001). The number of health employees increased by 1.20 million (an annual increase rate of 3.4 %) and reached 2.38 million in 1997. During this period 2.47 million medical students graduated from universities or health colleges. Meanwhile, hi-tech medical equipments were equipped hospitals (Chen, 2001). For instance in 1997, CT has been equipped in 73% of urban hospitals and 50% rural hospitals (CHSI, 1998).

Along with the increases in health professionals and hospital beds, utilisation levels also increased in urban China. Hospital admissions increased by 8.42 million between 1980 and 1997. Urban medical provision was changing from under-supply in the early 1980s to over-supply in the late of 1990s.

UNBALANCED HEALTH PROVISION SYSTEM – EQUITY ISSUES

Many expert commentators have concluded the economic and health system reforms are leading to increased inequities in health care (Gao, Qian, Tang et al., 2002b; Bloom, Lu and Chen, 2003; Li, 2004a). One of serious issues in health service provision is unbalanced development between urban and rural areas and between regions (horizontal equity), and between sub-population groups with different need for healthcare including vulnerable populations (vertical equity).
Of course, the health equity issue already existed before the transition (Chou, 2003; Wu, Li, Ye et al., 2003) although it has been exacerbated over the last two decades. Historically, social, economic and health policies for urban China and rural China are significantly different and have been for a long time.

To improve rural health services has now been set up as one of the priorities of national health policy (CCCPC & State Council, 1997). The three tiered health network, CMS and barefoot doctor could be widely found in rural China before the 1980s. In order to strengthen rural primary care and public health services, from 1991 the government allocated 11.5 billion yuan for the ‘three infrastructure constructions project’, which provided subsidies for hospital construction and equipment for THCs, country preventive and endemic stations and county MCH stations.

However, the principle of ‘prioritised rural health’ is hard to realise. The majority of health resources are concentrated in the urban areas, especially in the big cities. In general, 80% of national health resources are allocated to urban China where 20% of the total national population lives, and 80% of urban health resources are located in tertiary hospitals (Yang, 1999b). Health service inequity was criticised in 1969 as favouring the ‘urban milord’ (CCCPC, 1969).

From middle of the 1990s to the present, the average number of hospital beds per 1,000 population has been 2.39 (MOH, 2002b). This ratio has not changed for almost ten years. However, the gap between the rural and urban health resource inventories widened during and after the 1990s. According to the CHSI, number of hospital bed in urban China has continued to increase while that of the rural areas slowly increased until the middle 1980s and has declined since then (Figure 2-1). The number of beds per 1,000 urban population has historically been more than in the rural areas (Figure 2-2). The widest difference between urban and rural areas existed in 1975 with 4.61 beds per 1,000 in urban areas and 1.23 beds per 1,000 in rural areas. From 1975 to the early 1990s, the number of beds increased but with rapid urbanisation the actual ratio decreased. Across
the urban areas, huge variations also exist. In many big cities, the number of beds per 1,000 has reached seven, and some cities more than ten (Yang, 1999b, p.4).

Figure 2-1 Number of hospital bed in urban and rural China

Figure 2-2 Number of hospital bed per 1,000 urban and rural population

There is a similar trend with respect to the health workforce. The number of urban doctors has increased in terms of absolute numbers (Figure 2-3), although the number of doctors per 1,000 population in urban areas peaked in 1985 (at 3.35 doctors per 1000 populations) (Figure 2-4). Although the ratio has declined since the late 1980s (because of urbanisation), the difference between urban and rural is still significant. At present the number of doctors for urban residents is double than that for rural people, 2.32 and 1.17 per 1000 populations, respectively (MOH, 2002b).

In urban areas, hi-tech medical equipment (such as CT and MRI scanners) are oversupplied (as result of seeking hospital revenue through expensive procedures), while in
most rural areas, especially remote areas, there is a widespread lack of basic medical equipment (Yang, 1999b, p.4).

Figure 2-3 Number of doctors in urban and rural China

Figure 2-4 Number of doctors per 1,000 urban and rural population

Unbalanced health resource allocation also presents as gaps between regions. The variation in health resource allocation between regions and provinces is evident in Table 2-1 and Figure 2-5. Within provinces, diversity could also be found. For instance in Jiangsu province (see Table 2-2), Nanjing (the provincial capital) and three industrialised prefectures (Wuxi, Suzhou and Changzhou) have more hospital beds than the rest of the province. Health professionals are also concentrated in Nanjing, Wuxi, Zhenjiang, Changzhou and Suzhou city/prefectures (Jiangsu Health Bureau, 2003). Geographically, provincial health resources are concentrated in the south of Jiangsu, in the Yangzi Delta and near to Shanghai – one of the most developed metropolises of China.
## Population size (2000 Census) (10,000) Number of health institution Number of hospital bed (10,000) Number of registered physician (10,000) Hospital bed per 1000 Registered physician per 1000

<table>
<thead>
<tr>
<th>Province</th>
<th>Population size (2000 Census) (10,000)</th>
<th>Number of health institution</th>
<th>Number of hospital bed (10,000)</th>
<th>Number of registered physician (10,000)</th>
<th>Hospital bed per 1000</th>
<th>Registered physician per 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>126583</td>
<td>324771</td>
<td>317.7</td>
<td>160.3</td>
<td>2.51</td>
<td>1.27</td>
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<td>Beijing</td>
<td>1382</td>
<td>6176</td>
<td>7.1</td>
<td>4.7</td>
<td>5.14</td>
<td>3.40</td>
</tr>
<tr>
<td>Tianjin</td>
<td>1001</td>
<td>2983</td>
<td>4.0</td>
<td>2.7</td>
<td>4.00</td>
<td>2.70</td>
</tr>
<tr>
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<td>6744</td>
<td>20663</td>
<td>16.9</td>
<td>8.0</td>
<td>2.51</td>
<td>1.19</td>
</tr>
<tr>
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<td>6.7</td>
<td>3.40</td>
<td>2.03</td>
</tr>
<tr>
<td>Inner Mongolia</td>
<td>2376</td>
<td>7852</td>
<td>6.7</td>
<td>4.3</td>
<td>2.82</td>
<td>1.81</td>
</tr>
<tr>
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<td>12564</td>
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<td>8.2</td>
<td>4.51</td>
<td>1.93</td>
</tr>
<tr>
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<td>8.9</td>
<td>4.6</td>
<td>3.26</td>
<td>1.69</td>
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<td>6.3</td>
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<td>4.2</td>
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<td>2.51</td>
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<tr>
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<td>9.2</td>
<td>2.33</td>
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<td>8.3</td>
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<td>1.38</td>
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<td>7.0</td>
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<td>8.4</td>
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<td>0.97</td>
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<td>2689</td>
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<td>1.0</td>
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<td>Tibet AR</td>
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<td>0.4</td>
<td>2.29</td>
<td>1.53</td>
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<tr>
<td>Shanxi</td>
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<td>9.7</td>
<td>4.9</td>
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<td>1.36</td>
</tr>
<tr>
<td>Gansu</td>
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<td>7191</td>
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<td>2.8</td>
<td>2.30</td>
<td>1.09</td>
</tr>
<tr>
<td>Qinghai</td>
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<td>1847</td>
<td>1.7</td>
<td>0.8</td>
<td>3.28</td>
<td>1.54</td>
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<tr>
<td>Ningxia AR</td>
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<td>1.4</td>
<td>0.8</td>
<td>2.49</td>
<td>1.42</td>
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<tr>
<td>Xinjiang AR</td>
<td>1925</td>
<td>6705</td>
<td>7.1</td>
<td>3.4</td>
<td>3.69</td>
<td>1.77</td>
</tr>
</tbody>
</table>


**Table 2-1 Basic indicators of health resources by provinces of China**
Figure 2-5 Health resources among China’s provinces

<table>
<thead>
<tr>
<th>City/prefecture</th>
<th>Hospital beds N</th>
<th>Hospital beds Per 1000 population</th>
<th>Physicians N</th>
<th>Physicians Per 1000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>174499</td>
<td>2.38</td>
<td>102157</td>
<td>1.43</td>
</tr>
<tr>
<td>Nanjing (capital)</td>
<td>23059</td>
<td>3.83</td>
<td>13313</td>
<td>2.36</td>
</tr>
<tr>
<td>Wuxi</td>
<td>17901</td>
<td>4.03</td>
<td>8373</td>
<td>1.91</td>
</tr>
<tr>
<td>Xuzhou</td>
<td>18210</td>
<td>1.98</td>
<td>11396</td>
<td>1.26</td>
</tr>
<tr>
<td>Changzhou</td>
<td>11842</td>
<td>3.38</td>
<td>6436</td>
<td>1.88</td>
</tr>
<tr>
<td>Suzhou</td>
<td>19148</td>
<td>3.23</td>
<td>10605</td>
<td>1.82</td>
</tr>
<tr>
<td>Nantong</td>
<td>20040</td>
<td>2.46</td>
<td>11000</td>
<td>1.41</td>
</tr>
<tr>
<td>Lianyungang</td>
<td>8271</td>
<td>1.78</td>
<td>5115</td>
<td>1.10</td>
</tr>
<tr>
<td>Huai'an</td>
<td>7941</td>
<td>1.51</td>
<td>4990</td>
<td>0.96</td>
</tr>
<tr>
<td>Yancheng</td>
<td>12542</td>
<td>1.52</td>
<td>9036</td>
<td>1.14</td>
</tr>
<tr>
<td>Yangzhou</td>
<td>11285</td>
<td>2.42</td>
<td>6447</td>
<td>1.43</td>
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<td>Zhenjiang</td>
<td>7889</td>
<td>2.87</td>
<td>5078</td>
<td>1.90</td>
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<td>Taizhou</td>
<td>10402</td>
<td>2.04</td>
<td>7456</td>
<td>1.48</td>
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<tr>
<td>Suqian</td>
<td>5969</td>
<td>1.12</td>
<td>2912</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Source: Jiangsu Health Bureau (2003), http://www.jswst.gov.cn/tjxx/sheet005.htm

Table 2-2 Basic indicators of health resources in Jiangsu Province

NHSS reports suggest that health needs declined in both urban and rural populations over the last decade with the more rapid decrease in the urban areas (Gao et al., 2002b). However, the change has not led to more resources being allocated to the rural areas – the place with the higher level of need. The lowest income quintiles in the urban areas (most of whom are unemployed workers) and rural areas (especially those who live in remote
areas) receive less in the way of health services but are likely to have greater needs. The vertical equity issue is particularly serious in relation to inpatient services.

The design and implementation of health insurance programs have not done anything to redress the horizontal and vertical inequities. Health insurance is delivered according to classification of social class (Li, 2002c). Farmers are not able to access government health insurance (Feng, Tang, Bloom et al., 1995; Liu, Hsiao, Li et al., 1995). In urban areas, health services are recognised as a kind of welfare to the SOE workers through labour insurance scheme (LIS) and government employees through government insurance scheme (GIS)(Henderson, Jin, Akin et al., 1995).

**LACK OF ALLOCATIVE EFFICIENCY**

<table>
<thead>
<tr>
<th>Economics definitions</th>
<th>Meanings on health planning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productive (technical) efficiency</strong></td>
<td>For any given level of output, the value of inputs used to produce is minimized (World Bank)</td>
</tr>
<tr>
<td><strong>Allocative efficiency (Pareto efficiency)</strong></td>
<td>An economy provides its members with the amounts and types of goods and services that they most prefer. It occurs when resources are allocated in such a way that any change to the amounts or types of outputs currently being produced (which might make someone better off) would make someone worse off (World Bank).</td>
</tr>
<tr>
<td><strong>Dynamic efficiency</strong></td>
<td>Focus on innovation and measures how well a producer adapts to changes in consumers’ tastes for different goods and services. It is a balance between short-run concerns (static efficiency) with long-run concerns (focusing on encouraging and implementing R &amp; D)</td>
</tr>
<tr>
<td><strong>Horizontal equity (local equity)</strong></td>
<td>People with a similar ability to pay taxes should pay the same amount.</td>
</tr>
<tr>
<td><strong>Vertical equity (global equity)</strong></td>
<td>People with a greater ability to pay should hand over more tax to the government than those with a lesser ability to pay.</td>
</tr>
</tbody>
</table>

Note: the trade-off between equity and efficiency is also called ‘exchange efficiency’.

**Table 2-3 Concepts of efficiency and equity**

The distribution of health resources reflects a gross lack of allocative efficiency (see definition in Table 2-3). The top-down planning model had failed to respond to the needs of populations and community. Fragmented administration had resulted in poor
coordination and cooperation on regional health planning, and left few chances for patients’ referral between hospitals, between hospital and community health, and between rural and urban services. Health planners and the providers of separated departments at each level had allocated resources based upon their perspectives and their powers and in some had neglected social effectiveness. ‘They added more hospital beds, recruited more health staff, and bought more hi-tech equipment, regardless of regional health needs’ (Yang, 1999b, p.4).

The duplicated and unbalanced health investment in urban areas existed not only between departments, but also even within the health department. Firstly, health departments of different administrative levels would commonly invest in health resources in the same urban district, as a consequence of poor agreement and negotiation among health departments of different levels. Secondly, health department were investing more resources in curative care (hospital care) in contrast to of preventive and community services, although ‘prevention first’ had been set up as one of the basic principals of national health policies for more than 50 years. During this period of urban hospital extension, many preventive undertakings and public health services were ignored and under-funded. Poor health planning induced poor resource mobilisation and distribution especially in relation to rural health, preventive services and community care. The more cost-effective programs (such as MCH services, disease control and prevention and health promotion) had to find ways of earning money to survive, although they were nominally non-for-profit organisations and should have been financed through the government budget (in circumstance of lacking private funds in China).

LOW PRODUCTIVE EFFICIENCY

Low level of productive efficiency (see definition in Table 2-3) is an inherent disadvantage of the planned economy. The pressure of market competition had been eliminated since all means of production were transferred to public ownership in the 1950s. Private hospitals decreased from 800 in 1949 to 21 in 1985. Monopolised state ownership and collective ownership resulted in weak competition. There was little
motivation to improvement of medical service quality and efficiency nor other aspects of institutional and system performance.

It was expected that productive efficiency would improve when competition was introduced into the health sector. However, the health care market on transition was immature. Productive efficiency was recognised more widely as an issue in the 1990s. For instance, each doctor in the outpatient departments serviced 5.6 patients per day on average in 1980 and this number decreased to 4.6 in 1997. The average number of patient serviced by doctor of inpatient department declined from 2.1 to 1.4 per day (Chen, 2001).

Bed occupancy rates of urban hospitals declined from 82.7% in 1985 to 69% in 1994, to 66.9% in 1995, and then 61.7% in 1997 (Yang, 1999b, p.5). The newly released data (2001) of occupancy rates is 61.3% in county and higher level hospital (CHSI, 2001). Average length of stay (ALOS) is 11.8 days (MOH, 2002b, p.62). The CHSI has suggested that the major reasons for this continuing decline in occupancy rates was the rate of increase in bed numbers was greater than that of the population as well as a trend to shorter ALOS and the deterrent effect of more expensive hospital charges (CHSI, 1998). However, Chen Yude argued that health statistics report data overestimated the decline of service utilisation. An increased number of patients went to industrial or military hospitals and private medical practices which are not indicated in MOH statistics (Chen, 2001). Chen Yude also suggested that a decline of the number seeking hospital care can be attributed to unestablished labour insurance (as consequence of ill-operated SOE) and rapidly increase of hospital cost. The combined effects of the two factors dislodged patients from hospital care to drug store or self-care.

The pressures of maintaining over-supplied assets and over-staffed public hospitals compelled the government to implement perverse financing policies. Hospitals were allowed to gain extra economic benefits from drug services and new technology, in order to recover declined government subsides. In 1997, 51.6% of hospital revenue was gained from drug price differences (CHSI, 1998). Meanwhile, the price for labour intensive services remained below the cost of production (MOH, 2003b).
These perverse incentives distorted the practice of health professionals. Senior doctors in urban tertiary hospitals provided treatment of common diseases with high cost (Yang, 1999b, p.5). From 1980 to 1997, the annual increase rate of hospital charges was 26.0% and 23.8% for outpatient and inpatient services respectively. In 1998, general hospitals administrated by the health department charged patients 68.8 yuan per outpatient visit and 2596.8 yuan per inpatient separation on average (Chen, 2001).

Health facilities administrated by other departments have been working at even lower levels of productive efficiency. These hospitals comprise 24% of total hospital beds and 24.7% of health professionals (Yang, 1999b, p.5) but served only 10% of the national population. The occupation rate of these hospitals was 51%, which is lower than hospitals of the health department (CHSI, 2001, p.64).

Under the pressure of this complex of perverse incentives, the focus of hospitals and clinicians has been on revenue generation, in many cases at the cost of quality of health care. Among the hazards to quality have been overservicing where the price exceeds the cost of production, as in prescribing and the use of hi-tech equipment, and underservicing as in large outpatient departments where, because fees are fixed at a relatively low level, the only way hospitals can break even is to have high volumes, and brief consultations (associated with over prescribing and over investigation) provided by staff carrying very heavy workloads.

Nevertheless, compared with other public services and SOE, public hospitals seem to be relatively profitable. From 1980 to 1997, 3,208 new hospitals were established by health department and 3,131 new hospitals by other government departments. According to a study undertaken by the CHSI, most of those new hospitals were small-scale, had low occupancy, and poorly qualified staff (CHSI, 1999). Although health departments claim that patient satisfaction is very high (for instance the rate of Jiangsu province is 89.5% in 2003), consumer association surveys did not confirm this. Medical services were ranked as the most unsatisfactory of 13 services polled in Suzhou city (Jiangnan Daily, 2003);
medical service was ranked as the most frequent cause of complaint by consumers, based on a report of a national consumer association (Wang, 2004).

**HEALTH REFORM AND REGIONAL HEALTH PLANNING**

Many of the problems in health care appear to have been getting worse during the transition period (Wong and Gabriel, 1998; Wu, Mao, Chen et al., 1999) and as a consequence health sector reform has become an urgent agenda item. The broad direction of Chinese health sector reform involves a re-orientation of the role of government to focus more on the financing of healthcare, and to withdraw from service provision as well as extending the role of market mechanisms in the organisation and delivery of health care (World Bank, 1997; Ren, 2000; Wang, 2000; Miao, 2003).

Various pilot programs of health sector reform were implemented from the early 1990s (Cai, 2003; Rao, 2003). For instance, the urban medical insurance arrangements were piloted in 1992, formally implemented (in Jiujiang and Zhenjiang prefectures) in 1994, extended to 383 cities (prefectures) in 1992, and formally implemented nationally in 1998 (Cai, 2003). The RHP was piloted in Jinhua, Baoji and Jiujiang prefectures in 1989 and formally launched in 1999.

The Decision of CCCPC and State Council on Health Reform and Development (CCCPC & State Council, 1997) is recognised as an important landmark of national health reform during the transition period. The objective of health reform and development is identified as ‘to provide higher quality health services at lower cost’. One of the policy principles of health reform is ‘without the departure from country realities, to rationally allocate resources with a focus on promoting quality and efficiency’ (CCCPC & State Council, 1997).

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25 The Health Conference 1996 is called ‘First National Health Conference’. At the first session, all top leaders, including President of China, Premier of State Council and Chairman of National People’s Congress, attended the conference. The Decision was approved by the Conference in the end of 1996 and released on 15 of January 1997.
Central government has re-defined the government roles in health development (MOH, 2003b) as (1) providing public health goods, which includes public health financing, infrastructure construction, rural health improvement and disease control and prevention; (2) marketing medical services, which involves government taking an arms-length relationship to medical provision and encouraging multiple ownership within the health industry in order to let market forces play a major role in determining medical resource allocation; and (3) regulating the market and establishing a social safety net. One of the key tools for realising these transformations is regional health planning.

PREDECESSORS OF REGIONAL HEALTH PLANNING

One of uncertainties facing the health reformers concerns the degree to which the general principles, which have been adopted for the SME transition across the whole economy, can be applied to the specific challenges of health sector reform. The SME transition is designed to let market forces play a fundamental role in resource allocation. However, health services (especially public health services) are not simple commodities that fall into a framework of classical economic theories. Government has to play a number of important roles in health care including governance, provision and funding, as well as regulating to prevent and correct for market failure. On the one side, government should be encouraging development of medical market in order to improve productive efficiency and satisfy increasing and diverse demands; while on the other side, government should provide, fund or purchase public health services and basic care to all, especially those in rural and remote area, for the purpose of improving equity and allocative efficiency.

Many governments around the world have sought ways of achieving rational health resource allocation for effectiveness and equity of health services. The Resource Allocation Working Party (RAWP) of the UK was an early attempt to allocate NHS resource to geographical regions based on relative need rather than historical accident (Department of Health and Social Security, 1976; Carr-Hill, 1989; Smith, TA, Carr-Hill et al., 1994; Department of Health, 2000; Shaw and Smith, 2001).
In China, the evolution of China’s RHP policy can be tracked back to the late 1980s. At that time, health officials refused to introduce a market mechanism into the health sector. Working on the principle of ‘put social and private service in order’; the MOH and provincial health departments sought to strengthen their bureaucratic powers with a view to rationalising urban medical services.

Hospital accreditation and the three-level hospital hierarchy were introduced by the MOH in the late 1980s (MOH, 1989b, 1996). In contrast to other countries (such as Australia (Duckett, 1983)), China’s hospital accreditation was organised by the health department and based on the traditional health bureaucracy. Accreditation was tied to pricing policy so that hospitals accredited at a higher level could levy higher charge and acquire more hi-tech equipment. Teaching hospitals in the urban areas entered this system with a strong advantage and other urban hospitals were motivated to acquire new equipment and buildings, even preparing false reports in order to jump to the higher level. Hospital accreditation neither limited the expansion of urban health resources nor facilitated allocative or productive efficiency nor equity (Lin, 1999).

After the failure of hospital accreditation, the State Council recognised that the key is to break department fragmentation and to allocate resources based on a region-wide perspective. Regional Medical Institution Planning (RMIP) was implemented based on Medical Institution Administration Regulation (MOH, 1994b; State Council, 1994). Based on regional medical service demands, RMIP aimed to rationally allocate medical resources and ensure basic medical services were provided to all citizens. In contrast to hospital accreditation, the RMIP was authorised by the SC while the MOH was given the responsibility for implementation and supervision. The consolidated planning involved medical institutions administered at different levels, within different administrative sectors, and with different ownerships (MOLSS, 1999). The RMIP was formulated in county, prefectoral and provincial health departments, based on guidelines provided by the MOH (MOH, 1994a; Chi, 1996). The approved RMIP was recognised as the administrative reference point for evaluating and approving the setting up on new medical institutions through a licensing and supervision system.
Although the RMIP is similar to the RHP (regional and need-based programs), there are some differences between the two: (1) the RMIP is a market free program while the RHP assumes a mixed-economy environment; (2) the RMIP focused mainly on productive efficiency while the RHP is mainly focused on allocative efficiency; (3) the RMIP was concerned with improvement of service quality while the RHP has more emphasis on equity of care; (4) the RMIP was focused on medical facilities while the RHP takes a more comprehensive focus on health services generally; (5) the RMIP is managed by the health department (although authorised by the SC), while the RHP is managed by a multi-departmental coalition (led by the planning commission); and (6) the RMIP was designed as a tool for an entry-control policy, while the RHP is designed to improve cost-effectiveness, cost-efficiency, equity and quality of care of existing providers as well as new entrants.

Health planning evolved further during the 1990s. A World Bank health project (World Bank, 2002a, 2002b)\(^{26}\) introduced the concept of RHP into China in the end of 1980s. ‘Full of reforming spirit’ (FLO, 2002b; Duan, 2004), the project implemented a set of integrated measures to solve specific health issues, in a given administrative region encompassing both urban and rural populations. After gaining experience from this project, RHP was finally adopted as a government tool for health reform in the Decision of the CCCPC and the SC on Health Reform and Development in 1997 (Decision 1997).

**REGIONAL HEALTH PLANNING POLICY**

The aim of RHP ‘is to satisfy the essential health care needs of the population in a given region, and to rationally allocate health resources with respect to capital development, beds, staff, equipment and recurrent budgets’ (CCCPC & State Council, 1997). A planning official of the NDRC provides a simple interpretation: ‘the RHP focuses on allocative efficiency’ (Hou and An, 2003).

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The RHP as practised has involved setting standards for health resources allocation based upon health needs, focusing particularly on health institutions, hospital beds, the health workforce and medical equipment. The objectives of RHP are to establish an effective, economic and equitable health service system and management scheme, which adapts to national and local strategies of economic and social development. The capacities of health services and the efficiency of health service provision are expected to improve and advance under the RHP (NDPC, MOF and MOH, 1999).

The principal procedure of the RHP was clarified in the Decision of 1997. The primary region for the RHP will be at the prefectural level which includes both urban and rural areas. Prefectural governments should develop and implement their regional health plans ‘in accordance to the guiding principles of RHP and standards of health resource distribution, set forth by the central and provincial people’s governments’. ‘Based on the regional health plan, the health authorities should provide policy guidance, organise coordination, monitoring and supervision to support health development in the region. Existing health resources should be gradually adjusted and new provision strictly reviewed before approval’ (CCCPC & State Council, 1997).

The RHP is a regional integrated plan which aims to change the planning perspective from departmental-based to population-based. Health resources controlled by other government departments are expected to be integrated into the regional health plan. The Decision of 1997 required that the administration of health institutions affiliated with government enterprises ‘should be gradually transferred to health department based on the actual situation and due exploration’.

A significant portion of national health resources is controlled by the military system. Military hospitals generally provide services to the local population as well as military personnel. The Decision of 1997 does not mention how to integrate military health resources into the RHP. However, an agreement issued by the MOH and GLD (General Logistics Department, Chinese People’s Liberation Army) requires the closure of any military health institutions that do not fit local health planning (MOH & GLD, 1996).
Based on this agreement, there will be a role ‘for a limited number of military hospitals which have particular technical advantages, are welcomed by their local publics and conform with the RHP’. Health services (to local population) provided by military hospitals have to be approved by the government health department.

**Figure 2-6 Integration of regional medical resource management under the RHP**

In order to strengthen steering of RHP, a joint steering group (led by reform and development commissions) is set up in central, provincial and prefecture levels. Health bureaux involve (instead of lead) the formulation and implementation of RHP.

**PROGRESS OF REGIONAL HEALTH PLANNING**

Five years have passed since the RHP Guideline was issued. By 2003 the majority of provinces had documented RHP implementation plans and had released provincial Standards. Many prefectures have released their RHPs (Hou and An, 2003).

There have been many practical instances of RHP formulation. A significant number of RHPs focuses on urban hospital groupings (Qian and Lin, 1998; Tian, Li and Zhao, 2003; Zhang and Ran, 2003) where inefficient community and secondary hospitals are networked with a tertiary hospital. RHP in an isolated industrial city seems relatively easy because the institutional re-structuring is conducted within the scope of the industrial corporation (Zhang and Ran, 2003). Although RHP’s objective is to improve
allocative efficiency (CCCPC & State Council, 1997; Palme and Torgerson, 1999) most RHPs are still focused on productive efficiency (Ning and Ren, 2003; Jiang, 2004).

Facing delays in the roll out of RHPs, the central steering group has urged the provincial authorities to speed up the process. More paperwork has been generated under strong pressure from the central level. However, RHPs have still proved difficult to implement (Hou and An, 2003) according to the government’s progress reports and statistical analysis. Table 2-4 illustrates the widening gap between urban and rural health resources after RHP policy was issued. As the table showed, the urban health inventory, utilisation rates and cost levels still increased significantly, while rural health facilities and human resources significantly decreased.

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2003</th>
<th>change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Hospital</td>
<td>16010</td>
<td>17844</td>
<td>↑ 1834</td>
</tr>
<tr>
<td># Hospital bed</td>
<td>2102800</td>
<td>2269500</td>
<td>↑ 66700</td>
</tr>
<tr>
<td># Registered physician</td>
<td>1637300**</td>
<td>1740250</td>
<td>↑ 102950</td>
</tr>
<tr>
<td>Hospital bed occupied rate</td>
<td>66.9%*</td>
<td>65.3%</td>
<td>↓ 1.6%</td>
</tr>
<tr>
<td>Charge for outpatient service</td>
<td>39.9 yuan*</td>
<td>108.2 yuan</td>
<td>↑ 68.7 yuan</td>
</tr>
<tr>
<td>Charge for inpatient service</td>
<td>1667.8 yuan*</td>
<td>3910.7 yuan</td>
<td>↑ 2242.9 yuan</td>
</tr>
<tr>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># THC</td>
<td>51797</td>
<td>44279</td>
<td>↓ 7518</td>
</tr>
<tr>
<td># THC Bed</td>
<td>733100</td>
<td>672741</td>
<td>↓ 60359</td>
</tr>
<tr>
<td># Health professionals in THC</td>
<td>918870</td>
<td>906000</td>
<td>↓ 12870</td>
</tr>
<tr>
<td># Village clinic</td>
<td>804350</td>
<td>515000</td>
<td>↓ 289350</td>
</tr>
<tr>
<td>THC bed occupied rate</td>
<td>31.3%**</td>
<td>36.2%</td>
<td>↑ 4.9%</td>
</tr>
</tbody>
</table>


*: Data are adapted in Chen Yude (1999).

**: Data are unavailable, then replaced with data of 2001.

Table 2-4 Comparing major indicators before and after RHP implementation

CHALLENGES FOR REGIONAL HEALTH PLANNING

Some of the difficulties facing government health planning can be attributed to demographic and epidemiological changes. As in other countries, China is facing a rapidly aging population. Non-communicable diseases, combined with communicable disease and injuries have brought significant challenges to the Chinese healthcare system.

However, most of the difficulties of RHP formulation and implementation reflect particular constraints of the administrative and political environment (Li and Zhu, 2003),
for instance, fragmented health administration and uncertainties about the role of
government. China’s health planning is facing a double burden: an inflexible old system
and an immature new system. Health reform is conducted in two battlefields: internal
governance and the external market (Hou, 2001; Zhong, 2003). Government plays two

One particular issue which reflects these contradictions is the planning paradigm adopted
by regional planners. The traditional approach has been a planning perspective based
largely on assets (physical and human). If planning is to encompass issues of quality and
productive efficiency rather than simply ‘maintain public hospital’s operation’, the
planning perspective will need to be widened to include population indicators of need and
contemporary servicing and utilisation patterns, perhaps even outcomes. This shift in
planning orientation has significant implications for health information system
development.

**AMBIVALENT REGULATORS**

Djankov and colleagues comment that tighter entry controls cannot produce better quality
of public or private goods (Djankov, Porta and Slanes, 2001). China’s policy of entry
control is problematic. Hospital accreditation and the RMIP are examples of Chinese
health administration, which sought to use entry control policy as a planning tool but
which were ineffective or may have made things worse.

Part of the problem is the conjunction of weak regulatory tools and ambivalent
government departments. Where health departments have close relationships with ‘their
own’ hospitals, there is scope for using an incomplete regulatory regime to protecting
government powers and departmental interests.

Health officials are very aware of the implications for ‘their own’ sector when they
formulate and implement the RHP. Where regulation of entry is a major tool of
governance, and where health departments are both ‘judge’ and ‘player’, RHP can serve
as a tool of protecting public institution and workforce against market forces, enlarging
the market share of public providers and blocking the entry of outside providers. Moreover, RHP became a tool for seeking rent (Shi, 2004).

**U-TURN TO NEED-BASED HEALTH PLANNING**

For a long time, health resources have been allocated and administrated through a top-down departmental hierarchy focused primarily on supply-side investment (NDPC et al., 1999). However, RHP is intended to be need-based planning. Therefore, government resource allocation (for public goods provision or purchasing) requires a fuller understanding of the demand side, in order to respond to the population’s needs, including redressing horizontal and vertical inequities.

However, this u-turn in planning perspective confronts both political and technical barriers. The centralised decision-making model (see detailed discussion in Chapter Nine) mitigates against a need-based approach. The lack of an information system that collects, processes, analyses and produces demand-side information for health planning is a technical barrier.

Policy makers in transition are perplexed about planning and fall into two groups: radical policy makers who advocate a laissez-faire approach and conservative planners who aim to maintain the role of government in planning. Although some radical policy makers have limited knowledge or experiences of need-based health planning, they criticise all planning as jiang hua (‘rigid’, similar pronunciation to ji hua (planning)). They believe the future of health management should be largely free of regulation. They expect that the ‘invisible hand’ can handle everything. On the other hand, however, are the conservative planners who fear the onrush of health reform and aim to maintain the old approach to planning.

Lack of demand-side information regarding health planning is a critical technical weak point of local health planning. Although provincial governments issued their Standard of Regional Health Resource Allocation, many of these ‘standards’ are based on asset levels.
reflecting previous forms of planning and perhaps the interests of government health institutions.

**TREND TO INFORMED HEALTH PLANNING**

Better health planning requires better information support. The more uncertainty the planner faces, the more information support he or she needs. Naturally, social programs have higher uncertainty than physical sciences, while system transition adds more uncertainty in health planning. Therefore, to encourage more informed and evidence-based policy-making is a strategic approach for health management and development.

In the Decision 1997, information has been recognised as one government tool for health management, combined with other measures such as law and regulation, principles and policies, programs and directions, as well as financial incentives.

The reality is that health information systems have lagged far behind the needs of decision-makers. Data collections and information productions are suitable for planning under the planned economy. Some of the weaknesses of existing health information systems have been summarised as: data collection is incomplete and unsystematic, databases are out-of-date and unexchangeable, information flow and feedback is blocked, system infrastructure and human resource is inadequate and obsolete, and the system is isolated and fragmented (Office for National Statistics, 2002).

The requirements for health information are significantly different in the modern period from those of the planned economy. The focus of health resource allocation has shifted from equal availability to performance, efficiency, effectiveness and equity. The information needs have shifted from supply side and asset-focused information to demand-side and utilisation-focused information and in due course to outcome focused information. Health reform needs an integrated and open information system for involving stakeholders into health planning (Frossard, 1990). Decentralised health planning requires a strengthened HIS in order to meet the needs of local health planners (Tchokobou, Leduff, Beux et al., 2003). Local health planners need to be able to use their
HIS to support community input in order to improve responsiveness. Information tools are needed for bridging the gap between the knowledge of health planner and the demands of region and community (Aubel and Mansour, 1989).

Weak health information systems are common in developing countries (WHO/AFRO, 1999). Improving HIS is a strategic approach to sustainable health development and sound health planning in the developing world. Pappaioanou and his colleagues suggest three strategies of HIS development for developing countries: improve the ability of health planners to use information, improve the capacity of technical advisors, and strengthen HIS performance (Pappaioanou, Malison, Wilkins et al., 2003). Health departments of some developing countries have changed centralised reporting systems to health management information systems which enable managers to use information at the same level as it is collected (Gladwin, Dixon and Wilson, 2002). Matokovic developed a prerequisite matrix through a business systems planning study (Matokovic, 1994), and identified eight sub-systems of information for public health decision-making. These were: managing, resource, health-ecology, epidemiology, social medicine, statistics and analysis, health economic and development. Health resource management, statistics and analysis and health-ecology are identified as more important than the others.

In China, the CHSI has strengthened capacity for providing quality information products. However, provincial and prefectural HIS have not been well developed. Chinese colleagues have even suggested the need for a revolution in information systems (Tao, 2001). Both health planners and researchers look forward to improved health information systems, in order to meet the needs of informed health planning and thereby contribute to people’s health in effective and equitable ways.

**IMPACT OF INFORMATION TECHNOLOGY**

Information technology (IT) is a powerful tool for both economic development and evidence-based planning. In the health sector, the impacts of IT development can be found at the consumer, professional and health management levels.
IT has brought great benefits to consumers of healthcare. Many people in the developed world (32% Europeans and 43% Americans) use the Internet for health information. 21% of Europeans and 23% of Americans read something on the Internet before they visit a doctor (Eaton, 2002a). IT for informed-consumers is a big market for business and a hot topic of study (Ferriman, 2002). Many consumer-targeted HISs have been developed (Diseker, Michielutte and Morrison, 1980; Slater, 1999; Kwiatkowski and Brennan, 2001; Eaton, 2002b; Tuffs, 2002; Slater and Zimmerman, 2003). Other studies focused on the quality of Internet health information (Impicciatore, Pandolfini, Casella et al., 1997; 2000; Milne, Booth-Clibborn and Oliver, 2000; Pandolfini and Bonati, 2002) usually suggest that the reliability of information needs to be improved.

IT has provided significant help to health professionals. Professional knowledge resources are managed in the information age in electronic formats. New technology leads to innovations in medical sciences. Evidence-based medicine (EBM) is becoming the mainstream of clinical practice (Chinese Cochrane Centre Hong Kong Branch, 2003). Meanwhile, evidence-based policy (EBP) has been widely applied in health planning (WPRO, 2001; Lin and Gibson, 2003. p.xvii-xxvi), including the situation analysis for policy (SAP) in selected provinces (Shannxi, Guangxi, Zhejiang) (MOH, 2002f).

IT development has also increased the capabilities of governments in planning (Lanvin, 2003). Informed planners and managers can contribute more effectively to the allocation and use of resources. IT enables community and individual participation in the decision-making process. Transparent and networked health information helps to prevent bureaucracies from making arbitrary decisions, and improves timeliness and responsiveness of services. For supporting informed public health policy and strengthening the public health system, comprehensive on-line public health information systems have been established in the developed world (Friede, Reid and Ory, 1993). However, compared with systems serving consumers and clinicians, health information systems for government health planning and management still lag well behind needs and expectations (Agbam and Sim, 1997).
The expert application of modern health informatics also improves the performance of HIS in the collection, analysis, delivery and feedback of health information. Well equipped HIS can collect data quickly and accurately, process data using comprehensive software and deliver information to users through networks faster than before. Full cooperation between IT experts and users (both clinicians and health planners) is a critical step for successful health informationalisation in aspects of health efficiency (price and performance improvement) and effectiveness (decision making support) (Parker, 1995).

Management in the new millennium means managing through uncertainty and perhaps managing through disaster (Nolan, Brennan, Coyne et al., 1998). Health information systems appropriately equipped with IT and staffed by adequate numbers of appropriately trained experts is a necessary feature in the information age. China has already experienced the benefits of IT in the course of controlling the SARS crisis in 2003.

PREVIOUS HIS STUDIES

There have been many studies on management information systems focusing on how specific systems are designed and introduced, such as school systems (Johansen and Orthoefer, 1975), occupational health systems (Morrill, Oser and Kusnetz, 1971) and referral service systems (Cauffman, Lloyd, Lyons et al., 1973). Some publications have focused on HIS planning (Glasser, 1971).

Studies of HIS assessment methods and criteria are to be found in many journals. Many of them focus on Internet information evaluation, such as quick review method (Wilson and Risk, 2002), consumer perspective qualitative method (Eysenbach and Kohler, 2002) and particular evaluation instruments (Gagliardi and Jadad, 2002; Purcell, Wilson and Delamothe, 2002). Evaluation of computerised information systems in developing countries and for vulnerable populations are also to found (Gladwin et al., 2002), such as hospital information networks in South Africa (Herbst, Littlejohns, Rawlinson et al., 1999), computerised demographic and health information systems in Mali (Stewart,
Schroeder, Marsh et al., 2001), and Aboriginal demographic information in Australian hospitals (Hargreaves, 2001).

Hospital information system is a hot topic. For instance, the National Institute for Clinical Excellence (UK) recently conducted an evaluation project for assessing hospital information systems (Littlejohns, Wyatt and Garvican, 2003). Using quantitative and qualitative methods, this study showed that failure of hospital information systems is commonly due to lack of users’ understanding of system implementation and underestimation by designers of the complexity of healthcare tasks.

There are many different perspectives and criteria on information system evaluation. Eppler and Wittig summarised a conceptual framework of information quality (Eppler and Wittig, 2000). Clikeman suggested relevancy, reliability, timeliness and cost as key quality indicators of information products (Clikeman, 1999). Strong et al argued that quality assessment should follow the internal processes of the information system (Strong, Lee and Wang, 1997b). Chinese colleagues suggested information quality evaluation could be classified in terms of external information quality, accounting information quality and statistics information quality (Cao and Wu, 2002). The Australian Bureau of Statistics’ core principles of information system development are relevance, integrity, access for all, professionalism and trust of provider (ABS, 2002, page 3).

To link information system performance with effectiveness of government decision-making process, World Bank experts (Islam, 2003) suggested that transparency and accessibility correlate positively with quality of governance.

From the early 1990s to the present, a number of relevant articles have focused on inequality with respect to access and poor quality of health information in the developing and developed worlds (Kale, 1994; Singer, 2001; Richards, 2004). Recently, strategies for improving information quality and accessibility have shifted from professional-used systems to consumer-used systems with suggestions that IT could help improved dissemination of information to the consumer (Edejer, 2000).
Not all efforts in HIS development have gained positive outcomes. The WHO (1994) argued that many efforts to strengthen information systems have produced little improvement and have sometimes made the problems worse. In China, available articles focus on health statistics, hospital management information systems and clinical information systems. No systematic study focuses on strategies of regional information system development for the RHP.

The research reported in this thesis explores health information support for regional health planning with a focus on provincial HIS development. The research aim is to find rational directions and strategies for the development of provincial HIS so that they might contribute to improved regional health planning, and hence to more effective, efficient and equitable health services as well as the better health of people.

**SUMMARY**

Reform is the second revolution in China. From the end of 1970s, China has embarked on the transition from the planned economy to the SME. The macro transition has brought significant changes. Health reform and development must adapt to this macro environment in order to meet increasing health demands in effective, efficient and equitable ways.

Health reform in China walks with difficulty. Regional health plans are hard to formulate and implement. The health information system, as a necessary support for decision-making, is lagging far behind the SME transition and other elements of health reform. Weaknesses of HIS are barriers to the realisation of the goals of health reform policies.

A well functioning HIS is a critical requirement for successful health planning and sustainable health development. This study of health information systems has been initiated, designed and undertaken in the hope that the findings of the research will contribute to improved information products, improved planning and improved health outcomes for China, perhaps contributing also to the wider literature regarding informed health planning.
CHAPTER THREE

OBJECTIVES AND METHODS

Study objectives, conceptual frameworks and research strategies are described in this chapter. A framework of study questions is provided here which will be answered in succeeding chapters. The research setting and sampling methods are presented and data collection and strategies of analysis are described.

OBJECTIVES AND RESEARCH MODELS

OBJECTIVES

The objectives of this research were to evaluate the Chinese health information system, insofar as it is relevant to the RHP, including the policy framework, institutional structures, networks and relationships, data collections, analyses, quality and accessibility of information as well as the use of data in support of planning and decision-making. The research was designed to generate recommendations for new directions for health information systems development in particular to support of health planning.

RESEARCH FRAMEWORKS

A systematic framework was developed for the purpose of organising logical components of the research. This framework is described in the following narratives (from macro to micro) and is modelled as Figure 3-1:

(1) Both government planning and information systems are developed within a broad macro environment and are affected by political, historical and traditional factors. Health plans and information systems have to be constantly adjusted based on feedback from implementation, that is, learning from practice. The reform and development of the two
systems should incorporate historical lessons and balance interests among stakeholders.

(2) Rational and practicable health planning and management depend upon the accessibility and quality of health information (although decision-making is influenced by many other factors). Decision-making in a complicated policy environment (as in health planning in the SME transition) requires stronger support from the information system in order to reduce uncertainty.

(3) Interactions between the information system and decision-making processes lead to both better decision-making and better information. User involvement in information system design and management contributes to improvement in the relevance, responsiveness and usefulness of the information products, while the involvement of information custodians in the decision-making process leads to a better understanding of information needs, better feedback on the quality of information, positive support from users, and clarity of goals and strategies for further system development. The health information managers are likewise able to monitor and improve the health information system on the basis of feedback from the health planners and implementers.

(4) There are general understandings regarding the quality of information products carried in the wider information management literature including theories and reports of practical experiences, and regarding the principles of information system management, based on the accumulated knowledge and experience of this field and upon general management sciences.

The results of this study are presented in the reverse sequence, moving from the micro to the macro aspects. Firstly, the health information system itself is discussed. The ‘internal system study’ provides understanding on health data and information availability and quality and explores major issues of health information management. Secondly, the tensions between information system and users are explored. The ‘user-system interaction study’ illustrates how information production and system management fit in the changing environment of health planning. Thirdly, the traditions and histories of both information systems and health planning provide a macro basis for consideration of
directions and strategies of further development. Finally, the ‘macro environment study’ contributes to practical and realistic recommendations.

The following sections will explain each of the blocks of the framework.

![Figure 3-1 Framework of study on health information system for health planning](image)

**SYSTEMATIC ASSESSMENT ON HEALTH INFORMATION SYSTEM**

Systematic review of an information system requires a multi-disciplinary approach, because it involves consideration of the procedures for producing information, the policies and legislative backgrounds, the ways roles and responsibilities are distributed, organisational arrangements and implementation processes, as well as coordination mechanisms (Nilsson and Ljunggren, 2003, p.2).

Three approaches of information system assessment could be found in the literature. The classical and most widely used are a variety of economic methods, which originated as cost-benefit analysis (CBA) but have evolved into the discipline of information economics. This approach has a significant drawback in terms of evaluating HIS that are expected to yield benefits that are primarily intangible, indirect or strategic in nature (Parker, Benson and Trainor, 1988; Farbey, Land and Targett, 1993; Brown, 1994). The second type of assessment study is based on an experimental design which applies prototyping and simulation as major study tools (Smithson and Hirschheim, 1998). However, few studies appear to have addressed the issues of evaluation via simulation in an explicit manner. The third approach is believed to be the most appropriate for the
evaluation of information systems for health planning. Multi-objective and multi-criteria methods focus on involving a wide number of stakeholders in the evaluation process in an effort to facilitate ‘informed’ judgement on the expected value of the information system (Chandler, 1982). Value analysis, for instance, emphasises better information and better decision-making as the primary benefits of information system, and seeks to explore the value added by improvements to the information system (Guimaraes and McKeen, 1989; Rivard and Kaiser, 1992). Among these three approaches, the qualitative perspective (the third approach) is the most appropriate for this HIS study, because it can generate ideas about how to improve HIS in order to add value to RHP.

In another perspective, information system research can also be classified in two interrelated dimensions: first, analysis of the collection, processing and use of information products and second, analysis of organisational management. The first focuses on how effectively and efficiently the information generates, collects, analyses, maintains, retrieves, presents and uses, while the second focuses on how effectively and efficiently the system is managed in terms of planning, financing, staffing, controlling and evaluating, in order to satisfy HIS objectives. Most information production can be analysed in accordance with Forrester’s industrial dynamics model (Ahituv and Neumann, 1986, pp.110-8), which traces the paths of information flow from one stock to another and locates key weak points in the system affecting information production (see Figure 3-2). Information management research commonly applies general management theories for system performance evaluation and improvement. Likewise, the concepts and principles of human resource management (HRM), strategic planning and managing change are also frequently used. Both these two dimensions, the technical and the managerial, are explored in this HIS study.

In studying information production, it is useful to distinguish between ‘data’ and ‘information’. Data are collected, transmitted, processed and stored by an information system. To respond to inquiries of various decision-makers (patients, clinicians, public health planners, funders and other stakeholders), information (meaningful data) is retrieved, distributed, presented and used (Newell and Simon, 1972; Ahituv and
OBJECTIVES AND METHODS

In this research ‘data quality’ refers to quality at the early stages of production, from data collection to database storage, while ‘information quality’ refers to quality at the later stages, including information retrieval and utilisation. The term of ‘HIS quality’ takes the system perspective. Quality issues concerning data and information (see decision points in Figure 3-2) and HIS management are discussed separately in relevant chapters. This logical framework of quality of data, quality of information, and quality of information system is illustrated in Figure 3-3).

Figure 3-2 Health information production (based on Forrester’s industrial dynamics model)

Figure 3-3 Quality of data, information and information system
Quality of data and information

In general, information may be recognised as poor quality because it does not reflect real world conditions or is not easily used and understood by users (Wang, Kon and Madnick, 1993). However, this definition is not sharp enough for measuring and evaluating. As the basis for evaluating and improving for China’s HISs, practical indicators for quality evaluation are required.

Criteria for data and/or information quality and information assessment models vary according to their perspectives, for example, whether they are strong in their analytic (scientific) dimensions or in their pragmatic (practical) dimensions (Eppler and Wittig, 2000).

Many evaluation studies regarding data and/or information quality are focused on intrinsic quality without regard to information processing and utilisation (Strong et al., 1997b) particularly when the evaluators are system managers or information practitioners. This approach is important but insufficient to improve HIS performance in helping to solve complex planning problems. The evaluation also needs to incorporate the perspectives of the various stakeholders if the usefulness of the information is to be regarded as a dimension of quality.

In this HIS study, three interest groups have been involved: health data manufacturers, HIS managers and health information consumers. Among these stakeholders, the opinions of data manufacturers (collectors and processors) reflect upon the technical aspects of quality of data and/or information (intrinsic quality, such as objectivity, validity, accuracy, etc)(Ballou, Wang, Pazer et al., 1998). The system managers’ perspective evaluates quality in terms of the performance of the health information system (including efficiency, accessibility, security.). The judgement of the health planner reflects on how effectively and efficiently the system supports decision-making (relevance, timeliness, comprehensiveness) and adds value to health planning (contextual quality). Users also provide useful feedback regarding the ‘technical’ side of information.
improvement, such as interpretability, ease of understanding, concise and consistent representations (Strong et al., 1997b; Strong, Lee and Wang, 1997a).

Quality in HISs is a multi-dimensional concept (Pipino, Lee and Wang, 2002). The evaluation of data or information quality could be conducted through an objective approach (based on measurable quality indicators) or a more subjective approach (stakeholder opinion regarding defined parameters of quality) (Wang et al., 1993). In this study, the qualitative approach has been used. A panel of quality parameters have been defined based on the user-oriented approach and the findings of previous studies (Wang, Storey and Firth, 1995; Strong et al., 1997b; Clikeman, 1999; Pipino et al., 2002).

1) **Objectivity/validity**: unbiased, can be checked to make sure that is correct by verifying or reference to multiple sources;

2) **Accuracy**: detailed, reflect full-scale of events or facts;

3) **Relevancy**: relevant to the purpose they are to serve and closely response information demands.

4) **Sensitivity**: reflect significant changes in health status or quality of service;

5) **Comprehensiveness**: provide full range of information which related with decision-making.

6) **Development**: data have been analysed adequately;

7) **Timeliness**: decision makers gain current and relevant facts to ensure appropriate responses to specific situation;

8) **Economic viability**: the usefulness and benefits of the information exceed the cost incurred in collecting and processing the information;

9) **Simplicity**: easy to interpret and understand;

10) **Appropriate volume**: volume of information do not cause cognitive overload;

11) **Comparability**: standardised, able to be shared on an interdepartmental and intradepartmental sharing and exchange basis; and

12) **Projectability**: information products provide reasonable forecast on indicators for health planning.
Current approaches to HIS management have been evaluated in terms of the following aspects.

1. **HIS strategy and plan management.** System planning is the starting point for system development (Eagar, Garrett and Lin, 2001, pp.3-25). Comprehensive and forward-looking strategic plans are the key to the development of successful information systems. A variety of critical pressures, such as rapid changes in technology, scarcity of experienced IS professionals, scarcity of other organisational resources, and increased demands on evidence-based health policy, require HIS managers to plan for the development of their systems. Strategic planning for HIS development has been studied in this research in the context of the macro transition from planned economy to market economy; the health transition from the biomedical model to the biomedical-psychological–social model, and information technology innovation. The planning and management of HIS subsystems (such as hospital system, MCH system, disease control and prevention system, demographic system, medical insurance system) are discussed. System diversities between rural and urban and among regions are also included in the range of study.

2. **HIS organisation management.** The performance of health information systems reflects the organisational contexts in which they are managed and funded (Ahituv and Neumann, 1986, p.342-80). Organisational and managerial aspects of HISs have been studied in this research, in particular, issues of organisational structure, staff structure, leadership style, and relationship with host system. Cooperation and coordination among health related information systems are essential preconditions for effective HIS functioning. Therefore, departmental and centre-local relationships are also studied.

3. **HIS resources management and capacity building.** Scarcity of HIS resources forces system planners and managers to prioritise resource allocation and management. Regional plans will be inefficient and unilateral when planners rely on fragmented and
specious information systems. Planners have to balance investment strategies between high-technology information facilities and fundamental capacity building; how to set up rational staff structures and motivate people to work for organisational goals, and how system resources may be integrated and coordinated for efficient and effective HIS performance. HIS resource management and its impact on system performance are included in this research.

(4) **HIS function design.** System functions, determined by system goals and objectives, indicate how system activities should be arranged and organised. The functions of provincial HIS have been examined in detail in order to explore the links between system design and system activity and the demands of health planning.

(5) **HIS interfaces.** HIS should be an open system. There are three sets of windows which should be well designed and operate effectively (Ahituv and Neumann, 1986). The first one is for users through which inquiries are lodged and responded to (dialogue management). The second one is for system partners through which information is shared and cooperation organised. The third window is that through which the HIS engages with the wider environment, ensuring relevant and sufficient data collection, creating new information sources, and responding to social needs on health information. Standardisation provides a ‘common language’, which enables the effective functioning of these windows. ‘Stable, robust, simple and straightforward’ standards were perceived as essential when the RAWP formula was implemented in the UK so that funding decisions were seen as fair (Carr-Hill, Maynard and Slack, 1990). The effective functioning of these windows also depends on stakeholders reaching agreement on and commitment to system goals, objectives, partnerships and outcomes.

(6) **Government role on HIS management.** Government is the biggest information collector, processor, storer and user but also has coordinating responsibilities, perhaps through a national health information authority (as in Australia), which can develop a national data dictionary and achieve agreement on minimum datasets. This research has
also sought to identify and clarify the role of government in relation to information system development.

**USER-SYSTEM INTERACTION: THE RELATIONSHIP BETWEEN HEALTH INFORMATION PROVIDERS AND USERS**

Most information interaction studies have focused on human-machine relationship with a computer science perspective (Norman, 1986; Toms, 2002). However, the researcher focused on interaction at the system level, that is, the relationship between information system and decision-making process, especially the interaction between HIS and health planning.

*Users’ involvement and investment in HIS development*

Sufficient involvement of health planners will benefit information system performance and the quality of information production. Information system improvement is driven by new demands. The macro transition and health reform have produced many new demands for health information. The effectiveness of a HIS in support of decision-making depends on clear vision and guidance from the health planners (Figure 3-4).

Health planners have to clearly articulate their needs and appreciate their dependence on HIS. For instance, what are the ‘levers’ or implementation mechanisms, which will be used to drive the changes planned for in regional health plans? Financial mechanisms, which modulate demand such as the use of casemix purchasing, are frequently used in health planning, in Australia and other jurisdictions. The use of such implementation levers has important implications for information requirements. The regulation of the marketplace also involves new levers and new monitoring requirements with further implications for information products.

*HIS involvement in health planning process*

On the other side, information manufacturers and custodians need to walk out of the
kingdom of the information professional and the statistics bureaucracy. User-friendly interfaces should be established and maintained; feedback about information quality and utilisation should be collected and analysed; and new information products should be developed according to the model of health planning and the nature of health problems. Accessible and high quality information will promote effective health planning. In some circumstances, advances in information technology may contribute also to innovations in health planning.

The relationships between health planning and HIS development are a key theme in this research, as modelled in Fig 3.4 below.

Figure 3-4 User-HIS interaction

MANAGING CHANGE – MONITORING, ADJUSTMENT AND LEARNING

The development and improvement of both health planning and information management involve learning from the past. Four learning pathways have been studied in this research in order to identify the channels that should be established or strengthened in the future (see Figure 3-5).

(1) Learning from HIS and health planning interaction. Health planners guide HIS development by providing a vision and objectives, while the contribution of HIS to health planning improves through relevant accessible and quality information and the use of appropriate IT applications.
(2) **Learning from the cycle of ‘health planning – implementation – monitoring – evaluation’**. Health planning learns from practice and adjusts its protocols and procedures according to evaluation, while HIS indirectly learns from the health planning process.

(3) **Learning from cycles of ‘information system – planning – implementation – monitoring - evaluation’**. HIS is actively involved in the learning process and is one of the key nodes of the learning chain.

(4) **Learning from external (international) experiences**. International experiences and lessons from other sectors are analysed and the lessons arising are incorporated into general understanding. HIS and RHP is improved based on integration of practical and general understanding.

Ideally, these learning processes function simultaneously. However, in the real world, there are many hazards, which may interrupt these learning pathways. For instance, weak HIS reduces practicability of RHP planning and makes implementation difficult; departmental fragmentation may be an obstacle to learning from other sectors; language limitations and weaknesses in critical thinking may result in misinterpretation of international experiences; lack of monitoring and evaluation tools may prevent comparisons with benchmarks and assessments of the extent of goals reached.

![Figure 3-5 Learning process of HIS and RHP](image-url)
This research, including the recommendations and suggestions which arise from it, is part of an ongoing process of learning and must be contextualised in relation to previous cycles of learning and the structures and processes which have supported these cycles. This has involved an historical review of the co-evolution of HIS development and regional planning in China, as depicted in Figure 3-6.

**Figure 3-6 Logic of health planning and HIS study**

**STRATEGIES FOR REACHING OBJECTIVES**

**RHP AS CASE STUDY OF HEALTH PLANNING**

It is impossible to evaluate a HIS without regard to its functions and purposes, one of which is health planning. However, health planning is a very broad field, too broad to provide the evaluation criteria for a study of this size. However, the policy for regional health planning, announced as part of the 1997 Decision (see Chapter Two), provides a
much more circumscribed framework for evaluating HISs against their contribution to planning. The RHP policy represents a major development in health planning and a significant step in negotiating health reform in the context of SME transition. As such, it is a matter of close interest to health planners and health policy analysts. As discussed in Chapter Two RHP is facing significant challenges. There is active debate in academic and policy circles; some of the critical arguments concern the quality of provincial HIS support to RHP formulation and implementation. To select RHP support as the criterion for evaluating HIS will help to develop academic debate and generate practical suggestions for both planning and HIS development.

PARALLEL INTERACTIONS – HIS AND RHP

HIS and RHP are recognised as interactional entities in the study. They are shaped by some of the same determinants although there are specific factors in each case. Changes created from one side always have implications for the other side. A descriptive analysis of existing HIS and a review of health planning evolution from extremely centralised health planning to RHP was the first step of the study. An evaluative and analytical study of health information performance and its impact on RHP followed. Recommendations regarding HIS priorities and strategies, as well as RHP improvement strategies are based on findings of the earlier components of the study (Figure 3-6).

QUALITATIVE-QUANTITATIVE COMBINED APPROACHES

The selection of data collection and analytic approaches is determined by the nature of the problem (Achterberg, 1988). In this research, qualitative and quantitative methods are used for collecting evidence and answering specific study questions.

The qualitative approach, based on naturalistic philosophy (Achterberg, 1988), is used for collecting and interpreting data with a view to understanding (making sense of) health planning and information system development. Data have been collected through key informant interviews, one of the traditional methods of qualitative data collection, and
published and administrative sources. Interpretative thematic analysis has been used to
draw out from these data an understanding of HIS and health planning processes, and
their contexts and limitations.

A quantitative approach (using a self-administered questionnaire) has been used to collect
data from PHICs. The data thus collected provide a basis for analysing and generalising
from the experiences and opinions of PHIC managers regarding the quality of
information, the importance of various system components and strategies for system
development.

RESEARCH QUESTIONS

This study provides an academic analysis which government planners may be able to use
in the development of health information systems for health planning, and information
system manager may be able to use for improving HISs.

MAIN QUESTION

The main research question is: What are the key priorities for the development of health
information systems for provincial health planning for the next 5-10 years and what
might be the best strategies for development? More concrete research questions are
developed for understanding both fields of health planning and information system.

DETAILED QUESTIONS

ORGANISATIONS OF HEALTH INFORMATION

1. What are the organisational (both professional and administrative) arrangements for
   HISs at central and local levels? How do these arrangements affect the quality of
data/information and HIS performance?
2. What are the relationships between central and provincial information systems? How
   has decentralisation affected previously hierarchical relationships?
3. What are the internal structures of PHICs? How do these structures affect the quality of data/information and system performance?

4. How are PHICs led and supervised? How do styles of leadership and supervision practices affect PHIC involvement in health planning?

5. What are relationships of the PHICs to administrative, professional and academic bodies? How do these relationships affect information sharing and system efficiency, effectiveness and performance?

   - What is the intradepartmental relationship within the provincial health bureau (the position of the PHIC on the organisational chart)? How do PHICs cooperate with other health information sub-systems?

   - What is the relationship with other bureaux of provincial government? Who are key partners and what is the pattern of cooperation with them?

   - What are the relationships with (provincial, national and international) universities, research institutions and other ‘think tanks’? How do these relationships affect the quality of data/information and HIS performance?

   - What are the relationships with professional associations (such as statistics, management and information technology)? How do these relationships affect the quality of data/information and HIS performance?

   - What are macro-environmental and historical meanings of these relationships and/or partnerships? What are the potential ways to coordinate, cooperate and communicate between PHICs and other agents?

RESOURCES OF HEALTH INFORMATION SYSTEM

1. What are capacities and features of health information professionals and system managers?

   - What is the education and professional background of PHICs managers?

   - What is the education and professional background of PHIC staff?

   - How are changing information demands challenging PHIC capacity?
2. What are the physical (and IT) facilities of PHICs? How do internal and external factors affect HIS investment?

3. What are financial resources of PHICs? What sorts of developments do PHIC managers give priority to (for example, investment in IT or human resources capacity building)?

FUNCTIONS AND MANAGEMENT OF PROVINCIAL HEALTH INFORMATION SYSTEM

1. What are the major responsibilities of provincial HIS?
   - What role do PHICs play in government health planning and regulation?
   - What role do PHICs play in health data collection and management?
   - What role do PHICs play in system development (system design, human resource management, setting up standards and networks, IT applications)?
   - How do HIS identify and prioritise information needs and information products?

2. How do HIS manage routine activities and changes?
   - What are the regulations and standards of the system?
   - How is the HIS organisation reformed? What are opinions of HIS staff and supervisors?
   - What are the mechanisms for safeguarding information quality and promoting system performance improvement?

INFORMATION AVAILABLE FOR REGIONAL HEALTH PLANNING

1. Who has responsibility for demographic data collection? How they are collected and processed? How accessible are they?

2. Who has responsibility for socio-economic data collection? How they are collected and processed? How accessible are they?

3. Who has responsibility for epidemiologic (mortality and morbidity) data collection? How they are collected and processed? How accessible are they?
OBJECTIVES AND METHODS

4. How are hospital and healthcare activity data collected and processed? How accessible are they?

5. How are healthcare cost data collected and processed? How accessible are they?

6. How are (population-based) health needs and demands data collected and processed? How accessible are they?

7. To what extent are qualitative data and information collected and used (besides the traditional statistical collections)?

8. What are the gaps between health information demands and accessibility?

9. What are the major factors (for example, departmental fragmentation, communication technology, lack of regulation and standards, local protectionism) which affect data collecting, processing, and accessing?

QUALITY OF HEALTH DATA AND INFORMATION

1. What is intrinsic quality of data for health planning? What are the major barriers to maintaining and improving the quality of health data?

2. What is quality of health information for health planning? What are the major barriers to maintaining and improving the quality of health information?

3. What is the responsiveness and performance of the health information system in supporting health planning? What are the major barriers to improving the performance of provincial health information systems?

HEALTH PLANNING AND NEW DEMANDS ON HEALTH INFORMATION

1. How is the SME transition affecting health planning, resource allocation and the people’s health?

2. How is health planning changing along with the economic system transition? What are the features of health planning reform at the local level, especially in relation to regional health planning?
3. What are the strategies, mechanisms and tools for managing change towards more rational health resources allocation?

4. How are RHPs developed at the local level? What are the processes of regional health planning in the real world? What are the restrictions on the RHP formulation and implementation? What are the new demands for information supports under the RHP?

5. How are decision-makers and reference groups (Communist Party, people’s congress, people’s government) involved in RHP? What information demands can be identified based on their specific orientations and perspectives?

6. How do various sociological determinants (such as social class and benefit restructuring, dual Chinese society, decentralisation, etc) affect health planning and resource allocation? What additional information would be required to assist planners in factoring in these sociological issues into the processes of health planning?

PRIORITIES AND STRATEGIES OF HIS DEVELOPMENT

1. What are the international experiences from which China can learn?

2. What are the suggested strategies and actions for the consideration of central government for RHP and HIS improvement?

3. What are suggested strategies and actions for the consideration of central health information managers for assisting provincial HIS improvement?

4. What are suggested strategies and actions for the consideration of provincial governments for RHP and HIS improvement?
Health policy analysis and management study is an interpretive art, not a mechanistic and quantitative science (Giacomini, 2000). Qualitative research method is appropriate for a study such as this, which is focused on meanings and interpretation (Ezzy, 2002, p.3). Qualitative data collection and analysis is the main research methodology employed for understanding and interpreting the HIS functions and their support for the RHP.

Qualitative research involves data collection, analysis and interpretation. The evaluative analysis of HIS functioning in relation to the RHP can be addressed systematically through qualitative methods. There are different methodologies designed for different stage of study. Interview and document analysis are major methods of this study. Key informant interviews are conducted for in-depth study on particular mechanisms exploring various interpretations during the analytical and evaluation stages. Document review and analysis are appropriate for the regulations and policies of both the HIS and the RHP.
In order to gain a broad picture (overall patterns and variations in system structure, resources and functions) and to access different experiences and opinions of HIS development across China, a structured and self-administered questionnaire survey is designed and applied to respondents across PHICs.

The research focuses at the provincial level, which is a key nodal point in the information systems network in relation to RHP and other health planning. Meanwhile supersystems (in particular CHSI) and the subsystems (particularly at the prefectural level) are also included in the scope of the research.

KEY INFORMANT INTERVIEWS

Key informant interviews are an important and traditional approach to qualitative data collection (Chen, 2000, p.165; World Bank, 2002b). The interview study is used to uncover subjective judgments about problems and solutions. Interviews can provide useful insights into the social, emotional and experiential phenomena in the HIS and its performance. Interviewing is well suited to exploring ‘what’, ‘how’ and ‘why’ rather than ‘whether’ or ‘how much’. Individual interview tends to be more useful for evoking personal experiences and perspectives on HIS development and RHP. In this study, semi-structured, in-depth and individual interviews were conducted.

The analysis of interview data is not directed to generating ‘answers’ but rather to generating interpretations, narrative accounts, explanations and typologies of observation results. Data are organised within an interpretive framework and the analysis is used to explore, develop and challenge this framework.

The researcher has experience in key informant interviewing from previous studies (Tolhurst, Zhang, Yang et al., 2003; Lim, Yang, Zhang et al., 2004; Tolhurst, Zhang, Yang et al., 2004). Two sets of skills are required for interviewing: questioning skills (asking the right types of questions in the right sequence for eliciting more complete information) and rapport building skills (build rapport with the informants so that they trust the researcher and freely give information, including their views and opinions).
In planning for the interview study, the researcher designed the interview process. This involves: (1) articulating clearly the information being sought; (2) designing the questions which will reveal the desired information, listing the broad topics and re-phrasing these as questions; (3) Formulating an interview guide; and (4) Avoiding ‘double-barrelled’ questions, questions cast in the negative and technical jargon. The researcher needs to make sure that technical terms will be understood and should be equipped with a clear and succinct definition.

By definition key informant interviews involve a non-random purposive sample of ‘key’ informants. There is a risk of ‘selection bias’ which the researcher must negotiate, achieving some kind of balance across stakeholders and perspectives. Key informants may be expected to have strong views, which is part of the reason for selecting them. The researcher has a particular challenge during the analysis of judging, balancing, interpreting and noting discrepancies between the different views presented (World Bank, 2002b).

**QUESTIONNAIRE SURVEY**

In this study, the quantitative survey provides supplementary support for the emerging picture of health planning and HIS development. The questionnaire survey is designed to answer questions about experiences, circumstances and opinions of PHICs. Questions about opinions are scored by the Likert method, measuring the strength of agreement with a clear statement (developed by Rensis Likert in the 1920s)(Anastasi, 1988, pp. 586-7), and analysed using quantitative analysis software.

The questionnaire survey provided a general picture of provincial health information systems. Five themes were covered in the survey: (1) PHIC’s organisational structure, (2) PHIC’s resources, (3) intra and inter departmental relationships, (4) PHIC’s functions and responsibilities, and (5) opinions of PHIC’s director on the importance and quality of RHP related information.
DOCUMENTARY REVIEWS

Documentary analysis is a useful approach in policy, historical and organizational study of health care planning, public health management and HIS policies. The documents of health policies, program activities and processes are useful sources, which can generate ideas for questions that can be pursued through interviews and questionnaires (World Bank, 2002b). The objective of document review is to understand national and provincial health and health information policies as well as to trace the impacts of the macro economy transition. Documents were collected during field visits, conferences and/or from websites.

It is understood that the results of documentary review may be affected by selective-deposit or selective-survival bias. Ongoing document collection with multi-channel approaches is applied.

LITERATURE REVIEW

The purpose of the literature review is to understand health planning and information systems through previous research reports and scholarly commentaries. The international literature review focused on both the developed world and the developing world. Because of ease of access, the Australian and Victorian HISs are used as a comparator in relation to more detailed and dynamics aspects of regional planning and health information.

The domestic (Chinese) literature review focused on policy discussion, reports of progress in and evaluations of HIS and RHP. Chinese journals and media are the major sources of referencing.

Analysing and reviewing HISs and planning traditions in these countries cast light on the rationality of health planning under different social systems, and provided a framework for framing judgements and recommendations for Chinese health system and HIS during this period of transition. The international literature review was also used for following trends in relation to information technology and health information development.
KEY INFORMANT INTERVIEWS

FACTORS CONSIDERED IN THE SELECTION OF KEY INFORMANTS

The purpose of sampling in the qualitative study was to discover and describe categories of health planning and HIS (Achterberg, 1988). Therefore, the informant selection was aimed at obtaining the fullest range of features possible. Key informants were selected from central, provincial and prefectural levels.

Purposive sampling was used with a view to finding typical informants and provinces for investigation. In selecting key informants, the extent to which health planning reforms (decentralisation and regionalisation) had been implemented were key factors to be considered.

Geography was also considered. China can be classified as comprising three development areas: the developed areas of the east and south coastal areas, the developing areas in middle area and the less developed areas in the west. Key informants were selected in each of these three geographic areas. GDP per capita was used as an indicator reflecting the socio-economic development of provinces. Other factors in geographic selection include experience in RHP, e-government development, transportation conditions, as well as administrative support.

The roles and positions of key informants were recognised as important considerations in selection. Key informants could be grouped into seven categories based on their roles and positions.

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27 China West refers to 12 provinces (Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shanxi, Gansu, Ningxia, Xinjiang and Inner Mongolia), which featured a vast clime and rich natural resource, vast latent market with low labor cost and labor-compressed industry, borders with Asia and European countries, and industrial bases established in planned economy. China West is also recognised as remote territory with high concentration of minority peoples and degree of poverty. In 2002, the State Council released ‘General Plan for China West Development’, as one of important strategies of Tenth-Five-Year socio-economic development (http://www/chinawest.gov.cn/chinese/asp/start.asp?id=w).
position in the health planning and information system: (1) managers of HICs, (2) health officials, (3) planning officials, (4) statistics officials, (5) university professors and researchers, (6) hospital managers, and (7) hospital information system managers.

Key informants included managers or officials in charge of HIS and/or the RHP, either director or deputy director. The chief criterion for selecting key informants in universities and research institutions was their research experience in relation to the HIS and/or the RHP. The informant selection was free of age and gender control. All selected key persons had to have relevant experiences over at least five years.

The number of informants finally included was based on the saturation principle of qualitative study (samples are sufficient when no further significant finding are revealed). The initial research plan (including considerations of time and research expense) anticipated 25 informants. However, this number was increased to 40 in the field to accommodate the more complex variation in opinion and experience which emerged and which had not been anticipated in the original study proposal.

FEATURES OF KEY INFORMANTS

Three fourths of the key informants are under 50 years old. One fourth of them are senior officials or rich experience experts. Male informants (31 in total) compose the majority. See Table 3-1.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>40-</td>
<td>14</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>50-</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>60 &amp; above</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>9</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 3-1 Age and gender of key informants

The level and working department distribution of key informants are showed in Table 3-2.
OBJECTIVES AND METHODS

<table>
<thead>
<tr>
<th></th>
<th>Central</th>
<th>Province</th>
<th>Prefecture</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIC managers</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Health officials</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Planning officials</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Statistics officials</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Academics and researchers</td>
<td>7</td>
<td>3</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Hospital managers</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Hospital information system managers</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>14</td>
<td>14</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 3-2 Working department and level of key informants

QUESTION GUIDE FOR KEY INFORMANT INTERVIEWS

Semi-structured question guides were designed for the key informant interviews. This approach is widely applied by other investigators with an interest in defining and understanding meaning frameworks (Achterberg, 1988) and recognised as an effective and efficient way of qualitative data collection (Holmes and Roser, 1980).

Several sets of question guides were developed for different levels and positions. Each list comprised 11 – 16 topics and/or questions. The question guides were reviewed by professors of Peking University and La Trobe University and experts at the CHSI. The final draft of question guides were pre-tested in Beijing and approved by the CHSI. The question guides for the interviews are attached as Appendix 2.

METHODS USED FOR KEY INFORMANT INTERVIEWS

Key informants were contacted by phone and/or by mail and invited to participate in the study. Question guides were sent to key informants by mail or by hand one week before interview. With the consent of the proposed key informants, an appointment for the interview was scheduled.

Before the interview started, the researcher explained the objectives of the interview and indicated that the interview will take about 1 to 2 hours. Depending on the interviewee’s choice the discussion was recorded by note taking or by voice recording. Voice recording was the researcher’s preference but only if the person agreed. When voice recording was refused and note taking agreed to the researcher took diligent notes until the very end.
Two informants (both of them in charge of planning at central and prefectural levels) refused voice recording but agreed to note taking.

Beginning with self-introduction and repeating the purpose of the interview, the researcher started with the first question from the guide. The researcher considered straying from the guide if key informants were providing useful information. The researcher made sure that he clearly and completely understood the responses. Otherwise, he asked for clarification. The researcher played the role of active listener; and used his own words as a means of reflecting back the informants’ responses and of encouraging further discussion. The researcher listened critically and probes deeper if the answers do not address the issue in sufficient detail. When the interviewee started to go off on a tangent, the researcher gently reminded him or her of the question at hand. If the interview did not finish within two hours, the researcher asked to continue beyond the scheduled time or arranged for another appointment for an additional interview. After all the questions had been asked the researcher summarised the main points before closing the interview to verify that the researcher correctly understood the information provided.

SITE VISITS

The researcher organised field visits in Guangdong, Jiangsu, Jilin and Shanxi provinces, in order to interview provincial and prefectural key informants and collect local policy documents. In each province, the researcher visited the provincial capital and one or two prefectures. The provinces vary in economic development and health status (from high to low, as Table 3-3 listed) and are located in different geographic regions.

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Location in China</th>
<th>Prefecture/ city</th>
<th>GDP (per capita, yuan)</th>
<th>IMR (per 1000)</th>
<th>U5CMR (per 1000)</th>
<th>MMR (per 100 thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guangdong</td>
<td>Southeast</td>
<td>Shenzhen</td>
<td>13681</td>
<td>9.9</td>
<td>12.7</td>
<td>18.2</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>East</td>
<td>Lianyungang</td>
<td>12933</td>
<td>13.2</td>
<td>17.7</td>
<td>25.4</td>
</tr>
<tr>
<td>Jilin</td>
<td>North</td>
<td>Yanji</td>
<td>7533</td>
<td>32.2</td>
<td>39.7</td>
<td>53.0</td>
</tr>
<tr>
<td>Shanxi</td>
<td>Middle</td>
<td>Taiyuan</td>
<td>5540</td>
<td>22.7</td>
<td>25.7</td>
<td>60.6</td>
</tr>
</tbody>
</table>

Source: NBS, 2002

Table 3-3 Selected socio-economic and health indicators in visit provinces for key informant interview survey
GUANGDONG PROVINCE AND SHENZHEN CITY

Guangdong province, located in the southeast coastal area (Map 3-1), is at the frontline of the Chinese economic transition. GDP is 1,064.7 billion yuan in total and 13,681 yuan per capita in 2002 (NBS, 2003a)\(^{28}\), which is the fifth highest in China\(^{29}\).

The redevelopment of contemporary HIS in Guangdong started in the early 1980s with strong support from the provincial government. In the early 1990s, the government invested ten million yuan to construct a computer network for infectious disease surveillance, which has now been extended to all townships. Three networks (infectious diseases surveillance network, health administrative network and health inspection network) are being progressively integrated (Yangcheng Evening News, 2003).

Shenzhen city, China’s guinea pig for reform (FriedlNet, 2003), bordering on Hong Kong, is a newly erected city in the south coastal area of Guangdong. Shenzhen was a small fishing village with a population of only 30,000 at the beginning of 1980s. After being identified as one of the four special economic zones (SEZ) in 1979 (Gallagher, 2002) Shenzhen became the earliest and fastest-growing city in China. It enjoys the reputation of being the window and the pilot field for China’s opening up policy.

\(^{28}\) Based on Annual Statistics Report of NBS, population of Guangdong province is 77.83m in 2002.

\(^{29}\) Guangdong GDP per capita in 2002 is lower than Shanghai, Beijing, Tianjin and Zhejiang.
Shenzhen has become a modern city with sound infrastructure, complete urban functions and rich human resources. Among the total population of 5 million, 1.4 million are registered residents and 3.6 million are immigrants. Enjoying an annual average growth rate of 28.5% over the last two decades, Shenzhen achieved a GDP of US$27.1 billion in 2002, ranking fourth among major China’s cities, while its GDP per capita (46,030 yuan in 2002) ranked first. The backbone of Shenzhen economy is high technology. For instance, the IBM manufacturing base in Shenzhen is becoming the biggest manufacturing base for IBM notebook computers in the world.

Shenzhen does not have a laissez-faire market economy; the government plays an important role in socio-economic development. Accompanying the rapid economic growth, social welfare developed at the same pace. Government revenues increased consistently. Since 1979, government revenues have increased by 38.7% per annum and expenditure has increased at 35.4% annually, which is even faster than economic development (Shenzhen Statistics Bureau, 2002). In 2002, government revenue per capita was 1491 yuan, which is lower only than Shanghai, Beijing and Tianjin. The fast and stable government revenue and expenditure has built a strong base and provided the government with the financial levers required to regulate macro market economy and social activity.
Shenzhen has taken the lead in establishing a sound legislative system for protecting intellectual property rights, proper business operations, legal transaction and fair competition.

As one of the pilots of the SME transition, Shenzhen has gained strong political and financial supports from central and provincial governments. Health assets (institutions, hospital beds and health professionals) increased 14 times over the pre SEZ establishment (Shenzhen Library, 2003). An integrated urban-rural health network, community health services and emergency service are well developed.

As one of pioneers of health reform, since 1986 Shenzhen has experienced the medical insurance reform, which tested medical insurance reform and provided evidence for national policy formulation (Shenzhen Library, 2003). The majority (77%) of employees of Shenzhen are covered by the new scheme. In 1999, Shenzhen started its reform program for pharmaceutical management. Similar to the Australian PBS, the government establishes the Pharmaceutical Fund and negotiates with pharmaceutical corporations about price (Shenzhen Library, 2003). Shenzhen starts its RHP study in late 1990s and formally issued RHP in 2003 (Shenzhen Government, 2003).

**JIANGSU PROVINCE AND LIANYUNGANG CITY**

Jiangsu (Map 3-2), an eastern Chinese province, has over 1000-kilometers of coastline along the Yellow Sea. The population is 74.38 million in 2001. With merely 4.7% of the national arable land, Jiangsu continuously spurs and expands its four pillar industries: machinery, electronics, chemicals and automobiles. GDP is 951 billion yuan in total and 12,933 yuan per capita in 2002 (NBS, 2003a), which ranked as the sixth in China. Although GDP per capita of Jiangsu is close to Guangdong, the government revenue per capita of Jiangsu (778 Yuan) is only half of that of Guangdong (1491 yuan in 2002). The government expenditure per capita of Jiangsu is the lowest among all provinces (767

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30 Population of Jiangsu is 73.55 milion in 2002, accounting to NBS.
These economic figures, high GDP and low government expenditure, indicate that the government has weaker financial levers in relation to both economic and social activities in the developed areas. The Jiangsu economy has significant geographic variation. South Jiangsu is significantly richer than north Jiangsu.

Map 3-2 Location of Jiangsu province in map of China (left, shaded area) and location of Lianyungeng city in map of Jiangsu (right, pointed area)

Lianyungang, one of the ten biggest ports of China and a coastal prefectural city located in north end of Jiangsu province, has a population 1.27 million. Lianyungang was listed as one of coastal open cities in 1984 (Lianyungang Government, 2003). GDP is 35 billion yuan; the GDP per capita is 7,582 yuan in 2002 (Jiangsu Statistics Bureau, 2003). Government revenue is 2.699 billion and expenditure is 2.615 billion in 2002.

The Hospital is the biggest tertiary general hospital in North Jiangsu, with 840 beds and 208 senior physicians (Lianyungang Government, 2003). The CEO of the hospital was awarded one of ‘Hundred Hospital CEOs’ of China in 2002.

JILIN PROVINCE AND YANJI CITY

Located in North of China, Jilin province (Map 3-3) abuts with the North Korea and Russia. Jilin is home to several northern minorities, including the Manchu, Mongolian and Korean (Jilin Government, 2003).
The GDP of Jilin is 203 billion in total and 7553 yuan per capita in 2002, which is near to national average (7517 yuan). The government revenue per head is 450 yuan, which is closes the national average. The government expenditure is 1606 yuan, which is relatively high compared with other provinces. As a consequence of the SOE reform (significant increase of unemployment rate), Jilin’s urban income (5361 yuan) is among the lowest of all the provinces. However, the income of Jilin’s farmers is at national average level (NBS, 2003a).

Map 3-3 Location of Jilin province in map of China (left, shaded area) and location of Yanji city in map of Jilin (right, pointed area)

Yanji city is the capital of Yanbian Korean Autonomous Prefecture in Jilin. With the North Korea across Yalu River, Yanji is inhabited by Korean majority (59% of total population) with an average level of economic development.

In 2002, the annual conference of health statistics and information (organised by the CHSI) was hosted by Jilin and located in Yanji. One of reasons for selecting Yanji as a venue for field study was to interview selected PHIC managers attending this conference.

SHANXI PROVINCE AND TAIYUAN CITY

Shanxi (Map 3-4) is an inland province situated along the middle reaches of the Yellow River in the western part of the region known as North of China. The population was
32.97 millions in 2001. Shanxi has a traditional agricultural economy and a basic industrial system comprising coal and electric power, which form the backbone of industry of Shanxi. Shanxi is also a traditional energy base (coalmining) for China.

Shanxi is one of developing provinces in China, and at the primary stage of economic system reform. According to the NBS, GDP of Shanxi is 177 billion yuan in total and 5,540 yuan per capita in 2002, which ranked as the 21st of 31 provinces of China. With a population of 32.72 million, government revenue per capita is only 406 yuan, which is below the national average (611 yuan) and ranks as 18th among the provinces. However, government expenditure in 2002 was 1,626 yuan, which was higher than the national average (1,369 yuan). With a huge amount of unemployment in the SOE sector, urban income ranks fourth from the bottom. Farmer’s income (1,956 yuan) is also below national average (2,366 yuan) and ranks 22nd among the provinces (NBS, 2003a).

Map not included in compliance with Copyright Act

Map 3-4 Location of Shanxi province in map of China (left, shaded area) and location of Taiyuan city in map of Shanxi (right, pointed area)

Taiyuan, the provincial capital of Shanxi, is located 500 km southwest of Beijing. Since the time of founding in the 5th century B.C. until the 16th century, it was regarded as an important fortress city of Northern of China. Today it is the biggest industrialised city and the centre of politics, economics and culture in Shanxi province.

The First Hospital of Shanxi Medical University, located in downtown Taiyuan, is recognised as the biggest and is the highest medical service provider of Shanxi (Shanxi
Medical University, 2002). This tertiary hospital has 1,069 beds and 577 senior medical professionals. The number of senior medical experts comprises one third of total senior experts of Shanxi.

QUESTIONNAIRE SURVEY

PARTICIPANTS

Questionnaires were sent to 31 provincial health bureaux (including the autonomous regions and municipalities, but not including Hong Kong, Macao or Taiwan).

VARIABLES OF QUESTIONNAIRE

Items were designed with a view to learning about the organisation and departmental relationships of PHICs. They included: organisational title and immediate supervisor; the PHIC director’s education and professional background and administrative position in the PHB; relationships with departments of the PHB and with government bureaux beyond the PHB as well as universities, research institutions and professional associations.

For understanding the resources of the PHICs, the following data were collected: number of staff (planned, full-time, part-time), education background (medicine, accounting and financing, public health, health management, computer science) of staff, as well as organisational revenues (revenue from government budget and special funding, from consulting activities and from independent sources (contract)).

The following items were included with a view to learning about PHIC functions: (1) Involvement in planning and regulatory activities (health planning, health information planning, standardisation, legislation and inspection). (2) Collecting and maintaining health data (reporting and survey, inter-departmental statistics coordination, publication, data maintaining). (3) Professional standards and network development (statistics classification and coding, regional health information network development, health information technology development, management on health related websites and
OBJECTIVES AND METHODS

software development, management of health website of provincial government, design of health information database, computer-aid operating system, provincial network on health information, information security). (4) Research, consulting, training and exchanging (statistics study and consultation, training on computer science and network skill, health statistics professional accreditation, health information exchange, and coordination with the health statistics society.

PHICs were asked to provide their opinion on the quality of health data and information that are collected through routine health reporting, health surveys, and external sources. For RHP information, respondents were requested to provide their opinion on information importance among different type of datasets.

SURVEY CONDUCT

A draft questionnaire was designed by the researcher and reviewed by colleagues at PKU, LTU and CHSI. The re-drafted questionnaire was pre-tested in Beijing with the assistance of Beijing health bureau.

The questionnaire survey was approved by the CHSI in July of 2002, and distributed with an accompanying memorandum from the Director of CHSI endorsing the research. The indication of CHSI support (in the accompanying memorandum) authorised the recipients to respond to the survey. However, they were clearly advised that their responses would be handled confidentially and it is most unlikely that responses were in any way shaped by the official support.

Questionnaires were distributed by mail from Beijing, in the name of CHSI, PKU and LTU. PHICs (different titles among the provinces) of PHB were asked to answer all questions following the questionnaire guideline. All questionnaires were required to be mailed back to the PKU within one month. The researcher checked the quality of the questionnaires and contacted the PHICs to clarify uncertain items. For non-responders, the researcher sent additional copies and asked them to return completed questionnaire returns within the month. Non-responders after this second distribution were telephone
OBJECTIVES AND METHODS

interviewed or visited by the researcher. A set of guidelines for filling the questionnaire was drafted, pre-tested and distributed along with questionnaire. The questionnaire survey was mailed out first on the 15th of July and all data were in hand by the 15th of September of 2002.

CODING AND SCORING

Four types of questions were used in the questionnaire: multiple choice, filling numbers, yes/no choice, and Likert scales. For information regarding organisational structure, inter-departmental and inter-sectional relationship, and education background of HIS director, the multi-choice method was applied. For information regarding HIS resources, numbers were required to be filled in. For information regarding functions and responsibilities, respondents selected one option from Yes, No and Unknown. A Likert scale was used for measuring opinions on the quality of health information (the dimensions of quality are stated in previous section of this chapter). The scale was designed for coding on the basis that: ‘1’ represents extremely good and ‘5’ as extremely bad. The numbers between ‘1’ and ‘5’ represent degrees of ‘good’ or ‘bad’. If respondents could not provide evaluation on specific database or evaluation criteria, they were required to use ‘6’ as ‘unknown’. All scales were required to be marked in the designed matrix.

RESPONSE RATE

Four provinces (Beijing, Henan, Tibet and Yunnan) did not provide questionnaires after the second round of questionnaire delivery. For these missing cases, the researcher collected Henan, Tibet and Yunnan’s information by supplementary measurements, including telephone investigation, email communication and face-to-face discussion in a health statistics conference. The researcher visited Beijing HIC to collect the information and conduct field observations. Considering inconsistent data collection method with other 27 provinces, these four provinces were not indicated in the questionnaire analysis.
DOCUMENT COLLECTION

MOH and provincial authorities approved the collection of documents of health and information policies, regulations, standards, working reports and plans. Documents were collected as hard copies or electronic files where available.

Several channels were used to collect documents:

- **Formal publications.** National laws, acts and regulations, annual reports and yearbooks are publicly available in hardcopy format (and sometimes in CD format). These were purchased from bookstores or specific publishers.

- **Document collected during field visit.** Not all working documents are available in hardcopies or on websites, especially in the less developed provinces and regions. The researcher collected working plans, program proposals and health statistics forms from provincial and prefectural departments in the course of field visits.

- **Attending conference.** The 2002 annual conference of health statistics and information provided an opportunity for collecting conference documents and requesting participants (PHIC director) to provide relevant documents.

- **Website resources.** Some historical and current policy documents of central and provincial levels are available on relevant websites.

ISSUES RELATED TO DATA COLLECTION

The questionnaire study, key informant interviews, domestic literature reviews and government document collections were conducted in China, in both Beijing and the other four provinces. Literature reviews on international publications and government documents were mainly conducted from La Trobe.

Agreements to Participate and Informed Consents were obtained at the time of interview. The consent form was translated into Chinese before the interview, and presented to the informants by the researcher. Further explanation was provided as inquired.
All policy documents used in this study are formally published or released. The correct and appropriate translation directly affects quality of document analysis. For specific translations of Chinese policy terms, the researcher referred to the official Chinese source (http://language.chinadaily.com.cn).

DATA ANALYSIS STRATEGIES

QUALITATIVE DATA ANALYSIS

Miles comments that ‘the most serious and central difficulty in the use of qualitative data is that the methods of analysis are not well formulated’ (Miles, 1979). In this research, a three-step strategy (Achterberg, 1988) was used for interview data analysis.

The first step is data aggregation. This step closely followed interviewing activity. The researcher reviewed and transcribed interview materials, and assessed whether the information wanted had been acquired. The researcher identified the missing items and determined whether to interview the informant again or seek the information from another source. All interview materials (including notes on the interview environment, respondent’s emotion and significant body language) were transcribed in Chinese and stored as electronic files. Then each transcript was translated from Chinese to English by the researcher. The translation by the researcher himself involves a sort of preliminary analysis (Achterberg, 1988). During translation, additional notes were recorded in order to make the entire dataset more amenable for further analysis. Meanwhile, for the purpose of translation quality control, four English translated transcripts (10 percent of total) were randomly selected and translated back to Chinese by a Chinese colleague.

The second step is data coding and analysis. A draft of coding structure was prepared based upon the study frameworks (mentioned previously in this Chapter) and question guides. NVivo (software of data management for qualitative study) was used to systematise and organise the interview materials. The coding structure was modified according to new responses emerging in coming interview transcripts. The coding
structure was improved repeatedly until no further messages emerged out of the structure. The researcher examined themes and contents during and after the data structuring and then summarised the major findings step by step.

The third step is to generate a framework of major findings. The researcher conducted content analysis corresponding to the key themes of the study and identified theoretical categories to explain and link the results. Much of this phase of the analysis was undertaken in the course of writing this thesis (Achterberg, 1988).

Qualitative data analysis is a process of iteration. The researcher moved back and forth between the unstructured data, the research questions and the emerging interpretation as part of formulating and testing the findings.

**QUANTITATIVE DATA ANALYSIS**

After logical checking, the questionnaire data are double entered into the computer by the researcher and a research assistant at PKU who conducts a parallel data entry.

SPSS (software of data management for quantitative study) is used in questionnaire data processing. Data analysis is conducted systematically. It is unnecessary to conduct statistical tests for the PHIC questionnaire data, because the population of the questionnaire study is equal to the 'sample size'. Figures, tables and maps are used frequently during data analysis and results presentation. In order to present opinion results in simple and understandable ways, the researcher calculated percentages of combined ‘good’ plus ‘extremely good’ from the Likert scales.
CHAPTER FOUR

ORGANISATION, INFRASTRUCTURE AND FUNCTIONS OF HEALTH INFORMATION SYSTEM

INTRODUCTION

As part of the health sector reform, informed health planning has received much attention in China and this too calls for high-level information support. Some progress has been made in developing the institutional infrastructure for improved health information services. The CHSI has been established nationally and PHICs have been formed in more than half provinces. However, the quality of information services at the provincial and lower levels is still not adequate to support effective RHP (Liu and Jiang, 2002).

This is necessary for a clear understanding of the strengths and weaknesses of HIS organisation nationally, in particular in relation to health planning and management (Nilsson and Ljunggren, 2003). In this chapter, the range of health information organisations is discussed, including their organisational structures, roles and functions, policies and legislation and coordination mechanisms at central and provincial levels.

HEALTH INFORMATION SYSTEM ORGANISATIONAL ARRANGEMENT

VIEWING THE HEALTH INFORMATION SYSTEM AS A WHOLE

In order to understand how information systems work, the study starts by looking at the organisations that manage the system. The national HIS is managed and maintained in a traditional functional hierarchical style. It is appropriate to describe the whole system framework before proceeding to a detailed examination of PHICs.
According to the Statistics Law and government regulations, China’s government departments should establish statistics bureaux or allocate statistics staff (State Council, 1996). The National Bureau of Statistics (NBS), formed in the early 1950s, is the top-governing statistics department under the supervision of the State Council. The NBS is expected to collect and process economic and social data but is widely regarded as having focused primarily on ‘economic’ rather than ‘social’ statistics.

Traditionally, information providers in social sectors have looked to the statistics administration for technical and professional leadership. Thus while the CHSI and PHICs are formally part of the MOH and PHB, they are supervised in relation to technical and professional matters by the NBS and PSB (see Figure 4-1).

**Figure 4-1 Statistics System in China**

(Based on NBS [http://www.stats.gov.cn/tjjg/], Law of Statistics, and National Health Statistics Survey Regulation)
The evolution of central HIS organisation passed four steps (Figure 4-2).

1. Traditional model (pre 1980s): The leading health statistics agency at central level was the Division of Health Statistics (DHS) within the Department of Health Planning and Financing (DOHPF) of the MOH. The DHS was cancelled during the Cultural Revolution and re-introduced in 1973. This arrangement for the national coordination of health information was maintained until the early 1980s.

2. Modified model (1981-1984): Economic reform led to new demands for health information. Professor Chen Yude, former CHSI director, pointed out (in an interview for this research) that ‘health statistics data were insufficient for health planning, as the traditional health statistics report system did not provide relevant information to reformers and decision-makers’. In the early 1980s, a MOH delegation, comprising many senior officials, undertook a study tour to a number of industrialised countries and submitted a mission report, which aimed to set a new direction for China’s health statistics development. In this report, the establishment of a ‘National Health Statistics Centre’ was suggested, borrowing from the USA federal and Japan national health information institutions. However, the suggestion was not fully accepted by the MOH and the State Council. As an alternative, Research Office of Health Planning Statistics (ROHPS) was established within the DOHPF, working in parallel with the DHS. By the mid 1980s, the ROHPS was in charge of special surveys (such as the health human resource survey, rural health services research, urban health services research) while the DHS maintained the traditional health reporting system. Meanwhile, ‘Leading Group for Computer Applications (LGCA)’ was established within the DOHPF, in order to lead applications of hi-tech information technology within health department and institutions.

3. Preparation for CHSI establishment (1984-1989): Improved central HIS infrastructure and human resource development was supported by the first health Project of the World Bank in China (titled Rural health and medical
education, 1984-1991, so called Health I). The Health I supported central institutions (including the DHS and ROHPS) in order to strengthen central capacity of information support on health planning’ (FLO, 2002a). Thereafter, the infrastructure and capacity of central HIS was improved significantly: minicomputers were installed, a domestic working cooperative group was established and staffs were able to access training (Chen, 1993; Duan, 2004).

4. Current model (1989 to present): During the project period of Health I, the MOH Party Meeting decided to establish the CHSI, which was formally opened in 1989 (Chen and Rao, 1994). The CHSI, comprising previous DHS, ROHPS and LGCA, was divided from MOH bureaucratic system and restructured as a government institution. The title of the CHSI, as translated in English, is ‘Centre of Health Statistical Information’, but not as ‘Centre of Health Statistics and Information’.

The establishment of CHSI changed the pattern of health information management in several respects. Firstly, the health information authority became independent. Secondly, the locus of supervision of central HIS was upgraded from the DOHPF to the General Office of the MOH. Thirdly, the nature of the office managing the HIS moved from the civil service system to become a government institution. Fourthly, the recognised users of the health information products and services to be provided through the CHSI expanded from the DOHPF to the whole MOH (Chen, 1996, 2000b).
Therefore, although it is still located in the MOH building, the CHSI is not part of the government bureaucratic system, but is close to the decision-making processes.

From a bureaucratic point of view, HICs (CHSI and PHICs) are supervised by the health department (MOH or PHB) at the corresponding level. However, HICs are legally authorised under the Statistics Law and are professionally administrated by the relevant statistics department (the NBS or PSB), see (Figure 4-3). There is no law that authorises the vertical coordination of HICs in the same way as these horizontal relationships are authorised. However, the National Health Statistics Regulation (a department regulation issued by the MOH) does provide a broad policy framework for HIS development.

![Diagram](image)

**Figure 4-3 Administrative and professional arrangement of the PHICs**

The following laws and regulations (Table 4-1) constitute the regulatory framework for health statistics and information in China.
ORGANISATION, INFRASTRUCTURE AND FUNCTIONS OF HEALTH INFORMATION SYSTEM

Title  Year  Status

National statistics laws and regulation

Statistics Law (NPC, amendment)  1996  Effective
Statistics Law (NPC)  1983  Abolished
Implementation Regulation of Statistics Law (NBS, amendment)  2000  Effective
Implementation Regulation of Statistics Law (NBS)  1987  Abolished
Sectoral Statistical Work Regulation (NBS)  1999  Effective
Household Registration Regulation (MOPS)  1958  Effective
National Security Law (NPC)  1988  Effective

Health statistics regulations

Health Statistics Survey Regulation (MOH)  2002  Effective
Health Statistics Works Management Method (MOH)  1999  Effective
Health Statistics Works Management Method (MOH)  1992  Abolished
Health Statistics Works Regulation (try out, MOH)  1989  Abolished
Suggestion on Strengthening Health Statistics Works (MOH)  1985  Abolished
Criterion of Essential Functions of Hospital Information System (MOH)  2002  Effective
Responsibilities and Institutional Setting of the CHSI (MOH)  1991  Effective
Regulation on National Security in Health Work (MOH, National Security Bureau)  1991  Effective
Development Plan of Health Informationalisation (2003-2010) (MOH)  2002  Effective
Development Plan of Health for the Tenth Five Years (MOH)  2001  Effective
Regulation on Birth and Death Certifications and Vital Statistics (MOH, MOPS, MOCA)  1992  Effective

Some related local regulations

Regulation of Freedom of Government Information (Guangzhou, Guangdong)  2003  Effective
Regulation of Freedom of Government Information (Shanghai)  2004  Effective

Table 4-1 Health information related laws and regulations

SETTING OF PROVINCIAL HEALTH INFORMATION SYSTEM

Provincial health information systems also experienced changes in the last decade. Two major factors are shaping the evolution of provincial health information organisations. The first of these is the progressive movement of these organisations from their traditional locations within the PHB to more independent status as centres or institutes. The second influence arises from the government wide downsizing of the civil service system (a strategy for adapting government practice to the emerging market economy).

Traditionally, names are not only the identifier of an organisation but also reflect its legitimation and social status, for institutions as for individuals. If the names (titles) carry seniority, their words will carry more weight. The titles of PHICs reflected their natures,
their evolution and their relations with others. Three broad categories of PHICs were reflected in the responses to questionnaire survey undertaken as part of this research.

In the first type, PHIC is a division (or a staff) of the general office of the PHB (see Figure 4-4). Health information management is treated as a supplementary function of the general office. There are four provinces where the health information office is located within the general office of the bureau (Anhui, Gansu, Tianjin, and Xinjiang). This type of PHIC is fully funded by government budget and belongs to a civil servant system. PHIC officials are ‘real officials’ with the authority that this status provides (including ability to release ‘red title documents’ (see Glossary)) but are less independent with respect to system management. This type of PHIC has a close relationship with the provincial health director but a limited number of users from other departments of the bureau.

**Figure 4-4 PHIC as a part of the general office of the PHB**

In the second type, PHIC management is carried out through a division of the Department of Planning and Financing (Figure 4-5). Twelve provinces, including: Chongqing, Fujian, Hainan, Hebei, Henan, Inner Mongolia, Jilin, Liaoning, Ningxia, Shandong, Tibet, and Yunan have adopted this arrangement. This is the most traditional type of HIS management, corresponding to the previous model at the central level. The PHICs are fully funded by provincial government. They belong to the civil servant system with
greater authority but restricted independence. The most frequent users in this case are the PHB director and health planning and financing officials. Under this pattern the focus of PHICs is on asset planning and financing indicators, so-called ‘health resource statistics’, including the number of hospital beds and staff, as well as financial data. However, the needs of other departments may be neglected.

Figure 4-5 PHIC as a part of the department of planning and finance of the PHB

The third type involves a formally named Provincial Centre for Health Statistical Information (Figure 4-6). Based on the questionnaire survey, there are 15 provinces which have established such health information centres: Beijing, Guangdong, Guangxi, Guizhou, Heilongjiang, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shanghai, Shanxi, Sichuan and Zhejiang. This type of PHICs corresponds to the establishment of the CHSI at the central level. This appears to be the main trend with respect to PHB restructuring, as an increasing number of provinces set up their PHICs (as directly affiliated institutions) outside the formal government bureaucracy.

Under this model (Figure 4-6), the PHICs are partially funded by government budget. In most cases, this means that staff wages are provided but additional funds are tied to particular projects. The PHICs are located outside the civil servant system, and officials do not have the right to issue “red title documents” to subordinates and counterparts. This kind of PHICs has more independence with respect to its professional operation, and is
less subject to direction with respect to its information product priorities. This newer form of PHICs sees itself as meeting the needs of all of the various departments of the bureau. The general office of the health bureau is generally the immediate supervisor of PHICs, coordinating and facilitating inter-departmental linkages as needed\textsuperscript{31}.

Shannxi HIC is an exception. The Shannxi HIC is established within the PHB as part of the ‘civil servant’ system. Therefore, this HIC has the same administrative authority as other departments of the health bureau. Major features of these three types of PHICs were summarised in Table 4-2.

<table>
<thead>
<tr>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of health information organisation</td>
<td>Health Statistics Office of General Office</td>
<td>Health Statistics Office of Department of Health Planning and Financing</td>
</tr>
<tr>
<td>Nature of HIS Government budgeting</td>
<td>Civil servant system Fully covered</td>
<td>Civil servant system Fully covered</td>
</tr>
<tr>
<td>Immediate supervisor Users</td>
<td>General office</td>
<td>Planning and financing department</td>
</tr>
<tr>
<td></td>
<td>Mainly director of bureau</td>
<td>Mainly planning and financing</td>
</tr>
<tr>
<td>Independence Context</td>
<td>Less independent Previous model</td>
<td>Less independent Previous common model</td>
</tr>
</tbody>
</table>

Table 4-2 Three types of PHIC organisation

\textsuperscript{31} Right before the thesis was submitted, the immediate supervisor of the CHSI shifted from the General official to the newly established Department of Health Policy, Law and Regulation. The same change is expected at PHIC.
The second major influence on the recent development of PHICs has been the parallel program of government institutional reform generally which was initiated towards the end of the 1990s, in particular the drastic downsizing of the civil service system. Before the administrative system reforms of 1998, PHICs were all civil service systems, as part of the general office or the DOHPF of the PHB. After the government restructuring initiated in 1998, PHICs have generally moved out of the civil service system. At the time of this survey, 44.4% of provinces had established PHICs as government institutions (outside the civil service) while in 55.5% of provinces they remained within civil service system.

This movement has not been driven by any logic of improved health information services; rather it reflects the logic of the government structural reforms of 1998. One of the barriers to the transition to a market economy was identified as a contradiction between an immature economic system and a traditional social governing model (Bloom, 2003). The immediate target of central government restructuring was to reduce the number of civil servants by 50% (Zhu, 1998) in order to reduce the social cost of governing and to improve quality of government officials. The second target of the reform was to adjust stakeholder relationships and regulate government functions.

This was not the first reform of government structures in the history of modern China (Dong, 2003a). More significantly, the absolute number of government officials was relatively high (Figure 4-7). During the 1980s, the average population per government official was only 30. In 1997, there were 33 million government officials nationwide, comprising 5% of the national labour force and accounting for 41.6% of total government expenditure (360 billion yuan) in salary costs (Xu and You, 2002). This ‘greater government and smaller society’ model was associated with lower efficiency and heavier financial burden.

The downsizing of civil service employees started at the central level. According to the proposal of the State Council organisational reform issued by the ninth NPC and the
implementation plan issued by the State Council (State Council, 1998), there were to be 225 civil servants positioned in the MOH. Before reform, the Ministry had a staff of 450.

Figure 4-7 Average population per government officer in selected Chinese dynasties

Provincial and lower level restructuring followed the restructuring of national ministries. However, local government re-structuring has been more difficult than that at a central level, in particular, because of the challenge of placing the redundant staff. Several strategies have been used for reducing the number of officials, all of which have implications for the allocation of government functions: transfer administrative and regulatory functions to government institutions (including the PHICs); strictly implement official retirement policy (compulsory retirement at 58 year of age); and send young officials to university for advanced study.
The transfer of HICs from the core of health decision-making to semi-independent government institutions has some potential benefits in terms of releasing the HICs of bureaucratic fetters, and giving health information authorities greater scope to focus on quality of information and information system development more generally (Figure 4-9).

Figure 4-8 Structural transition of government departments and institutions

Figure 4-9 Increasing independence of HIC
INFORMATION SYSTEMS IN HEALTH SERVICE INSTITUTIONS

The information systems of hospitals, preventive institutions and MCH agencies need to be seen as part of the wider system of health information collection, analysis and provision. These institutional information systems include the medical reporting system and other information-related hospital departments. As one manager reports:

There was ‘an information office’ in the MCH hospital before 1995. The responsibility of the office was to collect MCH statistics and conduct MCH surveys. After 1995, the office was renamed as ‘Information Department’, which was given charge of computer network construction, medical record management, library, and statistics reporting (routine reporting and surveillance point reporting). The MCH survey was handed over to the Department of Prevention of the MCH station. (HIS manager, Guangdong)

To computerise hospital information systems has been a key policy objective of HIS planning over the last decade (Li, 2002b; Li and Cai, 2002). However, the integration of health information systems in system wide health planning depends on communication systems and the capacity to integrate data from different sources (Frossard, 1990). Current hospital information systems are designed primarily as internal systems, meeting the needs of managers and clinicians. From the system wide perspective, they are ‘isolated information islands’ separated by underdeveloped interfaces and lack of standardisation (Hou, 2002). This fragmentation is a serious barrier to integration of data from hospitals and other institutions (such as CDCs and MCH agencies) to provide an information base for RHP.

LEADERSHIP OF PROVINCIAL HEALTH INFORMATION CENTRES

EDUCATION BACKGROUND OF DIRECTORS OF PROVINCIAL HEALTH INFORMATION CENTRES

The directors of PHICs play a critical role in the development and performance of health information system. In this section, the researcher explores the educational background that they bring to this role.
Findings of the questionnaire study suggest that one quarter of PHIC directors gained their first higher education experience from medical universities. After considering further continuous educations, the most common educational background is medicine (41%); followed by accounting (33%) and health management (26%), see Table 4-3.

Chinese medical students receive limited training in social sciences and information technology. Schools of medicine provide only limited hours of training in health information and health management to their undergraduate and graduate students. Schools of public health are the only providers of systematic training in health statistics and health management (Education Department of Health Science Centre of PKU, 2003). However, very few schools of public health provide training in health information management.

Because most PHICs were previously located within provincial DOHPF, many directors of currently operating health information authorities have a financial or accounting background with limited experience of clinical services and health agency management.

Training in public health and health management is particularly relevant to health information management but research and teaching in health management was only introduced to schools of public health during the mid 1980s; only 15% of PHIC directors have training in public health. Continuing education and on-job-training are common in China. Of the 11 directors who have education backgrounds in medical science, two have attended accounting courses, two have attended public health education, and three have attended courses in health management. However, a few PHIC directors (from four provinces) are only formally educated in medical science.

<table>
<thead>
<tr>
<th>Education background of HIS director</th>
<th>Frequency*</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical science</td>
<td>11</td>
<td>40.7</td>
</tr>
<tr>
<td>Accounting</td>
<td>9</td>
<td>33.3</td>
</tr>
<tr>
<td>Public health</td>
<td>4</td>
<td>14.8</td>
</tr>
<tr>
<td>Health management</td>
<td>7</td>
<td>25.9</td>
</tr>
<tr>
<td>Computer</td>
<td>6</td>
<td>22.2</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>25.9</td>
</tr>
</tbody>
</table>

Table 4-3 Educational background of PHIC directors

(PHIC directors were asked to identify the field of their university training. They were able to identify more than one field. See Q 1.3, Appendix 1)
ORGANISATION, INFRASTRUCTURE AND FUNCTIONS OF HEALTH INFORMATION SYSTEM

POSITION OF DIRECTOR OF PROVINCIAL HEALTH INFORMATION CENTRES

One measure of the authority and status of PHIC director is their membership of the Communist Party Committee of their health bureau. The Party Committee must approve any important decision, which is the top and final decision-maker within the PHB. In some bureaux, there is one leader with double titles (organisation management title and the Party title), while in other departments organisational manager and the Party secretary were assigned to two persons, where the Party secretary keeps right of final decision.

Another decision meeting is the ‘Ministers’ Meeting’ in the MOH, or the ‘Director’s Meeting’ in the PHB, which is where professional and technical issues are discussed. Department directors are invited to participate in the discussion of topics that lie within their area of responsibility.

Most PHICs are supervised through the general office of the director of the bureau which provides a direct link with the ‘top decision making group’, because directors of the general office are members of this decision group. However, it does not follow that staff with health information responsibilities in the general office are likely to take a system wide strategic view of information system development. In many cases, they may be more preoccupied with the preparation of the director’s next speech ‘when it is required to add more figures to make the speech more scientific’.

For those PHICs supervised by the provincial DOHPF or restructured as a government institution, the director’s involvement in decision-making process will depend on whether he or she is a member of the ‘decision-making group’.

More than three quarters (77.8%) of PHIC directors responding to the questionnaire survey are outside of the Communist Party Committees. This suggests that most health information leaders are not involved in the most important decision processes.

There are exceptions. In one province, the PHIC director is a former director of the general office of the bureau. Although the HIC is established as a government institution, the director still participates in decision-making in formal (and informal) ways.
The status and power of the PHIC directors varies widely and their different levels of participation in decision-making are part of this. Conflict between the health information director and the director of the health bureau could be found in some provinces, while sustainable administrative supports was evident in others:

*If you want your position, you have to do something. The --- HI director has the support of the health bureau director because the HI director makes a good contribution and is appreciated by the health directors. There is similar situation in --, --, and -- provinces. [...] In -- the HI director is the wife of health director. She gets support from her director husband [...]. The HI director in -- is gruff. The health director does not like him. Even 'though he has capacity, it is more difficult to get support for health information development (HIS director, central)*

**DEPARTMENTAL RELATIONSHIPS**

The relationships between PHICs and other internal and external players could be described in terms of near and far. Following the administrative organisation structure, the relationship with government offices (in the civil service system) could be recognised as a core or near relationship; the relationship with government health institutions could be recognised as medium relationship; and the relationship with agencies beyond health sector administration could be recognised as external or far relationship. These relationship structures are illustrated as Figure 4-10.
DEPARTMENTAL RELATIONSHIP WITHIN HEALTH BUREAU

Even where the PHICs have been converted into a government institution outside the civil service, it is likely to retain its close relationships with the provincial DOHPF and the General Office as is shown in Table 4-4. Around half of PHIC directors surveyed identified Medical Administration or Disease Control as important or frequent partners.\(^3^2\)

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\(^{32}\) Questionnaire survey is overall investigation (i.e. not a sampling survey), therefore, statistical testing is unnecessary.
Table 4-4 PHICs’ frequent and important partners, within the PHB
(Respondents were asked to identify the departments within the PHB with which they cooperated ‘most frequently and/or most importantly’. Respondents were able to identify more than one department. See Q 1.5, Appendix 1)

<table>
<thead>
<tr>
<th>Departments of health bureau</th>
<th>Number of PHICs cooperating frequently or importantly with listed departments</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning and Financing</td>
<td>22</td>
<td>81.5</td>
</tr>
<tr>
<td>Health Bureau Office</td>
<td>19</td>
<td>70.4</td>
</tr>
<tr>
<td>Medical Administration</td>
<td>15</td>
<td>55.6</td>
</tr>
<tr>
<td>Disease Control</td>
<td>13</td>
<td>48.1</td>
</tr>
<tr>
<td>PHC/MCH</td>
<td>11</td>
<td>40.7</td>
</tr>
<tr>
<td>Science and Education</td>
<td>7</td>
<td>25.9</td>
</tr>
<tr>
<td>Personnel Affair</td>
<td>6</td>
<td>22.2</td>
</tr>
<tr>
<td>Health inspection</td>
<td>6</td>
<td>22.2</td>
</tr>
<tr>
<td>International Cooperation</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td>Equipment Management</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Health resources are concentrated in public hospitals and PHICs have a close relationship with hospital administrators. Department of Medical Administration (DOMA), the department in the MOH and PHB in charge of hospital administration, plays an important role in planning and regulating the administration of hospitals, including physicians and nurses as well as medical facilities. Since the 1950s, hospital administration has been recognised as a major responsibility of the MOH and the PHBs.

The difference in the intensity of relationships between PHIC and DOHPF on the one hand and DOMA on the other is significant. The DOHPF deals with resource allocation, allocating the government budget to the different health sectors (MCH, rural and urban community health, hospital, disease control, health inspection etc.) while the DOMA supervises hospital performance. The information required to support budget allocation is different from that needed for the supervision of hospital performance.

RELATIONSHIPS WITH PROVINCIAL HEALTH INSTITUTIONS

The questionnaire survey results suggest that PHICs have only limited cooperation with other research-oriented government institutes (which are generally recognised as the
think tanks of the health department) (Table 4-5). In only five provinces, the health information leaders indicate that they have a close relationship with the provincial institutes of hospital management and/or public health management. Only four indicated frequent or important cooperation with the institute of health economics. The results suggest some degree of isolation of the PHICs from other health related institutions.

<table>
<thead>
<tr>
<th>Name of other health institutions affiliated with PHB</th>
<th>Supervisor (of health bureau)</th>
<th>Identified as important/frequent cooperation</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Hospital Management</td>
<td>Dept. Medical Administration</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td>Institute of Public Health Management</td>
<td>Dept. Disease Control and Prevention</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td>Institute of Health Economics</td>
<td>Dept. Health Planning and Financing</td>
<td>4</td>
<td>14.8</td>
</tr>
<tr>
<td>Foreign Loan Office</td>
<td>Dept. Health Planning and Financing</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td>Centre for Personnel Exchange</td>
<td>Dept. Personnel Affairs</td>
<td>1</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Table 4-5 PHIC’s frequent and important related government institutions (major think-tanks)

(Respondents were asked to identify the government institutions of the PHB with which they cooperated ‘most frequently and/or most importantly’. Respondents were able to identify more than one institution. See Q 1.6, Appendix 1)

The limited relationships between PHIC and other major health related institutes at the provincial level reflect the vertical fragmentation of health bureaux. Each institute is initiated and controlled by a specific department; for instance, the hospital management institute is founded by the DOMA and commonly headed by the retired director of that department.

RELATIONSHIP WITH PROVINCIAL GOVERNMENT BUREAUX

This pattern of vertical fragmentation is also common between government departments at all levels and with predictable consequences. Respondents to the questionnaire survey indicate close cooperation with the PSB and some contact with the development and planning commission but limited contact with other bureaux including significantly the labour and social security bureau (see Table 4-6).

There are three important ‘mothers-in-law’ for PHICs. The first is the health director, as administrative supervisor within the health bureau. While his/her power is usually

33 From the Chinese puo puo referring to superiors in a patriarchal bureaucracy.
delegated to the director of DOHPF or the director of the general office, the health
director will determine staffing issues and the budget for the centre.

The second ‘mother-in-law’ is the PSB beyond the PHB. The PSB provides professional
supervision and technical requirements for upwards reporting. The PSB also provides
technical support in relation to system development and inspection with respect to
Statistics Law implementation in the health sector.

The third (and relatively recent) ‘mother-in-law’ is the department of information
industry. This department is in charge of promoting informationalisation in government,
enterprise and IT industry.

<table>
<thead>
<tr>
<th>Provincial government department</th>
<th>Frequently contacted</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics Bureau</td>
<td>26</td>
<td>96.3</td>
</tr>
<tr>
<td>Development and Planning Commission</td>
<td>11</td>
<td>40.7</td>
</tr>
<tr>
<td>Finance Bureau</td>
<td>7</td>
<td>25.9</td>
</tr>
<tr>
<td>Labour and Social Security Bureau</td>
<td>3</td>
<td>11.1</td>
</tr>
</tbody>
</table>

Table 4-6 PHICs’ frequent and important related government bureaux or
commissions

(Respondents were asked to identify the provincial bureau and commission with which they
cooperated ‘most frequently and/or most importantly’. Respondents were able to identify more than
one bureau/commission. See Q 1.7, Appendix 1)

About 40% of PHICs report important or frequent cooperation with their provincial
development and planning commissions (PDPC). The PDPC is a relatively senior
portfolio and it can be assumed that where health development is recognised as a whole
of government responsibility development and planning commissions are more likely to
work closely with health information centres. Having PDPC that are involved in health
planning does not appear to correlate with provincial economic status (see Map 4-1).
A strong and powerful planning commission was a defining characteristic of the socialist planned economy in China. During the 1990s, with strengthening of the market economy, the power of the planning commission (at national and provincial levels) has been reduced. As government has adapted to a macro-guiding role and the market has been given greater freedom of action, the role of the planning commission has been reshaped. Finally, the two Chinese characters for ‘planning’ (ji hua) have been erased from the title of the ‘national macro-regulatory department’. The role of the new commission is to reduce administrative interference in the market place in order to allow full play of market mechanisms in driving economic development (Xinhua News Agency, 2003).

Following the central reform, provincial planning commissions have changed their signboards one after another. However, three versions of the commission can be found at the provincial level, entitled planning commission, development and planning commission, and reform and development commission respectively.

In my opinion, the planning commission could be totally removed. See, I am the director, but there is no need for me to do anything. In our developed areas, the matured market handles everything. (Prefectural planning official, Guangdong)

Government planning is completely different from before. We have deregulated many transactions in the industrial and market sector. This leaves us with a free hand to
concentrate on social affairs and regulation. These are the areas where we should be planning. (Prefectural planning official, Guangdong)

Although its title changed, functions of the commission are unchanged. We are inland China. We need the plan to assist our poor people. (Health official, Jilin)

We are in a market economy. All aspects of the planned economy should be broken. The planned economy made our people poor, and the market economy will make us rich. We want the market. Planning has had its day. (City health official, Shanxi)

Therefore, the level and focus of cooperation between health bureaux and planning commissions depend not on the extent of economic development, but on how the government role is defined.

RELATIONSHIP WITH UNIVERSITIES

Map 4-2 Provinces (shaded) where PHIC leaders report close (frequent/important) cooperation with universities and research institutes

The university sector has specialist expertise that can support and complement the work of PHICs. Eighteen PHICs report that working closely with researchers at a provincial level university. Most of those provinces are located along the coast with some of them located in south and central China (Map 4-2). The map suggests that in the relatively underdeveloped provinces of the West and North, PHICs do not have close relationships with local academic institutions.
Provincial HICs have a great wealth of data for analysis but may not have a clear view of what relevant information should be provided to health planners. To cooperate with a local university is an appropriate way to solve this issue. The existence of such cooperation bears no particular relationship with local economic condition. Shannxi locates in West of China, but Shannxi HIC has done excellent work with close cooperation with Xi’an medical university. Another example is in Guangdong. Guangdong HIC is one of the best in China, but the Centre has also worked with Zhongshan Medical University to gain additional academic support. (HIS director, central)

Most of the cooperation reported appeared to take place within the province. None of PHICs reports frequent or important cooperation with universities from beyond the province (Table 4-7).

Cooperation with universities depends on the availability of academic expertise in health information and management within the province but the distribution of academic expertise in health management in China is quite unbalanced. Seven ‘national’ training centres for health management were founded with the support of the MOH in the middle 1980s (Pei, 1998). The seven training centres are still recognised as important centres of academic training and research in health policy and management. Although many provinces have founded their own provincial training centres, cooperation between PHIC and university researchers is more common in those provinces which host ‘national’ training centres.

However, not everyone sees the need for university cooperation.

I graduated from the School of Public Health in Medical University. I have enough knowledge to handle the task of health statistics. The health information undertaking is easy for me, just collect data from subordinates and submit them to the superior systems. For the RHP? The planners did not inquire more data. Anyway, I can handle it without anyone’s help. (City health official, --)

34 The seven training centers refer to those established in universities of Beijing, Shanghai, Zhongshan, Huaxi, Tongji and Harbin.
Several of the interviewees in this study spoke of the cooperation between PHIC and universities in the development of RHP. In many cases, the development of RHP was supported by local universities, such as in Weihai and Shenzhen. In provinces without local academic resources, external technical assistance was introduced, such as in Liuzhou (supported by BMU) and Lanzhou (funded by the World Bank and supported by multi academic institutions).

*In our province, PDPC, PHB and PFB were administrative organisers of the RHP and Zhongshan Medical University was in charge of academic works. The University formed a group with 20 professors and lecturers, which conducted data collection and analysis. (Planning official, Guangdong)*

*We used each other. We need academic supports and technical assistances, while the university needs bureaucratic support for their researches and practical venues for training. (CDC director, city of Guangdong)*

Universities in Guangdong province also designed a training program for health information personnel. As the president of a provincial medical university commented, ‘this is a huge market for our educators’:

*We introduced a training program of Health Information and Statistics in 1995. The major reason of our initiation was based on market analysis. Health departments and hospitals collected a huge amount of data but it was rarely analysed, presented and used. We understood one of the reasons was shortage of human resources. [...] This is a chance for us. [...] Up-to-now, two classes of students have graduated from this program and most of them work in health departments and hospitals. [...] All students easily found their job before graduation. [...] One of our students, graduated two years ago, works for the Dental Health Centre of -- Medical University. Now he is CIO of the Centre and in charge of network construction. [...] Our university is a*
RELATIONSHIP WITH PROFESSIONAL ASSOCIATIONS

In China, there are two Associations for health professionals: the Chinese Medical Association (CMA) and the Chinese Preventive Medical Association (CPMA). Nominally, professional associations in China provide training, self-regulation and research opportunities for their members. Although China’s professional associations have been criticised as ‘institutions for retired and slack officials’ and for being a ‘branch of government’ (Takunpao, 2004b), they still are significant players in health development.

Only three PHICs report close cooperation with the CMA, principally through the Society for Medical Information or the Society for Hospital Management. These relationships reflected the fact that medical library science was formerly the professional base for health information.

Most PHICs relate closely with the Society of Health Statistics (SHS) of CPMA. The SHS headquarters are located in Beijing and the Society is supported by the CHSI. Provincial branches can be found in all provinces of China. At provincial level, PHICs also maintain close contacts with the Society (Table 4-8). Another important association is the Society of Health Economics (SHE), with which some PHICs have cooperated.

<table>
<thead>
<tr>
<th>Association</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Society of Health Statistics (SHS)</td>
<td>23</td>
<td>85.2</td>
</tr>
<tr>
<td>Society of Health Economics (SHE)</td>
<td>13</td>
<td>48.1</td>
</tr>
<tr>
<td>Society of Hospital Management (SHM)</td>
<td>4</td>
<td>14.8</td>
</tr>
</tbody>
</table>

Table 4-8 PHICs’ frequent and important related professional societies
(Respondents were asked to identify the association/society with which they cooperated ‘most frequently and/or most importantly’. Respondents were able to identify more than one association/society. See Q 1.8, Appendix 1)

35 CMA: established in 1915, with 78 speciality societies, 321 sub-societies and 430,000 members.
36 CPMA: established in 1987, with 40 speciality societies and 80 thousand members.
DISCUSSION ON DEPARTMENTAL RELATIONSHIPS

The provincial level health information systems studied in this research can be categorised in accordance with three broad patterns: the core and periphery, the hierarchy and the network.

The organisation of most provincial health information systems corresponds to the core and periphery system. Health information for government health planning is located at the core of the system. Agency level information (where the users are hospital and public health managers) and social health information (where the users are individuals or are looking for community level information) are recognised as the periphery of the provincial health information organisation (Figure 4-11).

![Figure 4-11 Patterns of provincial HIS organisation and interactions - Style 1: Core and periphery](image)

In some other provinces, the health information centre is seen as the top of a hierarchy (Figure 4-12). The manager of PHICs expects to control all parts of the system. Health planning in such provinces tends to be instruction-based.
In Guangdong, Shanghai and other developed areas, PHICs are moving towards a more interactive network system. (Figure 4-13)

The relationship between PHICs and other agencies (health care providers, universities and professional associations) could also be described in relation to partnership theory (VicHealth, 2003). In many cases, the PHICs have established ‘networking partnership’ with other agencies, generally focused on the exchange of information. Coordinating partnership (exchanging information and altering activities), cooperating partnership
(exchanging information, altering activities and sharing resources) and collaborating partnership (in addition to the other activities, enhancing the capacity of the other partner) are much less commonly seen. In the continuum of partnership, networking relationship is the simplest and most easily handled. As relationships move towards a more collaborative style, they impinge more upon the domain of management. Perhaps for this reason, relationships between PHICs and other agencies beyond the PHB have generally maintained at the networking level.

HEALTH INFORMATION SYSTEM INFRASTRUCTURE

WORKFORCE OF PROVINCIAL HEALTH INFORMATION SYSTEM

HIS infrastructure includes workforce, hardware, software, technologies and networks (Gao, Yang, Yu et al., 2002a). Human resources are a critical determinant of success. People constitute most of the ‘human-machine’ information system and people are the sources and users of health information.

Workforce in PHICs can be classified as planned staff, formal staff and temporary staff (temporarily transferred or supplementary to the planned staff). The personnel planning commission and the personnel affairs bureau decide on the number of positions for planned staff. The number is determined based on the responsibilities and volume of transactions for that institution. The existing (actual) number of staff in PHICs comprises the formal recruited staffs plus temporary staffs.

Both the questionnaire survey and the key informant interviews evidenced an extreme shortage of human resources in health information departments. During the planning for the establishment of CHSI, the MOH sought to document the experience of developed countries:

I have visited the U.S. CDCP and Census Bureau many times. They were subsided by government budgets or project funding. The headquarters of CDCP recruited 500 staff. Look at Japan. It also recruited 500 staff and is financed by government. Do you know how many health statistics staff there is in the MOH? Only five! On the
other hand, China’s population size is significantly bigger than USA and Japan. (HIS director, central)

The number of planned staff in CHSI is 50, but it has proved impossible to reach this number, especially following the State Council re-structuring decision. The CHSI has actually recruited around 30 personnel, according to director of the CHSI.

A similar situation was found in the PHICs. The planned number of staff actually recruited depended on the government budget for salaries. In fact, most PHICs do not reach the maximum limitation of planned recruitment but some additional staff (part time or full time) are ‘borrowed’ from other institutions (such as hospitals or universities, who pay the salary of those personnel).

The responses to the questionnaire survey indicate that there are 138 planned positions for PHIC staff at provincial level. However, there are 108 staff working for PHICs: 87 staff formally recruited and 21 ‘temporary staff’. As in the CHSI, the number of operative staff is less than planned number. (See Figure 4-14 below). One of the chief determinants of staff recruitment is the institution’s financing. The government salary budget is based on number of planned staff, no matter how many staff are actually recruited. As mentioned before borrowed staff will be paid by their home-institution. Another limit on recruitment is the availability of appropriately trained personnel.

There is great variation between the provinces. Shanghai has the largest number of planned positions for its HIC (20 staff), followed by Guizhou (15), Guangdong, Hubei and Qinghai (10). Nevertheless, ten provinces are facing extreme shortage of PHIC staff. In each of Anhui, Chongqing, Fujian, Hainan, Hebei, Henan, Jilin, Ningxia, Shandong, Xinjiang provinces (autonomous regions) there is only one health information staff member in the provincial health bureau.

The health bureau of Shanghai city (the largest city in China and famous for international investors) currently employs eight formal health information staff (far less than planned number of positions), and no temporary staff.
In Guizhou, one of the poorest provinces in China, the HIC has 20 staff (12 formal and eight temporary staff). We still do not know why Guizhou reports so many staff for its PHIC. Further study is needed.

**Figure 4-14 Numbers of health information staff in PHICs**

(See Q2.1, Appendix 1)

EDUCATION BACKGROUND OF HEALTH INFORMATION STAFF

Both in central and provincial centres, most HIC staff had a medical background. The current CHSI director advised that half of the staff of CHSI were graduates from medical universities and another half of them studied accounting or computer science.

At the provincial level, both accounting and computer science graduates comprised 25% of total PHIC staff. Another 25% had graduated from medical universities or colleges, including 11% who had graduated from the school of medicine, 9% from health management and 5% from public health. The remaining 25% had graduated in other disciplines or had no experience of higher education. See Figure 4-15.

The workforce shortage in PHICs has been subject to policy attention from the MOH and the CHSI. The MOH allocated special funds for a health information training program at Tongji Medical University and for a health IT training program at Beijing Capital University of Medical Science. However, the structural issue has not been solved.
Two or three groups of students graduated from Tongji Medical University and more than 100 students graduated from Capital University of Medical Sciences. Most students worked for PHICs right after their graduation. Some graduates become the nucleus of PHICs, such as those working in Guangdong, Fujian, Qinghai, Inner Mongolia, etc. However, many others have left. [...] Training of health information professionals is a long-term strategy. Now, we have not a regular training program for health information system. (HIS director, central)

PHICs need more staff with up-to-date knowledge of health planning and health information management. The CHSI work program faces staffing constraints in several areas of its immediate short term work plan: producing social indicators, producing outcome indicators from existing data, designing a brochure/booklet on social indicators and meeting international standards. Medium term technical requirements include: designing databases linking data from different sources, improving analytical capacity, and training in methodology and data quality (GDDS, 2004).

PHYSICAL RESOURCE AND NETWORK CONSTRUCTION

Informationalisation\(^{37}\) is an officially recognised national development strategy for promoting industrialisation and modernisation (Gao et al., 2002a). Health information

\(^{37}\) See glossary.
facilities have improved significantly in the last decade, especially in the developed provinces, in hospitals and for infectious disease control. When asked about the most significant achievements in HIS, none of respondents forgot the magnificent hardware improvement and network construction.

The construction of a government information network in China was initiated in the middle of 1970s (Gao et al., 2002a). In 1975, the State Council commissioned the first computer centre in the central planning commission. Three years later, the State Council proposed the national government information network. In 1984 and 1986, the Information Management Office and the National Information Centre were established in the central planning commission. Information centres were also established in ministries, provincial planning commissions and other government departments. During the early 1990s there was further investment in government information systems including further development of the systems in the planning commissions, and targeted to the informationalisation of economic sectors. For instance, the San Jin Project initiated in 1993 involved a vast investment in IT in the banking system, the taxation system and the customs system.

Health informationalisation has been recognised as part of the national strategy. During the period of Ninth Five Year Plan (1995-2000), the project for the National Health Information Network was implemented. The ‘Three nets and one base’ and electronic health administration were established. Computerised hospital information systems were widely implemented (almost half of China’s hospitals are networked) and many ‘professional health information systems’ (such as community health service, health inspection, disease control and prevention, maternal and child care, tele-medicine, long distance medical education) made significant achievements (MOH, 2002c).

Physical resources and network capacity for PHICs have been updated along with the wider development of information technology. However, the development has been

38 Intranet for internal government transactions, Extranet for government information sharing, Internet for public information, and government databases.
unbalanced. The development of physical resources at the provincial level has depended on government financial capacity and the awareness of local governors and the health director. In the West of China, Xinjiang Autonomous Region and Shanxi province for instance, physical resources are in extremely short supply.

 [...] Of 16 prefectures of Xinjiang, only two are equipped with computers that can run Windows 95. Other prefectures have 486 computers or lower. Although the CHSI developed new software for health data reporting, our prefectures cannot install the new standardised software. I have submitted a proposal to the HIC director, but the director told me: ‘the cheapest appropriate computer costs five to six thousand yuan. Prefectural governments do not have money for that. If we (provincial government) buy computers for them, it will need about a hundred thousand yuan. The provincial government does not have this kind of money. (HIS manager, Xinjiang)

What is the meaning of doctor station? I have no idea about that. We have shortage of computer in health department and hospital. You can find only one computer in each department in the best hospital. In most hospitals, health data were generated through hard-copy forms. (Health official, city of Shanxi)

Things are different in the developed regions. As observed by the researcher, advanced equipment and computer networks have been installed in Shenzhen and Lianyungang cities. The CEO of Lianyungang’s first hospital introduced the new hospital building in the following term:

Our new building is designed as the most modern hospital in this area. Network cables are built-in and computers are installed in all offices. Health informatics is an important feature of a modern hospital. (Hospital manager, prefecture of Jiangsu)

With strong financial support from the Shenzhen government, Shenzhen HIC is implementing new information technology.

Since I started work in Shenzhen in 1991, HIS infrastructures have improved greatly and rank as top level for the Nation. We have gained greatly in physical resources within the recent 20 years. (HIS manager, city of Guangdong)

However, the financial and facility status of PHICs can not always predicted through regional socio-economic status.

Apart from salaries, our HIC only receives 50 thousand yuan per year for operating expenses. All computers in the HIC are Pentium II CPU computers. They are too old to install the new health reporting system. We have submitted a proposal for funding
to buy a new computer to conform to the new reporting system. (HIS manager, Beijing)

The diversity of HIS infrastructures among provinces is a consequence of macro-economic policy as well as the bureaucratic position of PHICs. A similar situation could be found across counties within the province.

Facility and network development always benefit from tragedies. A key feature of national health information policy currently is to improve infectious disease reporting system infrastructure following the SARS epidemic. Similar experience has been reported from Iowa in the USA (O'Carroll, Friede, Noji et al., 1995). The Network for Health Epidemic Information (NHEI) was upgraded after 1998 following the tragedy of flooding in South and North of China. Central and local government invested 2.6 billion yuan (1.0 and 1.6 billion from central and local levels respectively) in the National Health Information Network Project, which focused mainly on improving epidemic disease reporting. The NHEI operates at three levels: central level (MOH and CCDC) provincial level, prefectural and county level. The NHEI has been established and all nominated infectious diseases data (in accordance with the Law of Infectious Disease Prevention and Treatment) are reported through the electronic facility. The terminal of reporting is Chinese Centre of Disease Control and Prevention (CCDC) (Li, 2003a).

Another patch for the health information facility was designed after the SARS crisis. Some scholars criticised the patching approach and recommended a closer examination of the system issues revealed by the epidemic:

I had expected decision-makers would look at the system issues and design proposals to solve fundamental problems. Nevertheless, I am so disappointed. Sure, we have gained more money. However, this is a newly fragmented system with duplicated investment. (HIS official, central)

FINANCIAL RESOURCES

The Chinese government has directed substantial subsidies towards the development of Information and Communication Technology (ICT) in China (Lanvin, 2003). There has
also been significant investment in ICT in the health sector following the 1998 floods and the 2003 SARS crisis. One of the notable consequences of this investment has been the development of an Internet mediated Epidemic Reporting System. However, ICT investment in the health sector has largely gone to facility improvement in health departments, hospitals, preventive and MCH institutions. Most of these new funds have been made available through special projects or self-funded by hospitals, rather than through routine budgets.

The routine budget for PHICs is based on the number of planned staff (salary budget). In many cases, this is the only government funding that the PHICs receive. Many interviewees in this research have argued that government does not provide sufficient financial support to health reporting system. However, there is huge variation among the provinces. Some provinces receive only a salary budget (such as in Xinjiang and Shanxi), while others also receive additional funding for equipment, software and other non-salary costs from their local government (as is the case in Shanghai).

*Xinjiang is the furthest Region. We have spent four days travelling by train for attending a national meeting in Beijing. We have no money for airline fares. All colleagues of developed areas brought their portable computer. I do not because of no money. (HIS manager, Xinjiang)*

*Shanxi government was criticised by the State Council, because our information system was not financially supported. We receive very little from government for HIS development. (Health official, city of Shanxi)*

*Shanghai Health Bureau provided ten million yuan to HIS in 1998 and 16 million yuan in 2000. Those funds were used for improving HIS infrastructure and establishing health information network. Government provides a six hundred thousand yuan annual budget. Besides, we have many contracts for health information consultation and health informatics. (HIS manager, Shanghai)*

The CHSI short term and medium plans (GDDS, 2004) include requests for additional financial resources. In the short term, CHSI is seeking financial assistance to provide computing equipment to the Western regions, for training in computing skills and survey operations and for producing outcome indicators from existing data. In the medium term CHSI wishes to gain financial support to design databases aggregating data from different
sources; to set up a database of detailed information on health facilities and doctors, and to procure and use analysis software.

In the less developed areas, PHIC managers believed that the HIS development should be fully supported by government. However, PHICs in developed provinces, such as in Shanghai, are also able to generate revenues from contracts and projects. This is similar to the Australian experience, where the official health information organisation is required to raise part of its budget from the sale of products and services (AIHW, 2003a, p. 41). In 2003, the AIHW received A$8.1m from government, which was 39.4% of total revenue from ordinary activities. The greatest component of AIHW revenue was generated from its goods and services, 56.2% (A$11.58m).

FUNCTIONS OF PROVINCIAL HEALTH INFORMATION SYSTEM

Information system development proceeds as ‘resolving contradiction between increased information demand and sluggish information service’ (Taylor, 1999; Zhou, 2001). The official functions of HICs at the national and provincial levels are formulated in relatively general terms and are expressed in terms of the responsibilities within health departments. Specific tasks assigned to the HIC (likely to be labelled as ‘health statistics works’), commonly include initiatives for reform, proposals for government bills and guidance for other authorities. There are 13 functions/responsibilities designed for the CHSI (MOH, 2001c), which are classified and summarised in Table 4-9. There are similar regulations at provincial level and the table presents a comparison of PHIC designed functions in Beijing (Beijing institution registration office, 2002) and Guangxi (Guangxi Health Bureau, 2004) categorised in accordance with the functions assigned to CHSI.

It is evident that the PHICs have fewer functions than the CHSI. The regulatory documents prescribing the functions of the HICs, at central and provincial levels, do not clearly identify support for health planning as a critical function.
**Major CHSI functions**

**Provincial HIS functions**

<table>
<thead>
<tr>
<th>Guangxi</th>
<th>Beijing</th>
</tr>
</thead>
</table>

**Macro planning and Regulatory activities**

- Involve health planning
- Develop of HIS principles, policies, and plans
- Develop of HIS legislation and reporting system
- Conduct inspection on statistics law

**Information collection and management**

- Manage health statistics annual reporting system
- Conduct national health services survey
- Conduct special health survey
- Manage and coordinate health statistics within Ministry/Bureau
- Provide health statistics data for communiqués
- Maintain health statistics databases
- Review health information development plans within Ministry/Bureau
- Review health system data held by Ministry/Bureau

**Professional Standards and Network Construction**

- HIS data standards (for statistics reporting)
- HIS networks and health informatics
- Organize HIS networks and regulate medical IT market
- Develop and maintain Ministry/Bureau official website and data
- Office automation
- Coordinate on network and data safety

**Research, Consultation, Training and Communication**

- Health statistics analysis and study
- Health statistics consultation
- Health statistics inspection
- Training
- Accreditation
- Communication within provinces
- Communication among provinces
- Communication among countries
- Coordination with Health Statistics Association

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**Table 4-9 Functions of HICs at central and provincial levels**

<table>
<thead>
<tr>
<th>Function</th>
<th>Guangxi</th>
<th>Beijing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macro planning and Regulatory activities</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Information collection and management</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Professional Standards and Network Construction</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Research, Consultation, Training and Communication</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

The variation between different PHICs with respect to their authorised functions reflects their historical origins and the circumstances of their establishment. Most HICs are created through the combination of medical information institutions and the health statistics office of the PHB. For instance, Beijing HIC was established (in April of 2002) on the base of the former Beijing Medical Information Institute. Four departments have
been set up within the HIC: statistical information, health informatics, edition and translation, and medical reference searching (Beijing Health Bureau, 2003).

INVOLVING HEALTH PLANNING AND REGULATORY ACTIVITIES

As Figure 4-16 shows (below, based on questionnaire survey of PHICs), most PHICs do not involve in national health planning activities. This is not a surprise: health planning in China generally takes a top-down approach. National plans were supported by the CHSI and other think tanks at the central level. For instance, the CHSI, CHEI, CHMI and FLO are all actively involved in national health policy making and strategy setting. Occasionally, PHICs are invited to participate in national health planning. This might involve the CHSI inviting some PHICs to discuss specific health information issue or to provide specific health data for national planning.

There are no regulations or other mechanisms motivating PHICs (and PHB) to participate in national programs. National and provincial HICs regulatory documents do not identify the national-provincial HIS cooperation or partnership in health planning as a priority. In the other words, PHICs have no responsibility to be actively involved in national level health planning.

More surprising is the fact that only some 70% of PHICs are actively involved in provincial-level health planning despite their administrative affiliation with the PHB.

Figure 4-16 Percentage of PHICs involved in national and regional planning
(See Q3.1, Appendix 1)
Less than 20% of PHICs reported being involved in processes of national health information planning and policy setting. This suggests relatively weak cooperation between central and PHICs. China’s Health Statistical Survey Regulation (MOH, 2002a) is formulated mainly within the MOH subject to the approval of the NBS. This approach to regulation setting appears to explain some of the contradictions between central and provincial levels.

*The new health statistical survey regulation requested our PHIC to implement new standards of data collection and reporting. However, they (CHSI) do not understand our local realities. Most of their requirements cannot be reached in our poor province. Why? They (CHSI) did not discuss with us beforehand. (HIS manager, --)*

*During discussion on new health statistical survey regulation, we (the PHICs) found that the interests of the central and local were different [...] Central HIS focuses on supporting national health policy, [...] however, we (the PHICs) are more concerned with practical and implemental issues. However, we were not invited to help shape a national regulation that would meet our needs. (HIS manager, --)*

Most PHICs (85.2%) have formulated provincial HIS development plans and regulations. Presumably, 15% of provinces do not have HIS development plans. Although most provincial plans and regulations are copied from national HIS policies, PHICs generally issue modified plans, which are suitable for the local situation and information demands.

*Health databases for our province are more comprehensive and detailed than required by the national regulation. To maintain continuity of our own data collections, we implement the national and provincial standards simultaneously. (HIS manager, Beijing)*

Health informationisation is designed as an important role of government HIS. Central and provincial HICs include the formulation of health informatics policy, plans and standards among their responsibilities. The MOH has issued the Health Informationalisation Plan in Ninth-Five Year Period and Strategic Vision by 2010 (MOH, 2003c). However, the national plan and strategy did not provide for a significant contribution to local plans of the PHICs. The finding shows 66.7% of provinces reported (in the questionnaire survey) having prepared their own provincial plans for health information modernisation.
With the relative weakness of financial and administrative forces with respect to HIS development, legislative measures (under the Statistical Law and National Health Statistics Regulation) are recognised as powerful tools for regulating activities and improving the quality of health information. Nearly 30% of PHICs report being involved in the development of health information legislation at the national level, while more than 80% of them are involved in issuing local legislation. One third of PHICs actively cooperate with the CHSI on implementation and inspection of health information legislations, while 92.6% of provinces organise inspection activities in their provinces.

In summary, PHICs are not closely involved in health planning and health information planning processes at the national level. Their involvement is generally simply following central requirements and formulating provincial HIS policies that correspond to local circumstances. Health information legislation is viewed as an appropriate tool for HIS development and quality assurance.

COLLECTING AND MANAGING HEALTH INFORMATION

National Health Statistics Reporting and participating in the National Health Services Survey (NHSS) are two compulsory duties of PHICs. The questionnaire responses (Q3.2, Appendix 1) show that all provinces follow the national regulations in these respects.

However, only 55.6% of PHICs report conducting special health surveys in response to ad hoc information inquiries from local health planners and reformers (Figure 4-17). This figure does not mean there are no special surveys in those provinces. In many provinces, health bureau departments, other than PHICs, conducted special surveys or contracted out such surveys to research institutions or universities.

Almost 3/4 of PHICs (74.1%) reported reviewing the data collection and survey plans of other departments within the health bureau (such as MCH, hospital management and disease control). However, only half of them (55.6%) report reviewing other departments’ data collections. In most circumstances, ‘plan reviewing’ by PHICs was formalism, in which nearly half of the PHICs are not involved in or cooperating with
other departments in data collection and analysis. HICs from most provinces (92.6%) report that they carry responsibility for maintaining health data collections, which include reported data and special surveys conducted by HICs themselves, as well as copies of data collected by other departments.

![Figure 4-17 Percentage of PHICs involved in data collection and maintain](See Q3.2, Appendix 1)

**DEVELOPING STANDARDS AND NETWORK CONSTRUCTION**

Although health information modernisation is an important responsibility of PHICs, the results of questionnaire survey suggest that in fewer than half of the PHICs conduct relevant activities (Figure 4-18).

Findings of the interview study suggest that both the CHSI and the PHICs recognise formulation of health information standards as a responsibility of the central authority. PHICs recognise that their duty is to implement but not formulate the standards.

*This is not my business. Central level has to lead this task, and then give standards to me. My responsibility is to follow them.* (HIS manager, Jilin)

Only 37% of PHICs report being involved in organising and coordinating regional health information network construction and information technology development. PHICs
coordinate health-related website development and health IT application development in
a similar proportion of cases.

In over half of the provinces (51.9%) PHICs work on the construction of local networks
within the PHB (Intranet, which link the departments of the health bureau and are
controlled by the PHIC). In less than half of the PHICs are involved in health information
standards introduction, province-wide network construction and management, data and
network security and office automation systems.

![Figure 4-18 Percentage of PHIC involved in setting professional standards and
network construction
(See Q3.3, Appendix 1)](image)

Most standards for data collection and networking are formulated centrally. The
construction of province-wide networks would be the responsibility of the Ministry of
Information Industry (MOII) which is the sponsor of the so-called ‘e-government project’
(and corresponding local bureaux) (Feng, 2002).

The CHSI is assigned as top leader of health informationalisation in China. The MOH
formulated the National Health Informationalisation Strategic Plan in 2003 (MOH, 2003c)
in which health information modernisation is identified as an important element of health
reform and development. ‘There is an urgent need for health informationalisation. It will facilitate achievement of health reform goals, and help to drive health reform. Health informatics is a strong tool for improving the level of scientific management, quality and efficiency in health services’ (MOH, 2002c). The central strategic plan set up key priorities for health informatics development by the year of 2010: (1) establishing standards, (2) improving safety and operation maintenance, (3) strengthening management and legislation, (4) improving cost-efficiency, and (5) promoting balance of development and supporting Western regions.

The CHSI plans to extend the public health information system based on the National Health Information Network Construction Project. The collection, development and utilisation of public health information will be strengthened. The CHSI intends to set up national standards for databases of public health resource, health status and disease, preventive service. Public health websites are also going to be established and standardised in order to provide efficient consulting and health education services to community and population. In addition, the utilisation of information resource will be strengthened in order to realise value of public health information.

Based on the requirement from the State Council, electronic health administration system (e-health government) will be established at central, provincial and prefectural levels, and an auto-health office will be established. The e-health government is designed for improving information exchange, resource sharing and health administration efficiency. Websites and databases of health administration (health bureau) will be improved, in order to facilitate health information releases, government information transparency and consulting services provision. However, as the questionnaire survey finding suggested, e-health government is an unbalanced development among provinces.

The CHSI also provides efforts on hospitals information system (both CIS and MIS) development and standardisation, including electronic patient record, digital medical imaging, and doctor and nursing workstations. Both CHSI and PHICs negotiate with Medical IT businesses on technical improvement and system standardisation. Some
hospitals will be selected as demonstration hospitals for health informatics, in order to participate at the international frontline. However, HIS development is always interfered with by horizontal and vertical fragmentation. Serious comparability issues exist among hospitals of different sectors and levels. Medical science and technology information systems will establish medical reference and information databases and develop digital medical libraries.

Compared with many other countries, China’s health informatics development is late. There is a significant shortage of technological resources and financing investment. As commented by a senior medical IT expert, ‘health informatics is still in an early stage of development’.

In short, the National Health Informationalisation Strategic Plan is the only formal central policy found in China dealing with health information development. However, this strategic plan is not for HIS development in general, but is focused primarily on health informatics. This plan does not deal with the information needs of decision-makers and other users of health information. PHICs are also requested to formulate their local health informationalisation plan. However, the local agenda of health informationalisation is heavily depended upon government financing and priority setting.

**RESEARCH, CONSULTATION, TRAINING AND COMMUNICATION**

Findings of the questionnaire survey suggest that most PHICs reported having conducted health statistics studies, communicated health information within the province, and organised health information monitoring (81.5%, 77.8% and 77.8% respectively). In just over 2/3 of provinces (70.4%), PHICs provided health statistics consultation services. In about 60% of provinces the PHICs worked with the health statistics association. In half of the provinces (51.9%), the PHICs were involved in inter-provincial health information sharing. In nearly half the provinces (48.1%) PHICs provide training on topics such as of Internet use, computer operation and the software application.
In only one third of provinces are the PHICs involved in the accreditation of health statistics professionals. Very few provinces reported sharing their health information resources with other countries or with international agencies (Figure 4-19).

HEALTH INFORMATION SUPPORT FOR RHP

There are clear policies regarding the kinds of information required for RHPs: ‘The contents of RHP will include analyses of socio-economical status, health status and health resource; they will identify major health issues, set up objectives and standards for resource allocation, develop policies, implement, monitor and evaluate plans.’ (NDPC et al., 1999)

Based on this policy, the MOH (with the participation of domestic scholars) has developed detailed technical guidelines for provincial and prefectural regional health planners (Chi, 1996). Chi Baolan and her colleagues have suggested conducting household survey based on standard instruments and common methodologies. ‘The information provided by the surveys will benefit our understanding of regional health
needs, demands and resource utilisation. Then regional health planner would be able to rationally allocate health resources in equitable, efficient way’ (Chi, 1996).

Song Wenke, a professor of Chinese Medical University, provided guidance on the information requirements for RHP (Song, 1999). Song suggests collecting data from four major sources for RHP. (1) The routine statistics reporting system would be the first choice in data gathering; (2) special surveys should be organised when necessary data are unavailable, covering such data as health demands, disease classification, burden of disease etc; (3) literature reviews for some technical parameters benchmarking; and (4) some necessary qualitative data, such as expectations and responses of other departments and institutions for RHP. Song emphasised that information gathering and analysis requires high-level technical capacity. Regional health planners should bring information professionals into RHP, in order to ensure the quality of their data.

However, most PHICs do not believe they have formal responsibility of information support for regional health planning. ‘There are some ad hoc inquires on health data for RHP. Otherwise, regional planning is far from us’, as a HIS staff mentioned.

**SUMMARY**

The foundations of China’s HIS were developed within the framework of the planned economy and the evolution of the system are necessarily incremental. The HIS of the planned economy carried with it the disadvantages of instruction-based bureaucratic administration, departmental fragmentation and single purpose agencies, inefficiency, insensitivity to the needs of users, and lack of technical capacity. As a subsystem of the national statistics system, HIS has focused mainly on resource statistics.

Health data collectors and preservers are becoming health information owners, producers, users and disseminators. With government restructuring, PHICs are becoming semi-independent government institutions free from the constraints of the civil service system. The functions of PHICs have extended from maintaining inventories of statistics to population health study and ad hoc health policy study. User groups have extended from
the director and DOHPF of PHB to all departments, healthcare providers, other related government bureaus, as well as individuals and communities. Leaders in HIS development, such as Guangdong and Shanghai, have pioneered new roles in health planning and found a new position in the market. They are involved in health decision-making, and learned to use social resources to supplement the shortage of government resources. They share information with other sectors, and work productively with academic institutions. However, many other PHICs are not being properly supported or utilised and report inadequate resources and ignorance of leaders.

The contribution of the HIS to health planning is affected by various factors. One of factors is the power and position of the PHIC in the structures of health administration. The participation of PHICs in health planning, HIC managers’ political capacity and the contribution of information to local decision-making were different among the provinces.

Compared with developed countries, the HIS in China remains at a relatively underdeveloped stage. According to AIHW annual reports, the number of staff recruited by the national health information institution increased from 112 in 1994 to 201 of 2003; thus it was almost doubled in the last decade (AIHW, 1996, 1997, 1998, 1999, 2000, 2001b, 2002a, 2003b). In China, the lack of resources manifests itself particularly in the small workforce and low quality of staff. Weakness in knowledge (including management, information science and planning), skills (including computer application, data analysis, policy analysis and sociological study) limit performance and contribute to dissatisfaction. Although HICs benefited from accidental government attention and investment after the tragedies, fragmentations are emerging which may obstruct HIS development. The lack of coherent funding strategy for HIS infrastructures and capacities (not just health informatics) is another problem of system planning.

This research has shown that most PHICs are not closely involved in health planning or health system management. Although all PHICs are involved in data reporting and the NHSS, most of them lack a capacity to respond on an ad hoc basis to the information needs of local health decision-making.
CHAPTER FIVE

HEALTH INFORMATION AVAILABLE IN CHINA

INTRODUCTION

‘If you don’t measure it, you can’t manage it’. The availability of high quality and appropriate information is an important prerequisite for better health planning and the provision of such information is an essential function of a HIS.

Widely available health information supports better health planning and implementation; the informed public can judge the government’s ability to make sound health policy; informed stakeholders can plan and coordinate more effectively, and informed decision-makers have a better understanding of the issues they are addressing (Islam, 2003, p.5).

‘Health information’ encompasses a wide range of different kinds of information about different facets of health policy, planning and delivery (HIPAA, 2003)\(^{39}\). In China, health information can be used to refer to medical science information for medical practitioners and statistical information for health planning and management (Chen, Yang, Song et al., 2001). To be useful in practice, the term should be defined more precisely.

For health planning, information can be classified according to different perspectives. The national health information model of Australia (AIHW, 2002b) classifies health information as service information (location, expenditure, outcome, etc), party role and characteristics, events, business factors, enabling factors and environmental factors.

\(^{39}\) According to HIPAA, the term ‘health information’ means any information, whether oral or recorded in any form or medium, that is created or received by health care providers, health planners, public health authorities, employers, insurers, schools or universities, or information clearinghouses; and relates to the past, present, or future physical or mental health or condition of any individual, the provision of health care to an individual, or the past, present, or future payment for the provision of health care to an individual. ([http://www.hpiaabasics.com/glossary.htm](http://www.hpiaabasics.com/glossary.htm), accessed in 19/01/04)
McGlynn (McGlynn, 1998:pp9-19), using a source-oriented perspective, suggests that an integrated health information system draws information from five basic sources: administrative files, enrolment files, clinical records, surveys and other data. UK colleagues however, using a more functional perspective, recognised that health information may describe four major domains: population, mortality, morbidity and health care (Wright and Walley, 1998). Eagar and her colleagues (Eagar, Garrett and Lin, 2001, p.119-37) define six broad types of information for health planning purposes: demographic and socio-economic data, epidemiological (mortality and morbidity) data, hospital and health service activity data, health economic data, qualitative data about needs, perceptions and preferences, and information about the efficiency of health interventions. Finally the data can be categorised in terms of the different kinds of resources upon which the system depends including information about capital (assets), workforce, and equipment.

**DEMOGRAPHIC DATA AND INFORMATION**

Contemporary public health takes a broad view regarding the determinants of health. Many relevant information systems exist beyond the realm of health administration, including for example the population databases, which are generally looked after by statistics authorities. Nevertheless, demographic data are essential for regional health planners and managers.

**AUTHORISED ORGANISATIONS**

Several organisations in China have responsibilities for population data collection and analysis. The NBS is an official authority with responsibility for collecting and releasing population information. The Department of Population, Social Science and Technology Statistics of the NBS is responsible for releasing demographic data, while the Census

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Demographic data reflect characteristics of human population in terms of wide range of socio-economic factors, for instance population size and structure, birth and death rates, age distributions, marriage and divorce rates, immigration and emigration rates.
Centre which is affiliated with the NBS is in charge of organising, analysing and releasing census information (NBS, 2002a). All local statistics bureaux are supervised, with respect to the technical dimensions of their work, by the NBS. Statistics Yearbooks are published, at central and local levels supplemented by a wide range of statistics publications and periodical reports.

The National Population and Family Planning Commission (NPFPC)\(^{41}\) is the top government agency for population development and family planning. The Division of Information in the Department of Development and Planning of the NPFPC is in charge of family planning statistics, with responsibility for the conduct of sample and special surveys; for analysing national population statistics; for releasing family planning information; and for supervising the collection, management and analysis of family planning statistics (NPFPC, 2003). The Chinese Population Information and Research Centre (CPIRC)\(^{42}\), which was established in 1980 and is affiliated to NPFPC, was designed as a base of collecting, analysing and distributing demographic and family planning information. The Research Centre undertakes many population studies, provides consultation services, and publishes three periodicals and the Yearbook of China’s Family Planning (CPIRC, 2004). It is recognised as an important policy ‘think-tank’ in relation to population and family planning policy at the national level. There are many other institutes for population and family planning study nationwide. According to the CPIRC, 66 institutions have been established both at the Central and provincial levels. Each province owns one or two such institutions. Some of them are government affiliated, and others are located in universities (Popin, 2003).

The ministries (e.g. MOH, MOLSS, MOCA, MOE, etc) also collect specific demographic data for purposes of departmental planning and selected indicators are published in departmental yearbooks. Sectoral datasets are passed to the NBS and are then published in the Statistics Yearbooks. Besides the yearbooks, most local government

\(^{41}\) Newly renamed in March 2003, and re-structured based on former Family Planning Committee.

\(^{42}\) CPIRC was renamed as Chinese Population and Development Research Centre in 2003.
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departments also publish specific population based data in professional periodicals and ad hoc reports (Figure 5-1).

Figure 5-1 Demographic data collection, flow and presentation

The United Nations (UN), World Health Organisation (WHO), United Nations Development Programme (UNDP), United Nations Economic and Social Commission for Asia and Pacific (UNESCAP), United Nations Child’s Fund (UNICEF), the World Bank, Population Council, Population Reference Bureau (USA), International Planned Parenthood Federation, Family Health International and many other international organisations also publish nation-specific population based data. However, the data used by those international agencies are in almost all cases derived through official channels.

POPULATION DATA COLLECTION

The principal sources of demographic data are the household registration system and the periodic population census.

HOUSEHOLD REGISTRATION

Household registration has existed in China for more than 2000 years. It originated in the Zhou Dynasty (1066 BC – 256 BC), and was formally established in the Qin Dynasty
HEALTH INFORMATION AVAILABLE IN CHINA

(Dong, 2003b; Zhao, 2003) by Lord Shang Yang43. The system was established earlier than comparable systems in other countries, e.g. Japan in 701, Sweden in 1741, France in 1539, Switzerland in 1874, Germany in 1875, USA in 1639, Canada in 1918 and Australia in 1911 (ABS, 2000), which are based on various different laws or regulations (Department of Civil Affairs Taipei City Government, 2003).

Demographic information has been collected by the Public Security Department based on the household registration system since the 1950s. Before 1956 (1951-1955), urban and rural household registrations were separately managed by public security department (based on the Urban Household Management Regulation) and civil affairs department (based on the Rural Household Registration). After 1956, the public security department began to manage both urban and rural registrations. In 1958, the State Council issued a Household Registration Regulation, which is still effective today. Based on the Regulation, ‘population migration should be planned’. Any individual has to be registered as either ‘rural resident’ or ‘non-rural resident’, in order to prevent farmers’ ‘blind flow’ to the cities (although citizens have freedom of migration, based on the Constitution 1958). The household registration provides a permanent label for everyone (infant inherits from parents), unless rural residents were employed by government or matriculated by university.

Traditional demographic statistics are based on the household registration system. Basic demographic data included four items: births, deaths, migrants in and migrants out. The numbers were generated from ‘household registration record’, which is maintained by police stations in each urban community and rural town. In the end of each year, police officials summarise and submit these four numbers to county or city public security bureaux. The county or city public security bureaux then transmit the collected data to the

43 During the Qin Dynasty (365 BC), Lord Shang Yang proceeded with his reforms which entailed: (1) redistribution of land, (2) division of the state into administrative districts, (3) changes in the taxation system, (4) the establishment of a severe penal code based on collective responsibility, and (5) establishment of meritocratic system of public administration.
provincial public security bureau and from there, the numbers are reported to the Ministry of Public Security (MOPS). The MOPS passes these data then to the NBS.

Compared with other government policies, household registration is an old and stable government policy, which was established in its present form in 1958 and still operates. Before China’s opening-up policy (1978), household registration was implemented efficiently and quite restrictively. Rural people found it almost impossible to move from countryside to urban areas and urban residents had little chance of moving from one city to another. Basic population data generated from household registration was relatively accurate (Contemporary China Series Editing Group, 1989).

However, the household registration policy and the population statistics derived from it have faced serious challenges after 1978. Rapid urban constructions attracted massive and cheaper labour from the countryside. Increasing numbers of businesses and other institutions were keen to employ ‘talents’, whether or not they were registered as urban residents, particularly in the big cities. Arguments on human rights grounds for the free migration of farmers challenged the morality of the policy (Zhang, 2003; Sun, 2004), particularly after serious cases of discrimination on rural immigrants (Luo, 2003). Increased internal migration influenced the accuracy of demographic data. Many farmers
left their land and moved to urban centres looking for jobs. Limited number of immigrants gained their urban registration (see Figure 5-2). However, many of the jobs for immigrants were short term or seasonal and most of the immigrants did not register with urban police stations to obtain temporary resident certificates, and freely returned to their rural homes during harvest seasons and for the Spring Festival.

The Resident Identification Card Regulation was implemented in 1985, and was also administrated by the Public Security (MOPS, 2004). Although the unique person identification number for every citizen (see Figure 5-2) enables linkage of exposure and outcome data and helps to determine population size of regional population, it has not been used for this purpose.

POPULATION CENSUSES

The population census is the other main source of demographic information for RHP. There were seven population censuses in China during the last century. The first population census was organised during the Qing Dynasty (in 1909); the population at that time was 370 million. The second census was conducted by the government of the Republic of China in 1930, which covered 13 provinces; the estimated national population was 474.8 million (People's Daily, 2000). Since 1949, five population censuses were conducted in 1953, 1964, 1982, 1990 and 2000 (Contemporary China Series Editing Group, 1989), see (Table 5-1). The censuses were organised by the NBS. Population censuses in China are conducted every ten years (as in the USA and UK but different from Australia and Japan).

<table>
<thead>
<tr>
<th>Year</th>
<th>Total population (million)</th>
<th>Sex ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (million)</td>
<td>594.35</td>
<td>694.58</td>
</tr>
<tr>
<td>Sex ratio</td>
<td>107.56</td>
<td>105.46</td>
</tr>
</tbody>
</table>

Source: NBS (http://www.stats.gov.cn/was40/search)

Table 5-1 Five population censuses in China and major results

The Census is an important demographic information source for health planning. However, the long span of time between population censuses is a drawback for health planning, because population migration increased so dramatically in the last two decades.
Two intercensal estimates (in 1987 and 1995) are conducted by the NBS based on annual 1/100 sample surveys conducted by the Census.

**FERTILITY SURVEYS**

The CPIRC conducts a number of population studies in association with domestic and international partners. Fertility surveys and population projections are among the most important products of the CPIRC. Most of studies have been published, and databases have been publicly released, such as Population Database of Fourth National Census\(^{44}\).

**SPECIFIC POPULATION-BASED DATA**

Other government departments collect specific population data though their departmental statistics reporting systems or special surveys. For instance, the health sector collects demographic and other population-based information though the NHSS; the education sector collects information about school enrolment through education statistics reporting; the labour and social security sector collects employment and unemployment data; and the civil affairs sector collects information regarding marriage status and poverty.

Beyond the summarised data published in Statistics Yearbooks and sectoral yearbooks, more detailed data are kept by the vertical sectoral administrations. Horizontal sharing of demographic data is difficult and presents a significant obstacle for local health planners.

*Do you know how we gained birth and death data? We obtained them from the Public Security Bureau (who in charge of the birth and death registration), the Family Planning Committee (who collects family planning and fertility data), and the Preventive Station (a health institution of the health bureau, which provides immunisation services), the Civil Affairs Bureau (in charge of marriage registration) and even the funeral home (a civil service administrated by the civil affairs bureau). (HIS manager, Guangdong)*

*The MCH administration is a top-down structure: from the provincial MCH institution to city MCH institutions, to district or county MCH institutions. In each*

\(^{44}\) Publication and data service are responsibilities of the Data Utilisation Service (DUS), Publishers of Population and Family Planning Journal and Yearbook.
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district or county institution, the Preventive Department supervised MCH data collectors in urban community hospitals or rural THCs. The bottom line is the village doctors, village midwives, and the staff of urban residents’ committees. [...] Data collection is a reversal of administrative links. The primary point of MCH data collection is at the township or ‘street’ level. Village doctors/midwives or the staffs of residents’ committees are invited to attend a bimonthly meeting, with lunch provided after reporting the data of births and deaths. Then, the township or district staff filled a data report and submitted to the district/county MCH institution. Finally, we (the provincial MCH) got the summarised data. (HIS manager, Guangdong)

SOCIO-ECONOMIC DATA AND INFORMATION

Socio-economic development is widely recognised as one of the most important determinants of population health status (World Bank, 1993, pp. iii-iv; Hao, 2001; Hao, Yu, Wang et al., 2001; Gong and Feng, 2002). Economic policy has been a top priority in recent decades at the central and local government levels and there is a rich resource of economic information collected (Liu and Jiang, 2002).

AUTHORISED ORGANISATIONS

STATE INFORMATION CENTRE

Established in January 1987, the State Information Centre (SIC) was an affiliated institution of the NDRC. The SIC is in charge of establishing the National Economic Information System (NEIS). More than 1600 sub-centres have been established in local settings and 130,000 staff recruited by national and local centres (SIC, 2001). The SIC has gained multi-departmental and multi-level government support. With strong authorised powers, the SIC collects and analyses comprehensive economic information and is involved in decision-making and policy development for economic development.

NATIONAL BUREAU OF STATISTICS

The NBS and its provincial subordinates collect and publish extensive economic and social information (NBS, 2002a). As in Australia (Eagar et al., 2001a, p.119), the NBS of
China officially publishes information on socio-economic development. Demographic information is of course a key element of socio-economic data. This field has been described in the previous section.

**SOCIO-ECONOMIC DATA COLLECTION**

There are three major sources of information on socio-economic data: routine data report, sampling survey and census.

**ROUTINE DATA COLLECTION**

The NBS collects, compiles and publishes annual reported data, including data submitted by other government departments for inclusion in the Statistics Yearbook (Appendix 11).

**SAMPLE SURVEYS**

The government established a supplementary data source, paralleling the reporting system based on the Urban Socio-economic Survey Team (USEST) and Rural Socio-economic Survey Team (RSEST), both affiliated institutions of the NBS (Figure 4-1)\(^{45}\). Both of these bodies conduct regular sample surveys and provide valuable data collected from urban and rural households.

\[...\] City Statistics Bureau conducts sample surveys with a 1200 household sample size once four years and with a 300 household sample size once a year. The surveys (rural and urban) include economic data and residents’ consumption indicators. None of these is directly related to health services. (Statistics official, city of Shanxi)

**CENSUSES**

The China Economic Census is conducted at five yearly intervals at Year 3 and Year 8 of each decade. The China Agricultural Census has been re-scheduled at Year 6 of the decade.

\(^{45}\) There is another survey team, named Enterprise Survey Team, affiliated with NBS. This survey team conducts sample institutional surveys in all types of business.
decade. The China Population Census is conducted at Year 0 of the decade (NBS, 2004).46

The Statistics Yearbooks at Central and provincial levels provide a package of socio-economic information. For instance, the Statistics Yearbook for 2001 contains twenty-six parts (NBS, 2002c). For more detail, please see Appendix 10. The Statistics Yearbook is publicly available and its CD version has been available since 2000. Provincial statistics bureaux also publish their yearbooks, which provide specific data by prefectures, counties, and cities. County and city statistics bureaux also publish their yearbooks but the quality of the data is variable and in some cases quite questionable.

Whatever level of yearbook production, one of common issues is that all data are edited and presented as flat two-dimensional tables (both in the hard copy and CD versions). Raw data are not publicly available. This presents significant difficulties for regional health planners who may need to conduct further analysis of particular issues. In some circumstances, scholars can gain access to the databases for purpose of study under formal or informal agreement. The statistics bureaux generally charge data purchasers.

Another issue is the quality of data. Quality of census data and sample surveys tend to better than hierarchical reported data. The NBS states in the preface to the Statistics Yearbook that ‘some tables’ totals are not same as would result from adding sub items, because of standardisation problems and data quality in some provinces’.

Other important information related to health is provided by specific government department agencies, such as detailed information regarding education that is collected through the educational hierarchy and released by the Ministry of Education (MOE) and local administrations. Those belonging to “national statistics” will be reported by MOE to the NBS and will be released through the statistics authority.

46 Before 2004, there were four 10-year censuses and one 5-year census in China. The Population Census was conducted at each Year 0 of the decade; the Industrial Census at each Year 3 of the decade; the Agriculture Census at each Year 5 of the decade; the Third Sector Census at each Year 7 of the decade; and the Institutions Census at Year 1 and Year 6 of the decade. In 2000, the R&D Census was instituted. In 2004, these arrangements were changed and the Third Sector Census, Industrial Census and Institution...
### Table 5-2: Basic Medical Insurance Information Provided by MOLSS

Medical Insurance information is collected by the Ministry of Labour and Social Security (MOLSS) and its local administrations. However, health planners are not able to get detailed analyses of medical insurance coverage and payouts. This is partly because the MOLSS itself cannot collect detailed medical insurance data because the medical insurance system is implemented at the city level. In the Statistics Yearbook of Labour and Social Security for 2001, only a summary table is provided (MOLSS, 2001), see Table 5-2. The only information provided by this table was that population coverage of basic medical insurance has increased and plenty of revenue had been saved (suggesting under-protection of the insured populations).

<table>
<thead>
<tr>
<th>Year</th>
<th>Employees Basic Medical Insurance</th>
<th>Employees Retirees Medical Insurance</th>
<th>Revenue</th>
<th>Expenses</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>2676094</td>
<td>225182</td>
<td>14355</td>
<td>13335</td>
<td>4343</td>
</tr>
<tr>
<td>1994</td>
<td>3745924</td>
<td>257408</td>
<td>31561</td>
<td>29113</td>
<td>7115</td>
</tr>
<tr>
<td>1995</td>
<td>7026144</td>
<td>432560</td>
<td>96667</td>
<td>72835</td>
<td>30982</td>
</tr>
<tr>
<td>1996</td>
<td>7911835</td>
<td>644715</td>
<td>190084</td>
<td>162336</td>
<td>64403</td>
</tr>
<tr>
<td>1997</td>
<td>2954494</td>
<td>738742</td>
<td>1293457</td>
<td>992015</td>
<td>523000</td>
</tr>
<tr>
<td>1998</td>
<td>4017360</td>
<td>1076359</td>
<td>11079683</td>
<td>62613458</td>
<td>605924</td>
</tr>
<tr>
<td>1999</td>
<td>4698570</td>
<td>1240773</td>
<td>10395529</td>
<td>4318220</td>
<td>898660</td>
</tr>
<tr>
<td>2000</td>
<td>18181600</td>
<td>4878355</td>
<td>1044624</td>
<td>1699984</td>
<td>1245411</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increase over preceding year (%)</th>
<th>1994</th>
<th>40.0</th>
<th>14.3</th>
<th>119.9</th>
<th>118.3</th>
<th>63.8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995</td>
<td>87.6</td>
<td>68.0</td>
<td>206.3</td>
<td>150.2</td>
<td>335.4</td>
</tr>
<tr>
<td></td>
<td>1996</td>
<td>12.6</td>
<td>49.0</td>
<td>96.6</td>
<td>122.9</td>
<td>107.9</td>
</tr>
<tr>
<td></td>
<td>1997</td>
<td>63.5</td>
<td>53.9</td>
<td>175.1</td>
<td>149.5</td>
<td>157.8</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>36.0</td>
<td>45.7</td>
<td>-14.3</td>
<td>163.4</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>1999</td>
<td>17.0</td>
<td>15.3</td>
<td>-6.2</td>
<td>65.2</td>
<td>48.3</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>287.0</td>
<td>293.2</td>
<td>0.5</td>
<td>1.1</td>
<td>89.2</td>
</tr>
</tbody>
</table>

Note: The social pooling funds balance of illness catastrophe medical were included in medical insurance in 1999, 2000.
MORTALITY – VITAL STATISTICS

The numbers of people dying for different reasons at various ages has a key place in any description of the health status of a population (Lopez, 1998). Significant achievements in generating good epidemiological data have been made over the last 50 years. Before the 1950s, irregular mortality reports were produced but based on rough estimates only. From the 1950s to the 1970s, vital data were collected through the registration of births and deaths but cause of death was poorly recorded. Since the 1980s, population censuses have provided more accurate vital data and the Disease Surveillance Point System have been developed. During the 1990s expended analysis were undertaken on the basis of the population census and fertility surveys supplemented by data from the new integrated surveillance point system enabling more comprehensive analyses and reports.

IRREGULAR VITAL DATA BEFORE 1950S

During the 1930s and 1940s, there were attempts to implement death registration in municipalities such as Nanjing, Beiping (Beijing), Shanghai, Hangzhou, Guangzhou and Hankou (Huang, 2003). According to Huang Rongqing, the data quality of those death registers was variable. Another source of mortality information is one-off academic research studies. A life table was calculated by professors of Jinling University, based on rural survey data collected from 1929 to 1931. According to this study, the life expectancy (LE) at birth of Chinese farmers was 35 years for males and 40 years for females (Huang, 2003). Researchers from National Survey Institution of Tsinghua University calculated another life table based on death register data of Chenggong County from 1940 to 1944. LE calculated in this study was 32 years for males and 34 for females. For the first time, the Tsinghua study provided a list of leading causes of death. Six among the top fifteen causes were infectious disease (cholera, smallpox, measles, typhus fever, malaria, and tuberculosis) (Huang, 2003).
Between 1917 and 1933 there were as many as 31 reports presenting crude death rates. Huang Rongqing suggests however that only 17 of them were reliable. There were some estimates of infant mortality based on local collections before the 1950s. The IMR of Guangzhou city in 1925 was estimated at 555.0 ‰ (Huang, 2003). According to Chen Da (Chen, 1981, p.7), Chinese IMR was 275.0‰ in 1934.

VITAL DATA BASED ON BIRTH AND DEATH REGISTRATION (1950s-1970s)

After the founding of Communist China in 1949, the new government sought to develop a national birth and death registration system. This was formally established in 1954. The ‘Household Register Regulation’ in 1958 (mentioned above in the section on demographic information) assured the availability of birth and death data.

Based on register data, the NBS released mortality data each year. The quality of mortality data in this period was unsatisfactory for several reasons. Firstly, many deaths were not reported, especially in rural areas. Many deaths occurred at farmers’ homes leading to inaccuracies with respect to time and cause of death. More importantly, because consumption supply in that period was based on the household register (rationed in form of coupons for foodstuffs, non-staple foodstuffs and cloth, etc), many families did not register deaths in order to maintain their eligibility for coupons. During the third population census of 1982 the government cleaned up household registration and found around eight million deaths in which had not been recorded through the household registration system (Huang, 2003). A US demographer who examined the extent of underreporting during that period estimated that the underreport rates for death were 35% in 1960s, and 15% in the 1970s (Cole quoted by Ma and Feng, 2004). However, Chinese demographers argued that Cole’s estimate was too high and the rate was more like 5% (Jiang and Li, 1987). More demographic studies focused on the quality of data, especially that of infant death reporting. Zhou Youshang and his colleagues (Zhou, Rao and Zhang, 1989) suggest that the infant mortality underreport rate of Population Census 1982 was 44% in rural areas and 4% in urban areas. Adjusting for underreporting based on Zhou Youshang’s finding and eliminating unverified counties and cities has suggested that
China's IMR in 1981 was closer to 56‰ than the official estimates of 35‰. Other scholars have also suggested that aged deaths were also underreported (Huang, 1997); Li Nan and Sun Fulin (Li and Sun, 1994) suggest an overall underreport rate of 15%.

The household register regulation required all deaths reported to include name, gender, age and cause of death within one month. However, the analysis of these data was neglected over a long period. Each year, the NBS only reported annual death rates. Age-specific and disease-specific mortality rates were unavailable, and therefore life tables could not be calculated. One of the major reasons of poor analysis was poor quality of registration data. The NBS conducted special surveys in 1957, 1963, 1975 and 1978 in order to obtain age-specific mortality rates. However, these non-probability based sample surveys did not represent the situation of general population. Because these data were regarded as ‘national secrets’, the survey results were not made available to the public.

Figure 5-3 Traditional system for vital (death) data collection
A remarkable improvement on mortality data availability was achieved with the third population census in 1982. There were five items in the 1982 census related to mortality information: name, gender, age, birthday and date of death. These data enabled the calculation of life tables and IMR at national and regional levels (Jiang, 1984). According to Jiang’s work, LE in 1981 was 66.4 years for males and 69.5 years for females; IMRs were 35.5‰ for males and 33.7‰ for females. Beijing and Shanghai had the longest LE and northwest and southwest China had the lowest LE. For the purposes of provincial and prefectural health bureaux, mortality data, such as LE, gender and age-specific mortality rates and IMRs can be derived. In the late 1980s, mortality information were published at the National and provincial level (provincial editions), sponsored by the UNDP (CPR/85/P52).

The improvement of vital data promoted a blossoming of demographic study in China as scientific research, including demographic studies, recovered from the Cultural Revolution. The nation paid more attention on population and family planning. As Huang Rongqing has noted, it was the starting point of an efflorescence of population study (Huang, 2003). Many works were published in the late 1980s and early 1990s, such as analysis of death between genders, age group, regions, nationality, marriage status, education level and occupation (Liu, 1986; Huang, 1988, 1989).

This was a significant period of achievement in China’s population study, made possible by the availability of mortality data at national and regional levels. However, the 1982 Census did not include questions about relevant social determinants of mortality. Other issues include impossible mapping between census data and cause of death data, and underreporting infant death.

The fourth population census in 1990 represented a further achievement. Data about education, occupation and marriage status of decedents were collected. The analyses and reports provided a much more detailed picture of mortality and its determinants.
Information resources available since then have continued to improve (Editing Committee of Chinese Population of New Century, 1994).

In summary, information provided through the census helps us to understand basics of mortality. However, under-reporting is a serious issue and a limit to the usefulness of available data for RHP.

**DISEASE SURVEILLANCE POINT SYSTEM**

In China, unlike Canada and Australia and other developed countries, mortality statistics and in particular cause of death data is not based on a universal collection despite the provision for collecting causes of death on death certificates. ‘It is impossible to completely and accurately report all deaths and reasons’ (Research Centre for Chronic Disease and Risk Factors, 2003a).

Because both the census and death register data are subject to some underreporting and do not provide reliable cause of death data, some special retrospective surveys have been conducted. For instance, national retrospective study on causes of cancers was conducted in 1973-1975 (CHSI, 2001).

Besides these ad hoc surveys, the MOH has taken a supplemental approach to improve the quality of mortality data, which includes preventive and endemic stations (PES) collecting deaths data for the purpose of infectious disease control and prevention (Huang, 2003; Li, 2003a). Mr. Li Guangyin (Health Statistics Official of Beijing Health Bureau and professor of School of Public Health of Beijing Medical College) calculated the first life table of new China in 1957, based on PES’s death data.

In the end of 1970s, a famous Chinese epidemiologist, Professor He Guanqing suggested the establishment of a disease surveillance system, in order to collect improved data regarding population, birth, deaths and causes, infectious disease and immunisation (Research Centre for Chronic Disease and Risk Factors, 2003a). The Department of Epidemiology of the CPMA conducted a pilot study in a rural county (Tongxian) and an
urban district (Dongcheng) of Beijing city in 1978 (reference as above). Later on, the
MOH formally requested all provinces to carry out disease surveillance and recognised it
as a core component of public health infrastructure.

From 1980 to 1989, 71 ‘Disease Surveillance Points’ (DSPs) were established across 29
provinces of China. These cities and counties participated voluntarily. Most of the
‘points’ were concentrated in richer or urban areas and were not representative of the
national population. In 1989, with technical support from the World Bank, the
Department of Epidemiology of the CPMA redesigned the distribution of DSPs, named
as New Disease Surveillance Points (NDSPs) based on a random sampling method. Since
then 145 NDSPs have been established covering 1% of China’s population (Map 5-1). On
average, populations of 30,000 to 100,000 are monitored at each NDSP, and in total, a
population of 10 million is followed nationwide (Research Centre for Chronic Disease
and Risk Factors, 2003a).

Map not included in compliance with Copyright Act

Source: National Disease surveillance Point System (Research Centre for Chronic Disease and Risk
Factors, 2003b)

Map 5-1 National Disease Surveillance Points

The current NDSP is multi-functional, which is recognised as integrated surveillance and
health monitoring system. Data collected through this program includes births, deaths and
causes of death, and cases of infectious disease. Recently (since 1995), a surveillance study on behavioural risk factors (such as smoking) was conducted across the NDSPs, in order to provide evidence for non-communicable diseases (NCDs) control and prevention.

The NDSPs work with several administrative sectors including the health department, the public security department and the civil affairs department in the death registration, data processing and information release. It is a complicated procedure involving interdepartmental and multi-level activities.

At the central level, the CHSI delegates responsibility for NDSP data analysis to the Research Centre for Chronic Disease and Risk Factors of the CPMA. All causes of death are coded into ICD 9 (before 1990 used CCD 86). The Research Centre publishes technical reports each year.

The CHSI releases major findings from the Research Centre. IMR, mortality of children under five and neonatal mortality have been officially released annually via the Health Statistics Yearbook and Digest since 1991 (CHSI, 2001, p.70 and 102). Gender and cause-specific mortality rates (for top 10) are also published at national and provincial levels (CHSI, 2001, p.71).

Although the NDSPs only covered one percent of total population, the Department of Epidemiology of the CPMA believe that ‘the data quality is satisfactory. Many research institutions and government departments refer to these data for studying and policy-making purposes’ (Research Centre for Chronic Disease and Risk Factors, 2003b). However, as Huang Rongqing comments, ‘up-to-now, there is not a nationwide and completed vital statistics system’ (Huang, 2003). Firstly, mortality and cause of death are still unavailable outside the NDSPs, especially in remote and developing areas. Secondly, even within the NDSPs, the underreport rate was around 22% and more for IMR (Research Centre for Chronic Disease and Risk Factors, 1999). Thirdly, the quality of the cause of death data is questionable. As Figure 5-3 shows, the cause of death data were collected through multi-level and interdepartmental procedures. Although China has conducted many training programs on disease coding each year (WHO, 2003b), most of
these training programs have been targeted at clinical doctors and nurses. As in the case of medical record front-page recording where doctors make many mistakes in coding diagnoses and procedures, likewise there are quality problems in cause of death coding, especially in relation to the principal cause of death (Gong, Duckett, Legge et al., 2004).

To improve the quality of infant mortality data, NDSP has conducted supplementary collections to estimate the degree of underreporting in standard hospital and household based collections (Research Centre for Chronic Disease and Risk Factors, 1999). In cases of infant death in hospital immediate after delivery, hospitals were required to complete a ‘direct infant death report’ for (direct) submission to the health bureau providing a more accurate estimate of in-hospital deaths for comparison with the figures based on submitted death certificates (Tianjin Health Bureau, 2000). A similar collection addressing underreporting of infant deaths at home involves household interviews based on the informal advice of local community leaders. These measures were designed to estimate the extent of underreporting with a view to then adjusting the published mortality rate. However, the reliability of the underreport estimates, particularly in the case of out of hospital deaths, is still problematic.

THEMATIC SURVEYS

There have been other surveys focused on mortality for specific diseases, for instance the Retrospective Survey of All Reasons of Cancer Death in 1975, which was organised by the Cancer Prevention and Treatment Institute of the MOH, and covered a population of 850 million across 29 provinces of China (Rong and Li, 1981). Based on this survey, the MOH obtained regional and national life tables, and region, age and gender-specific composition of cancer deaths. This was the most complete dataset for causes of death at that time (Huang, 2003)
MORBIDITY

There were three major sources of data for morbidity: health statistics report (front-page) for inpatient disease composition, NHSS for self-reported health, and thematic surveys.

HOSPITAL MORBIDITY DATA

Health statistics derived from hospital morbidity data provide planners with a useful index of ‘normative need’ for inpatient services. For instance, Australian hospital data are collected and managed based on National Hospital Morbidity Database (NHMD) (AIHW, 2004b) since 1993. This significant information resource supplies State and Territory health authorities with valuable information for health planning and research.

In China, hospital morbidity data collected from ‘front-page’ (medical record abstract, see Appendix 5) is recognised as ‘professional data’, because the collectors of the data are clinicians working in hospitals. Before 1990, there was not a standardised format of hospital medical record (Hu, 2003b). In 1990, MOH requested all hospital to use a standard front-page format (the abstract of the inpatient episode record)(MOH, 2001a). In 2001, MOH issued a new version of the front-page. The inpatient episodes were coded under ICD 9 before 2001 and ICD 10 after 2002 (when a new Chinese Health Statistics Regulation was issued) (MOH, 2002a, pp.104-13).

Researchers and regional health planners have to keep in mind that the hospital morbidity data has serious shortfalls. Firstly, as shown in Figure 5-4, the dataset is neither universal nor representative and so there are difficulties in generalising from the data to the entire population. Secondly, the database only reflects the morbidity of those hospitalised in teaching and some secondary hospitals (the ‘front-page’ data are unavailable in most community hospital). Thirdly, the coding system for episodes is a simplified version of ICD modified by Chinese scholars (Gong et al., 2004). Fourthly, the quality of inpatient morbidity data is questioned (quality of data will be discussed in next chapter). Finally, hospital morbidity data are rarely accessed and used by local health planners. Although
raw data from 128 hospitals is collected and forwarded to central HIS, local health planners (at provincial and prefectural levels) find it hard to gain access to analyse these data. In fact, it appears that central and provincial health statisticians do not analyse the data nor publish it for public access (or even for internal reference).

Among hospitals, the naming and coding of diagnoses and procedures are not standardised. The names of principal and other diagnoses are handwritten on the front-page by the physician (for clinical purposes), and are then coded by staff of ‘patient medical record office’ (using ICD 10), for statistics purposes. Not all physicians write the diagnoses or procedures in standard format (Lu, 2000) under which circumstances the coders find it hard to code correctly. Physicians commonly confuse principal and secondary diagnoses (He Huiqing 1999; Medical Record Office of First Hospital of Suzhou University, 2003). As He Huiqing noted, physicians often simply list the patient’s major conditions or symptoms in the medical record, and do not identify which one is the ‘principal diagnosis’. Miscoding may happen if the coder simply identifies the first listed condition/symptom as the principal diagnosis.

Unlike Australia and other countries, ICD 9 or ICD 10 is used in China’s hospital data coding only for collecting morbidity statistics. Although it is unlawful, about 30% of physicians do not provide complications information (Hu Yansheng as above), including hospital-acquired infection. Government funding, hospital accreditation, quality control of medical services and insurance payments are disconnected from hospital morbidity data. It is understandable that hospital manager ignore quality of the data.

The classification and reporting of outpatient data are problematic internationally (Wright and Walley, 1998). In China, morbidity information from hospital outpatient and emergency services is not available (Figure 5-4); hospitals do not maintain outpatient records and are not required to report. All outpatient and emergency patients are required to buy a ‘booklet’ before consultation. The booklet, recording only the main complaint of the patient at each attendance and the medicines prescribed, is held by the patients and is easily lost. In NHSS 1993, CHSI organised a ‘One Day Outpatient Service Survey’ (in a
HEALTH INFORMATION AVAILABLE IN CHINA

The national health statistical system (NHSS) collects morbidity and mortality data on patient entry to and exit from hospitals nationwide, which collected detailed data at patient entry to and exit from hospital the outpatient department. This is the only representative dataset for outpatient services. This ‘One Day Survey’ however is not included in later NHSS.

Figure 5-4 Availability of hospital morbidity data

Morbidity data from community services (community health centres, private clinics, and village health stations) are almost non-existent. Up-to-now, there is no regulation regarding medical records in community health services and no requirement for data reporting. In its plans for the development of community health services (MOH, NDPC, MOE et al., 1999; MOH and NDPC, 2002) the MOH requested local health bureau to conduct household surveys in order to understand the needs and demand of the communities and to design community health plan informed by such surveys before the establishment of Community Health Centres (CHCs). However, according to Liu (Liu, 2003a), community surveys were not conducted before all CHCs were established. In the cases (as discussed in Liu’s PhD study) where surveys were conducted, the data were not used in any strategic way for CHSs planning. The product of the community diagnosis surveys was the ‘household health record’ which tended to be stored on a ‘household health record shelf’ available to be shown to health bureau officials to demonstrate that they followed the official requirements (Zhang and Liao, 2003; Nanjing Revolutionary
Committee of the Kuomintang, 2004). Liu found that the household health records were quite disconnected from the patient-held clinical notes and from the hospital medical records system. Most household health records were ‘dead records’ \(^{47}\), and were not helpful for community health planning or for RHP.

**MORBIDITY DATA COLLECTED FROM THE NHSS**

The methodology of NHSS was introduced into China in 1981, when USA-China joint study project conducted in Shanghai County of China and Washington County of USA (Yang, Bryant and Henry, 1982; Gong, 1987; Zhang, 2002b). This study was led by Dr. Yang Mingding on the China side and Dr. J. Bryant on the USA side. Study findings were published in the American Journal of Public Health (1982, Volume 72, Issue 9) and in special issue by College Academic Collection of Shanghai First Medical College.

<table>
<thead>
<tr>
<th></th>
<th>Shanghai County</th>
<th>Washington County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross mortality</td>
<td>6.2‰</td>
<td>9.5‰</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>2.4%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Mortality decline within 30 years</td>
<td>68.53%</td>
<td>17.93%</td>
</tr>
<tr>
<td>IMR decline within 20 years</td>
<td>58.31</td>
<td>48.99</td>
</tr>
<tr>
<td>Life expectation increase</td>
<td>27.7 year within 30 years</td>
<td>24.0 year within 80 years</td>
</tr>
<tr>
<td>Annual health expenditure</td>
<td>26.45 yuan</td>
<td>US$1,103</td>
</tr>
</tbody>
</table>

**Table 5-3 Major comparative findings in PRC-USA health service study in 1981**

This was a milestone for health system development in China and in particular for health information development. The comparative study demonstrated pros and cons associated with the two different healthcare approaches. The study brought fresh air to Chinese colleagues and demonstrated that there are alternatives to bureaucratic health data reports. Chinese colleagues understood how to know population’s needs and demands and how to use this information for health planning.

In 1985 and 1986, the DOMA of the MOH, in association with other departments of the MOH, organised a rural health service research in ten provinces (MOH, 1985) and an urban medical service research in nine provinces (MOH, 1986). In the late 1980s and early 1990s, many thematic health surveys were organised by the MOH, focused on

\(^{47}\) The demo health record is called a ‘dead dossier’ (*si dang*) by some scholars in China.
services that were administrated by different departments of MOH. These research projects include MCH service research in 1987, minority service research in 1988 and rehabilitation service research in 1993, preventive service research in 1989, township enterprise occupational health service research in 1990, and community health service research in 2001. In addition, many provinces and cities also conducted local health service researches.

Because the NHSS provided valuable information, which could not have been collected through the traditional reporting system, it has gained much attention by health managers and researchers, and was recommended as an important technical tool for health project and health planning (MOH, 1995, 1999; NDPC et al., 1999; State Council, NDPC, NETC et al., 2000). For instance, health five-year plans (from eighth to tenth) were in part based on NHSS data.

In 1993, 1998 and 2003, CHSI organised NHSSs, covering all provinces (MOH, 2003d). The NHSS is a sampling survey, and included 95 counties/cities, 475 townships/districts, 950 villages/resident committees, 56,000 households (MOH, 1999, pp 2-3). The population interviewed was approximately two hundred and ten thousand. The Survey collected population-based data (through the household interview survey) and institution-based data (health institutions survey). Qualitative survey was added in the 2003 NHSS (MOH, 2003d)\(^48\).

Information collected through the household interview questionnaire includes: (1) family (household) background, (2) socio-economic features of household members, (3) needs for and utilisation of health services by household members, (4) health behaviours of household members, (5) reproductive health of woman aged 15 to 49 years old, and (6) immunisation status of children born after 1998 (see Appendix 9).

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\(^{48}\) Interview and focus group discussions were conducted. Informants include urban and rural residences, medical professionals, health managers, and vulnerable (indigent and migrant) groups.
In relation to health service utilisation, the household survey can provide detailed data regarding healthcare activities for different types of needs, i.e., (1) symptoms over the last two weeks reflecting perceived needs for outpatient or emergency services, (2) chronic disease over the last six months reflecting perceived need for continuous or long-term care, (3) hospitalisation over the last 12 months reflecting the use of inpatient or acute services, (4) reproductive health for women aged 15-49 years old, and (5) immunisation status for children born after 1998, reflecting preventive services.

The NHSS was a new information source for health planners after the 1980s. MOH recommended that regional health planners use this information for understanding regional health needs and utilisation. There are two reasons for MOH’s recommendation. Firstly, the NHSS is the only comprehensive source of information collected on the demand-side. This information can overcome some of the drawbacks of the health statistics report system. The NHSS provides a ‘whole picture’ of population health and utilisation across a range of regions. Secondly, the NHSS data are reasonably reliable. NHSS plans have been discussed in broad scope before the final questionnaire issued, draft versions of the questionnaire are tested in urban and countryside pilot areas, and many national and international (CDCP of USA and IDS of UK) technical resources are involved. All interviewees are well trained. While the NHSS is being implemented, central and provincial experts monitor the quality of survey day and night in the field. Data analysis and reporting are led by CHSI with many Chinese universities participating as well. Many students of medical universities use the NHSS data for their degree study.

The NHSS has traditionally contained questions about residents’ ‘self-report’ morbidity (MOH, 1999, p.3). As the Appendix 9 shows, the following data could be obtained from the interview survey, which reflected perceived needs and demands for health services. Three types of perceived needs are investigated: diseases within two weeks, chronic diseases within six months, and disabilities within three months.

49 Reproductive services include prenatal and postnatal care, hospitalised delivery, etc.
Disease within two weeks

‘Disease within two weeks (DWTW)’ refers to residents reporting unwell or uncomfortable for health reasons\(^50\). Types and names of perceived conditions are investigated and coded (simplified ICD 9 coding). Perceived seriousness and continuance of conditions are also investigated.

Some residents reported having symptoms but not having sought medical services in the last two weeks (49.8% of urban patients and 32.9% of rural patients, according to the NHSR 1998, p.41). The interviewers ask respondents the reasons, such as self care (and purchasing medicine in pharmaceutical store), financial difficulty, too busy to see doctor, inconvenience associated with transportation, bad quality of medical services, unavailability of effective treatment, etc. For residents who reported self-care, information for purchasing medicines is investigated.

For those who do seek medical services the following data are collected: (1) visit frequency, (2) category of service provider (clinics, THC or CHC, hospitals in different levels), (3) reasons for selecting this provider (near-by, lower price, good quality, designated provider, has acquaintance, trusted doctor, good attitude etc.), (4) category of practitioner (TCM, Western medicine, integrated medicine), (5) drug purchased (and source), and (6) expense and reimbursement, transportation and other costs.

Quality and responsiveness of medical service are investigated in the NHSR 2003. Opinions on medical services (patient education, time spent on transportation and waiting room, respect for patient, privacy protection, clear explanation, opinion sought when prescribing drug or treatment, environment and facility, convenience when verifying bills, convenience for making complaints) are asked. Respondents are invited to identify the most unsatisfactory aspect of the service provided (attitude, technical aspects, 

\(^{50}\) Residents are recognised as having perceived needs when they report: (1) to seek medical services for their unwell or uncomfortable feelings, (2) to perform self-care such as traditional massage, cupping or herbal treatment, (3) to take at least one day leave from work or school, and (4) abnormal crying for infants and cachexia for elderly.
environment and facility, over-supply of unnecessary services, unreasonable billing, high medical service cost, do not allow to pay on credit, complicated transactions, long waiting time, inconvenient transportation, others).

**Chronic disease within six months**

Chronic disease morbidity is useful for planning for community and long-term and continuing care. ‘Chronic disease within six months (CDWSM)’ refers to chronic conditions reported by residents that had been diagnosed by medical doctors. Residents are asked the category of health practitioner who have diagnosed or are treating their chronic disease. In NHSS 2003, tuberculosis patients are invited to answer detailed questions about their symptoms, examination, treatment and provider (DOTs).

Two points should be kept in mind in relation to using CDWSM for health planning. Firstly, in most circumstance, the names of the chronic disease conditions nominated by respondents are based on their recall, not necessarily on a clinician’s diagnosis, although some respondents referred to their ‘outpatient booklet’ to ensure their answers are accurate. Secondly, the questionnaire allowed only three spaces for respondents to nominate what they perceived as their most important chronic conditions. However, for aged residents with more than three conditions, their morbidity is under-investigated.

**Inpatient service utilisation**

Several questions relating to hospitalisation within the last 12 months are asked in the NHSS. Name of diseases for hospitalisation are asked during the interview, and interviewers code these disease and conditions into ‘simplified ICD coding’. Residents are asked the category of their inpatient service provider, waiting days for admission, length of stay, reasons of ‘early discharge’, total bill of admission and amount of composition and so on.

For those respondents who reported an inpatient admission, further data on their experience are collected, including feeling respected as a patient, protection of privacy,
clear explanation, opinion sought when prescribing drugs or treatments, environment and facility, convenience for family and friend to visit, convenience when verifying bills, and convenience with respect to making complaints. The opinion survey intends to collected data regarding healthcare responsiveness.

Patient Satisfaction

A satisfaction survey is also conducted following the responsiveness survey in the NHSS. Respondents’ opinions are sought in relation to: attitude, technical aspects, environment and facility, over-supply of unnecessary services, unreasonable billing, high medical service cost, pay on credit facilities, complicated transactions, long waiting time, and inconvenient transportation.

Summary data regarding inpatient morbidity from the NHSS 1998 are shown in Table 5-4 (CHSI, 1998).

<table>
<thead>
<tr>
<th>Disease</th>
<th>Admission rate (per 1000 population)</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>1.70</td>
<td>4.30</td>
</tr>
<tr>
<td>Acute &amp; chronic gastritis</td>
<td>1.59</td>
<td>4.29</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1.45</td>
<td>4.11</td>
</tr>
<tr>
<td>Gallbladder &amp; cholecystitis</td>
<td>1.39</td>
<td>3.92</td>
</tr>
<tr>
<td>Prostate</td>
<td>1.30</td>
<td>3.67</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>1.08</td>
<td>3.65</td>
</tr>
<tr>
<td>Chronic bronchitis</td>
<td>0.97</td>
<td>2.75</td>
</tr>
<tr>
<td>Acute nephritis</td>
<td>0.79</td>
<td>2.22</td>
</tr>
<tr>
<td>Hypertension</td>
<td>0.75</td>
<td>2.12</td>
</tr>
<tr>
<td>Tubercolosis</td>
<td>0.59</td>
<td>1.66</td>
</tr>
<tr>
<td>Digestive ulcer</td>
<td>0.56</td>
<td>1.57</td>
</tr>
<tr>
<td>Tubercolosis Affecta</td>
<td>0.51</td>
<td>1.44</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.50</td>
<td>1.45</td>
</tr>
<tr>
<td>Emphysema</td>
<td>0.48</td>
<td>1.22</td>
</tr>
</tbody>
</table>

Table 5-4 Disease-specific admission rate (per 1000 population) and composition (percent), based on NHSS 1998

Disability

Disability data are also collected in the NHSS. The concept of ‘disability’ used in the household survey is borrowed from EuroQol 5D+ classification for health statistics (Stouthard et al, 1997; Mathers, Vos and Stevenson, 1999, p.18). This concept of disability includes ‘self-care’ (extent of difficulty in brushing teeth, washing face, brushing hair and wearing clothes), ‘usual activities’ (extent of difficulty for working and
house-working), ‘pain/discomfort’ (extent of pain and uncomfortable), ‘cognition’ (extent of difficulty for concentration and memory); ‘visible ability’ (extent of difficulty for recognising an acquaintance from 20 meters); ‘anxiety and depression’ (extent of sadness, annoyance, emotional depression) (MOH, 1999, p.3).

The NHSS databases are maintained at the CHSI. Technical analysis reports and statistics tables are published in quite informal way. Health planners and researchers can obtain the informal publications from the CHSI. If planners and researchers seek to obtain electronic databases, the CHSI requires that they enter into an (relatively informal) agreement. However, the reports and electronic databases are not formally published in China, for the following reasons: (1) the absence of related government regulation on releasing health databases, (2) worry about analysis capacity of users whom may make inappropriate interpretations, and (3) systematic errors exist in databases, which could be concealed at national level but emerge at county level.

Most regional health planners interviewed for this study undertook their own local health service surveys, which generally copied the design of the NHSS. The reasons for ignoring the NHSS resources for RHP formulation could be summarised as (1) NHSS data and information is unavailable at the prefectural level, (2) lack of representativeness (in relation to their prefecture), (3) NHSS did not cover many topics of interest to local health planners.

THEMATIC SURVEYS

Specialty societies, professional groups and health departments and institutions undertake a range of special morbidity surveys around particular issues. For instance, the MOH conducted a Child Development Survey in 1985 collecting anthropometric data from children under seven years old; a National Student Survey in 1985 and 1995 collecting anthropometric data for 7-12 year-olds; National Hypertension Surveys in 1959, 1979 and 1991 (Chinese Medical and Biologic Information, 2004), Shanghai Diabetes Survey (1978), National Diabetes Survey (1980), and the Daqing Diabetes Survey (1986).
ROUTINE HEALTH DATA COLLECTION

Routine data (or administrative data) includes data that is generated in administrative processes and collected through a hierarchical health reporting system (Chen and Rao, 1994). It includes death registration data, hospital inpatient data, disease notification data, pharmacy data, laboratory data, workplace data, etc (Wright and Walley, 1998). Routine health data hereafter refers to those collections designed by the CHSI based on the National Health Statistical Survey Regulation (MOH, 2002a). Each facility reports to their county health bureaux or CDC. From thereon, each level reports to their superior level and finally to the MOH or CCDC. Similar with other developed countries (Burnside and Farrell, 2001), electronic compilation has been introduced in the early 1990s and extended to county level.

The National Health Statistical Survey Regulation encompasses both comprehensive health statistics (CHS) and professional health statistics (PHS). The CHS ⁵¹ include reports on general health information, such as resources, population health and health financing. The CHS data were collected in a ‘bottom-up’ way, and finally aggregated, analysed and published by the CHSI. The PHS ⁵² datasets are designed by other departments of the MOH, and are collected through the ‘silos’ of professional administration (such as Medical Administration, Health Inspection, Maternal and Child Care, and Disease Control and Prevention).

The Regulation details the primary collector and reporter, timing, data format (raw data or summarised table), key indicators and standards (most of them are national standards) either at the end of each form or in an appendix.

There are some innovations in the Regulation; for instance, workforce data from health institutions (collected as raw data), rural and urban community and health services, medical record front-page (collected as raw data for designated public general hospitals).

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⁵¹ Form HS-1 to HS-8, see Appendix 10 and Appendix 7.
⁵² See Appendix 10 for detailed form titles.
A list of titles of national health report datasets is provided as Appendix 4. Table 5-5 provides a summarised brief of those datasets (MOH, 2002e):

As mentioned earlier, the national health reporting system only reaches those organisations that are administered through the health sector. For other industries, including the railways, coal mines, electronics industry and the military system, it has been much more difficult to collect information regarding the health services provided by these industries. However, for the purposes of RHP (particularly where it touches upon overall resource allocation) it would seem desirable to have a comprehensive information system.

Meanwhile, reporting systems do require collectors (hospital, preventive station, MCH station, etc.) submit raw data. Therefore, the information system at all levels does not simply report information regarding data on an individual level (except limited assigned hospitals which are required to submit patient record).
<table>
<thead>
<tr>
<th>Survey</th>
<th>Report period</th>
<th>Primary report unit</th>
<th>Data collector</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution survey (HS1)</td>
<td>Annual</td>
<td>Hospitals (excluding clinics, CHSs and VHSs)</td>
<td>Health bureau</td>
<td>End of February</td>
</tr>
<tr>
<td>Health workforce survey (HS2)</td>
<td>Triennial</td>
<td>Health professionals</td>
<td>Health bureau</td>
<td>End of June</td>
</tr>
<tr>
<td>Equipment survey (HS3)</td>
<td>Biennial</td>
<td>Hospitals, MCH, CDC, ISI</td>
<td>Health bureau</td>
<td>End of June</td>
</tr>
<tr>
<td>Medical institution operation</td>
<td>Annual</td>
<td>Hospitals, clinics, MCH, ISDPT</td>
<td>Health bureau</td>
<td>End of February</td>
</tr>
<tr>
<td>survey (HS4)</td>
<td></td>
<td>Public general hospitals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital separation survey (HS5)</td>
<td>Annual</td>
<td>Clinical, health stations, medical offices, CHS</td>
<td>Health bureau</td>
<td>End of February</td>
</tr>
<tr>
<td>Community health service survey</td>
<td>Annual</td>
<td>VHS</td>
<td>Health bureau</td>
<td>End of February</td>
</tr>
<tr>
<td>(HS6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Village health service survey</td>
<td>Annual</td>
<td>NDSP</td>
<td>Public security bureau,</td>
<td>End of February</td>
</tr>
<tr>
<td>(HS7)</td>
<td></td>
<td></td>
<td>health bureau or CDC</td>
<td></td>
</tr>
<tr>
<td>Causes of death survey (HS8)</td>
<td>Annual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease control survey (HS33-43,</td>
<td>Varied from</td>
<td>Varies among sub-surveys</td>
<td>CDC</td>
<td>Varies among sub-</td>
</tr>
<tr>
<td>HS49-54, and Aiwei)</td>
<td>daily, monthly to seasonal and annual</td>
<td></td>
<td></td>
<td>surveys</td>
</tr>
<tr>
<td>Health inspection survey (HS11-32,</td>
<td>Varied from</td>
<td>Varies among sub-surveys</td>
<td>IHI</td>
<td>Varies among sub-</td>
</tr>
<tr>
<td>HS55-57)</td>
<td>daily, monthly to seasonal and annual</td>
<td></td>
<td></td>
<td>surveys, Annual</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>report due</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10th October</td>
</tr>
</tbody>
</table>

Table 5-5 Databases of routine health reporting system

HOSPITAL AND HEALTHCARE ACTIVITY

In most developed countries, hospital discharge abstract information is a central dataset for national and regional health services planning. It provides planners with a picture of the morbidity of the population and patterns of utilisation of hospital resources (Eagar et al., 2001, p.124).

In China (as in many other countries), the early development of hospital information systems was directed towards monitoring revenue and expenditure and personnel. Since the 1990s, with the boom of IT industry, PC or internal networks handling those functions have been installed in tertiary and some secondary hospitals. Clinical information system (CIS) has also developed quickly in the last decade.

However, those systems provide little help to managers with respect to patient management (Liu and Jiang, 2002; Computer World, 2003). The first barrier is in the design of hospital data collection. ‘We have very limited information about patients’, said
the director of the information centre at a major military hospital in Beijing. Lack of activity level information is common in developing countries (Stewart et al., 2001). The traditional information system has focused on financial, billing, revenue and expenditure data. Activity and process information are often not collected or reported.

A second major weakness in terms of information about hospital activity levels is the complete absence of information about primary health care, although the MOH does plan to collect urban community health care and rural village clinic information though national health reporting system.

A third weakness with respect to the reporting of information about hospital activity is the ‘information isolated island’ problem. Most hospital activity information is isolated within hospital because hospital information systems are not compatible across the industry and do not interface easily those of the central custodians. RHP researchers and planners find it hard to get any activity information from hospitals.

Most hospital activity data sleeps in the hospital’s finance department or in the medical record room. Hospital managers occasionally request some data from those systems. The only window to outside is the reporting to the health bureau. There is one person who copes with the data reporting. He can provide any data which the health bureau requests, whether or not he understands their purpose. However, in my understanding, those submitted data were useless for both the hospital manager and the health officials. (Hospital manager, prefecture of Jiangsu)

**ACTIVITY AND OUTPUT INFORMATION COLLECTED THROUGH MEDICAL RECORD FRONT-PAGE**

Besides morbidity data, the inpatient ‘front-page’ contains outcome data of hospital care. The standardised front-page (see Appendix 5) contains 101 data items, including patient details (name, gender, birthday, age, marriage status, occupation, birth place, nationality, personal identification number, employer, contact person), admission and discharge dates and departments, diagnosis in outpatient/emergency department, in admission and in discharge (principal and other diagnoses), consistency of initial and final diagnosis, signatures of responsible staff, surgical operations, as well as fees charges.
However, the quality of the medical record data is questioned (He, 1999; Lu, 2000; Hu, 2003b). For instance, the recorded length of stay (LOS) is not always consistent with the data collected at the discharge office (perhaps because of a delay in payment). In this situation, the ALOS is exaggerated (Medical Record Office of First Hospital of Suzhou University, 2003).

_The health bureau requires unreasonable levels of consistency between admission diagnosis and discharge diagnosis. [...] This policy encourages physicians and hospital managers to falsify data. (Research institute director, central)_

The ‘outcome’ for principal and secondary diagnosis is an important indicator for assessing quality and effectiveness of hospital care. This item has been recorded for 50 years. However, the definition of the values that can be assigned to this question has been subject to argument for a long time. The concept of ‘outcome’ is blurred and easily misinterpreted despite the attempt by the MOH to standardise it in 2002 (MOH, 2002c, p.367). According to the MOH, ‘cured’ applies when symptom have been completely eliminated and function completely restored; ‘improved’ applies when symptom have been lightened and function partially recovered; ‘unchanged’ applies when the condition/disease has not lightened at all and might even have worsened. Most physicians provide their subjective judgment based on their professional knowledge and the ambiguous definition. Inconsistencies in outcome coding contribute to the quality problems with respect to aggregated outcomes data (He, 1999; Medical Record Office of First Hospital of Suzhou University, 2003)

These issues have been known about for a long time. Recently, the MOH has sought to regulate medical record (reference MOH and National Bureau of Traditional Chinese Medicine Administration. 2002. Principle and Regulation on Medical Record (pilot version)). It is believed that more training and more effective regulations regarding medical record information will contribute to better quality of hospital information.

Not all items specified on the front-page (record abstract) are required to be reported to the health department; most items are designed for clinical usage (see Appendix 6) and stored in hospital medical record office. In general, the raw data is abstracted from the
front-page to a database maintained in the hospital’s ‘patient medical record office’, and summarised reports are submitted as required. The CHSI requests that hospitals establish a front-page database in hospital (HS-5) and submit three summarised reports based on the front-page: outcome-specific separation and LOS data (HS5-1), age-specific separation and LOS data (HS5-2) and disease-specific separation charges (HS5-3) (MOH, 2002a, pp.105-7). Based on these three reports (which are summary rather than unit record data, see also Appendix 7) the government publishes two tables: ‘The top ten diseases of urban and rural hospital separations’ and ‘Medical expenses of selected diseases in general hospitals’ (MOH, 2001b, pp.41-6 and 50-5). Since these tables are themselves based on aggregate summary tables from the reporting hospitals, there is no capacity for information users (other government agencies, researchers and the public) to seek further information about hospital morbidity and billing patterns.

In 2002, the MOH (through the CHSI) requested a selected sample of public general hospital (administrated by health department) (MOH, 2002a, p.104) to submit raw front-page data to CHSI, MOH, electronically. The hospital sample is identified by the MOH with numbers varying with the size of each province (Medical Record Management Committee of Chinese Hospital Management Society, 2001, p.95). This pilot is recognised as a significant step forward in HIS development. Up until now, it has not been possible to analyse the front-page information provided through CHSI and provincial health information systems.

INFORMATION FROM HOSPITAL STATISTICS REPORT

Besides the summary statistics tables derived from front-page information, regional health planners may derive some useful aggregated information from the ‘medical institution operation statistics report’ (HS-4).

The HS-4 form (see Appendix 8) is submitted by all registered medical service facilities, including hospital, CHC, THC, clinics, MCH institution and specific disease institutions (MOH, 2002c, p.87). The report contains information about the nature of the provider,
the hospital level and grade, the distribution of hospital beds among the departments, medical care services, and financial statistics. The ‘medical care services’ data include outpatient and inpatient service volumes (number of episodes) and bed-days occupied. Information on inpatient service volumes (including surgical operations) for the HS4 form is generated from the ‘front-page’ of the medical record. Some of these data are also reported via the ‘Hospital Separation Survey’ (HS5-1, 5-2 and 5-3). The data regarding outpatient services are collected through periodical transaction reports.

**Figure 5-6 Outpatient service and information flows**

Outpatient details are generally not recorded in electronic form, except in some tertiary hospitals. Doctors record patient information in the ‘outpatient record booklet’, which is carried by the patients themselves. Patients are expected to bring their booklets with them when they visit the outpatient department. Summary data regarding the volume of outpatient services (Figure 5-6) are generated through daily or weekly workload summary reports. Each division of the outpatient department reports attendance data in a summary form to medical administrative office or finance office or hospital information centre (if an integrated information department has been established) (Medical Record Management Committee of Chinese Hospital Management Society, 2001, p.47). The office (receiving the daily attendance report) has the responsibility of maintaining daily...
HEALTH INFORMATION AVAILABLE IN CHINA

attendance data and provides monthly, seasonal and annual attendance statistics reports to hospital management and prepares annual statistics for reporting to the health department. However, the morbidity of the outpatients is not collected.

Hospital statistics reports only provide the number of attendances and amounts charged (Table 5-6).

<table>
<thead>
<tr>
<th></th>
<th># Episode of outpatient and emergency visits (million)</th>
<th># Episode of inpatient admission (thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total hospital (county level and higher)</td>
<td>114000</td>
<td>35430</td>
</tr>
<tr>
<td>Health institutions administrated by health department</td>
<td>83200</td>
<td>28620</td>
</tr>
<tr>
<td>Health institutions administrated by industrial departments</td>
<td>28300</td>
<td>6320</td>
</tr>
<tr>
<td>Collective health institutions</td>
<td>2300</td>
<td>410</td>
</tr>
<tr>
<td>Other hospitals</td>
<td>4300</td>
<td>410</td>
</tr>
<tr>
<td>Health centres (urban and rural)</td>
<td>78400</td>
<td>17130</td>
</tr>
</tbody>
</table>

Source: Chinese Statistical Yearbook, 2001, National Statistics Bureau, China Statistics Publisher (CD)

Table 5-6 Number of episodes of outpatient visits and admissions, provided by the NBS, 2000

Health planners using these data need to keep the following issues in mind:

Firstly, hospital activity information provided through the statistics reporting system is incomplete. The data in the Health Digest or Health Statistics Yearbook is limited on hospitals that are administrated through the health department system. Activity data regarding hospitals administered through other sectors or the military are not included.

Secondly, the accuracy of the data is questionable, especially the outpatient service data. There are technical problems with respect to many of the data items reported.

Thirdly, although some information is available through the front-page of the medical record, much useful information (for instance, information about surgical operations and patient details) leaves unused and is not provided to health departments or analysed for hospital management.

Finally, yet importantly, health departments are not able to further analyse hospital activity data because unit record data are not reported. All reported data ‘second hand’,
presented as summarised tables. Although the MOH has requested some public general hospitals to provide unit record data electronically, raw data regarding hospital activity is generally not available for further analysis.

UTILISATION INFORMATION COLLECTED THROUGH THE NHSS

An alternative approach to understanding morbidity and healthcare activity is the NHSS. The CHSI estimate the national volume of healthcare activities based on the representative household survey (MOH, 1999, pp.181-2), see Table 5-7.

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>NHSS 1993</th>
<th>NHSS 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated perceived morbidity</td>
<td>4.371 billion</td>
<td>4.869 billion</td>
</tr>
<tr>
<td>Estimated perceived morbidity of chronic disease</td>
<td>0.159 billion</td>
<td>0.160 billion</td>
</tr>
<tr>
<td>Estimated total days of illnesses</td>
<td>38.40 billion</td>
<td>40.85 billion</td>
</tr>
<tr>
<td>Estimated total days of sick leave (labour)</td>
<td>4.750 billion</td>
<td>6.380 billion</td>
</tr>
<tr>
<td>Estimated total days of sick leave (student)</td>
<td>0.500 billion</td>
<td>1.078 billion</td>
</tr>
<tr>
<td>Estimated total days of being kept to bed</td>
<td>3.840 billion</td>
<td>3.875 billion</td>
</tr>
<tr>
<td>Estimated long-term disability</td>
<td>-</td>
<td>85 million</td>
</tr>
<tr>
<td>Estimated handicaps</td>
<td>-</td>
<td>16 million</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume of services</th>
<th>NHSS 1993</th>
<th>NHSS 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated outpatient visits</td>
<td>5.288 billion</td>
<td>5.226 billion</td>
</tr>
<tr>
<td>Hospital visits</td>
<td>2.501 billion</td>
<td>2.511 billion</td>
</tr>
<tr>
<td>Clinic visits</td>
<td>2.760 billion</td>
<td>2.915 billion</td>
</tr>
<tr>
<td>Estimated unmet need of outpatient services</td>
<td>1.591 billion</td>
<td>1.856 billion</td>
</tr>
<tr>
<td>Estimated self-care</td>
<td>-</td>
<td>1.384 billion</td>
</tr>
<tr>
<td>Estimated inpatient admissions</td>
<td>43 million</td>
<td>44 million</td>
</tr>
<tr>
<td>Estimated surgery operations</td>
<td>9.344 million</td>
<td>10.74 million</td>
</tr>
<tr>
<td>Estimated unmet need for inpatient services</td>
<td>14.64 million</td>
<td>18.13 million</td>
</tr>
<tr>
<td>Unmet need for economic reason</td>
<td>7.94 million</td>
<td>11.37 million</td>
</tr>
<tr>
<td>Estimated total length of stay</td>
<td>0.858 billion</td>
<td>0.705 billion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financing and charges</th>
<th>NHSS 1993</th>
<th>NHSS 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated annual household health expenditure (yuan)</td>
<td>87.6 billion</td>
<td>20.25 billion</td>
</tr>
<tr>
<td>Estimated charge for outpatient services (yuan)</td>
<td>72.9 billion</td>
<td>119.3 billion</td>
</tr>
<tr>
<td>Estimated charge for inpatient services (yuan)</td>
<td>40.1 billion</td>
<td>104.8 billion</td>
</tr>
</tbody>
</table>

Table 5-7 Estimated morbidities, volumes of services and financing and charges, based on NHSS household survey, 1993 and 1998

The data in Table 5-7 reflect the changing patterns of morbidity and utilisation during China’s transition to a market economy. Many researchers have undertaken further explanatory studies. However, there are limitations on the use of NHSS data for RHP purposes. Firstly, health needs and utilisation are based on respondent perception. As mentioned by Chen Yude, ‘NHSS does not map precisely the data from the hospital medical record front-page or the health institution statistics reports […] The concept of
utilisation is different between the two datasets’. Secondly, the data cannot be taken as representative of individual municipalities and prefectures because this is not the purpose of the sample. Thirdly, perceived needs do not correspond to need as judged by medical professionals that must also be considered in planning. Fourthly, the NHSS does not cover migrants and therefore tends to underestimate regional morbidity and utilisation. Finally, the NHSS is a very expensive survey, which needs a huge amount of human resources and strict technical support at every stage. Data and information quality in the NHSS will be discussed later.

HEALTHCARE COST DATA/INFORMATION

Although China is in the process of moving from an (extremely) planned system to a market system, health planners face an embarrassing lack of health cost information. The total cost of healthcare is unclear for many hospital managers and health officials. One of the reasons is the lack of standardisation with respect to financial information systems within institutions.

Information with respect to the cost of institutional services is maintained within hospitals. Some aggregated data are submitted to health bureau (see Appendix 9). Typically, two separate systems deal with financial data: the outpatient and emergency services billing system, and the discharge billing system for inpatient services. Workforce data (salary, training and pension) are maintained in the personnel department, the department of education, and the department of senior personnel affairs. Assets (equipment and facilities) data are maintained in the department of infrastructure and/or the department of facilities. In hospitals that have implemented ‘department-based responsibility system performance management’, the directors of clinical departments often present modified accounts in order to obscure the sources of bonus and ‘red package’ payments. In most hospitals, financial data is regarded as ‘top secret’. Hospital managers may not wish to show others how rich they are, or acknowledge that they do not know how much they spent and earned.
I can tell you how much government gives me. However, no hospital presidents would tell the truth to government about how much they earned. If they told the truth, government would withdraw its subsides (laughing). [...] In most case, we do not know the details; for another reason, we do not want to lose money (Hospital manager, prefecture of Jilin)

For health planners, there are three major sources of health financing data available in China: Total Health Expenditure (THE), summarised medical service expenditure statistical report, and the occasional health expenditure survey.

TOTAL HEALTH EXPENDITURE

The DOHPF of the MOH commissioned the China Health Economic Institute (CHEI) to calculate the total health expenditure. The method of THE calculation is based on ‘National Accounting’. The government finance department, the statistics bureau and other related government departments provided data for THE calculation.

Total health expenditure provides an overview of health financing and industry investment (AIHW, 2001a; CIHI, 2002; National Statistics, 2003b; Wang and Zhang, 2003; Zhao, Wan, Gao et al., 2003). However, this indicator is unable to be appropriately used for RHP. Firstly, nearly half provinces and almost all prefectures cannot obtain their THE. Secondly, THE does not make any allowance for regional variations in health service efficiency and effectiveness.

INFORMATION IN THE MEDICAL SERVICE FINANCIAL REPORT

Until the late 1980s, the MOH and local health departments did not collect any health cost data as part of the national health statistical reporting system (MOH, 1989a). This situation was changed after the 1980s.

In 1989, in order to meet the need for health reform and to understand more about compositions of admissions and cost in medical institutions in terms of diagnoses, Ministry of Health added the ‘Health Institution Socio-economic Data Reporting’ into the health statistical reporting system. The MOH requested 281 hospitals in 23 provinces to submit the front-page database, which contained data regarding diagnosis and costs. (HIS director, central)
Since 1989, all general hospitals (under health sector administration) have been required to summarise and submit a statistical report on service charge information at each end of year (HS5-3, see Appendix 9). The inpatient billing information is partly based on the hospital medical record front-page. For these data to be recorded in the front-page database, there are several steps required, as follows:

- Doctors and nurses record procedures in the medical record at the time of admission and during the patient’s hospitalisation. If the hospital has installed a computerised system that includes an electronic medical record, data are entered at the doctor or nurse stations and maintained in the data storage of the hospital information centre.

- Doctors and nurses finalise the medical record before the patient is discharged, and then send the records to the medical record office where the hospital stores hard copy medical records. For computerised systems, the doctors sign an electronic signature and then the data are stored in the computer storage.

- In hospitals where hard copy records are held in the medical record office, the diagnoses are coded (ICD9 or ICD10). However, if a computerised system is installed, the diagnosis is coded automatically.

- The discharge office of the hospital finalises billing procedures and is where billing data are stored. If the hospital is computerised, the billing data will be stored on the mainframe and the discharge office has the authority to control the data.

- Both medical record and billing details are sent to the department of statistics or information centre, either manually or in electronic form.

- For a manual system, the department of statistics extracts items from the front-page of the medical record and billing data into an ‘abstract card’ (101 items for each episode, as mentioned above). Staff classify and count the numbers of cards in order to gain the statistics figures required by the health department. For computerised systems, hospital statistics system draws the required items from the medical record database and billing database and then produces the summarised statistics report.
- The statistics report (HS5-3) is finalised and submitted to the health bureau, with the approval of the hospital president. The billing information in HS5-3 only shows charges for 30 specific diseases.

The quality of the reported data affects the data analysis. The CHSI released inpatient charge information, based on only 72 general hospitals under the administration of the health sector (MOH, 2001b, footnote on page 50). The data should be interpreted very carefully (Table 5-8).

<table>
<thead>
<tr>
<th>Principal diagnosis: acute appendicitis</th>
<th>ALOS (day)</th>
<th>Total charge (yuan)</th>
<th>Bed (yuan)</th>
<th>Medication (yuan)</th>
<th>Surgery operation (yuan)</th>
<th>Examination &amp; Treatment (yuan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average*</td>
<td>7</td>
<td>2652</td>
<td>118</td>
<td>993</td>
<td>505</td>
<td>890</td>
</tr>
<tr>
<td>MOH hospital</td>
<td>7</td>
<td>4521</td>
<td>153</td>
<td>2107</td>
<td>465</td>
<td>1229</td>
</tr>
<tr>
<td>Provincial hospital</td>
<td>7</td>
<td>3194</td>
<td>114</td>
<td>1188</td>
<td>554</td>
<td>1180</td>
</tr>
<tr>
<td>Prefectural hospital</td>
<td>8</td>
<td>2694</td>
<td>134</td>
<td>974</td>
<td>603</td>
<td>884</td>
</tr>
<tr>
<td>City hospital</td>
<td>7</td>
<td>2391</td>
<td>118</td>
<td>786</td>
<td>308</td>
<td>920</td>
</tr>
<tr>
<td>County hospital</td>
<td>6</td>
<td>1762</td>
<td>78</td>
<td>717</td>
<td>336</td>
<td>530</td>
</tr>
</tbody>
</table>

*: 72 general hospitals under administration of health department


**Table 5-8 An example of published national health data – ALOS (day) and average charges (yuan) for acute appendicitis in different types of hospitals**

The inpatient separation billing data is of some use to regional health planners. As shown in Table 5-8, the charges for an acute appendicitis admission vary widely across different levels of hospital. However, the inpatient separation billing data do not accurately reflect the real costs of hospital services (because of poorly accounting system and significant ‘undertable payment’, i.e. ‘red package’), nor are they representative of the different classes of hospital. More seriously, the quality of data is questionable.

There is a widespread view that hospital managers disguise their cost information.

_Hospital cost data is falsehood. That is true. It is very hard to validate the truthfulness of hospital financing data. They (hospital managers) have many versions of their financial reports in their pocket: one for bargaining with government when they want more subsidies, one for coping with inspection by the Tax Bureau when they want to evade tax, and maybe there is a real cost report in his/her pocket which they do not show any others. (Research institute director, central)_
Do you know why hospital financial data are inaccurate? One of the important reasons is that the government ask our staff to pay individual income tax. The government believes that medical professionals belong to high-income groups, but it is hard to find evidence from the hospital’s financial report. The report shows that every hospital staff member’s income was below the threshold level for income tax. In order to find the real taxable income of medical professionals, the government commissions the statistic bureau and/or audit bureau to review financial data in hospital. If they find false data, the hospital will be punished according to related regulations or laws. In order to protect our benefit, the financial department makes financial reports ‘more truly like real one’. (Hospital manager, prefecture of Jiangsu)

Some informants argue that many hospital CEOs do not understand their own cost information.

_We often visit hospitals and ask hospital presidents whether they know about their average cost per admission, average cost per prescription. [...] You see, for such simple questions, many of them had totally no idea! Moreover, even some hospital managers did not know their institution was in deficit or surplus._ (Health project manager, central)

Another issue for health cost information is quality of collection and analysis.

_When the health bureau wants to know the cost information of a hospital, the health official may request the hospital to complete some forms as an ad hoc survey. However, no one was in charge of data quality and no one could interpret the results. It is nonsense to do that kind of survey. In the view of our health statistics professionals, that cost information is unacceptable and useless, because the quality of raw data is unclear._ (HIS manager, city of Guangdong)

Hospital managers are also dissatisfied with the available financial data. They believed that both the information provided to hospital managers and to the health department are inaccurate and inconsistent.

_The Department of Finance (in the hospital) may give you something (data or information report), while the Department of Hospital Statistics (in the hospital) may give you another set of information (copy of statistical report to health department). The two sources of information may report on the same indicators. However, they provide different data for the same indicators! I told the two departments ‘Shit! What is the matter with you two? Why do you two have such a huge difference? Check it for me at once!’ Do you know what is the result of their checking? They have different understandings of those data, and different channels of data collection._ (Hospital manager, prefecture of Jiangsu)
Sometimes I have checked the quality of data and found some funny results. For instance, to add up all subtotals of a financing report may find the result is greater than the grand total provided. Sometimes I felt the data provided by the Financial Department is significantly different from my imagining. I asked the director of the department to explain the reason. Finally, I understood the reason. The Department of Financing ‘adjusted’ the data though a ‘technical process’, in order to make a balance between the expected data and the actual data. If you did not understand the financing transaction or you did not ask further question regarding the financial report, you may never find out those issues. Therefore, this is a serious issue. If health data can be so easily ‘modified’, how can you use the rubbish? (Hospital manager, prefecture of Jiangsu)

The reasons for the shortfalls in health cost information include the following factors. Firstly, government health financing is not based on cost-efficiency or cost-effectiveness of health services. Traditionally, government has provided subsidies to health institutions based on the number of staff and/or beds. In this form of health planning, cost information is out of the scope of health planning formulae.

Secondly, health cost information is inaccurate and often irrelevant. Although the MOH has collected 1.3 million hospital medical records from 128 public general hospitals since 1986, the cost information (billing data) has never been analysed.

They (health information system staff in the MOH and at provincial level) said that the front-page information was too confused to be analysed. It is impossible to gain some useful stuff from that database. If we intend to dig for information for cost analysis, we have to spend more money and more time. (HIS director, central)

INFORMATION COLLECT FROM THE NHSS

The NHSS household surveys also collect charging information for outpatient and inpatient services (see Table 5-7 and Appendix 10). However, experts interviewed for this study questioned it on the grounds of its significant recall bias. Furthermore, the NHSS data only reflects billing levels, not the real meaning of service cost.
THEMATIC SURVEYS

Chinese scholars have conducted some thematic surveys regarding health expenditure for the purposes of THE calculation, CHSs study, rural health study, etc. The aim of those surveys is to make up for the shortfalls in current health economic data collections. However, most survey results are hard to generalise.

HEALTH NEEDS/DEMANDS AND PRIMARY CARE

A systematic approach to the assessment of population-level health needs and demands has often been missing, despite the fact that many RHP designers have clinical knowledge and experience within the assessment of needs at the individual level. The span from clinical diagnosis to community diagnosis has proven very difficult for many health planners, many of whom are trained as medical doctors. RHP is aimed at satisfying the needs and demands of regional populations (CCCPC & State Council, 1997). Therefore, health status and risk assessment at a population level is important for regional planners and evaluators.

This is a great challenge for HIS, which has previously served health planning based on departmental structures or levels of governance, and has focused traditionally on the supply-side for resource allocation.

DEMAND SIDE INFORMATION

Sampling surveys (such as NHSS, see Appendix 10) and case studies are the most frequently used methods for collecting demand side information in China. Recently, increasingly special surveys have been conducted by government as well as by research institutions, designed to answer questions for health sector reform and to supplement routine reporting systems (Chen and Rao, 1994).

Besides the NHSS, there are four other sample surveys conducted by research institutes and commissioned by the MOH, namely the Nutrition Survey, the Survey on Smoking,
the Survey on Cancer and the Survey on Chronic Diseases. The NHSS household survey is recognised as the core of these national survey and provides valuable information on the demand side, including socio-economical status of the population, disease within two weeks, major chronic disease, handicap and disability, outpatient and inpatient service utilisation, major health related behaviours (smoking, drinking, regular excise) and household environment.

PRIMARY CARE INFORMATION

Surveys have been used to collect information about need and utilisation of urban and rural health services, especially in CHCs, CHSs, THC and VHSs, in order to design and implement community health services. Most of the studies are conducted by universities or government.

Most collections of primary care information are ad hoc approaches. In addition, there is significant variation in quality of surveys. As a result of weak study on management tools, benchmarking is almost impossible in these ad hoc surveys.

In summary, the NHSS and thematic surveys provide supplementary data sources that are intended to overcome drawbacks of the traditional health reporting system and more importantly, to make demand-side information available. However, regional health planners interviewed for this study still complained about the shortage of demand-side information. Both the reporting system and the NHSS are initiated at the central level for the purpose of central planning. To conduct surveys requires a certain level of technical expertise. Currently the resources for data collection and the analytic capacity are ‘centrally owned’. Many health planners at the provincial level (and below) do not have access to adequate data for regional planning, nor do they have the expertise to commission and supervise the collection of such data.
BURDEN OF DISEASE – DALY

The most commonly used indicators of health status in China are mortality and in-hospital morbidity, collected through routine reports and surveys. This is the simplest and traditional way, however, ‘complex planning requires complex data’ (Mathers et al., 1999, p.5). Murray and Lopez developed the Disability-Adjusted Life Year (DALY) to ‘provide information to support health policy and priority setting at global level’. In 1990, the DALY was used by the World Bank and the WHO (Murray and Lopez, 1997), for understanding the global burden of disease and injury and for informing global health planning. Burden of disease (BOD, using the DALY) has been calculated globally and by WHO region. Several developing countries, such as Ghana (Wright and Walley, 1998), have attempted to estimate the national disease burden, but it is difficult owing to the lack of data and poor quality of data.

The first report on burden of disease and injury in Australia was published in November 1999 (Mathers et al., 1999). The Australian study was financially supported by the Commonwealth Department of Health and Welfare and undertaken by AIHW. The 200-page report

[…] provides the first detailed and internally consistent estimates for Australia of the incidence, prevalence, duration, and mortality and disease burden for more than 175 disease and injury categories. It has also taken first steps towards quantifying the burden associated with a range of risk factors and health determinants, and with socio-economic disadvantage.

BOD is an approach to measuring population health and describing the ‘size of the health problem’ (Ren and Li, 1999). It also enables a number of health economic indicators to be calculated including the cost-effectiveness of particular interventions. It is one of the most important benchmarks for prioritising national and regional resources allocation (Wang and Meng, 2003), especially for prevention and control of chronic diseases, such as NHPA initiative in Australia.53

53 National Health Priority Areas (NHPAs) of Australia: The governments have agreed to work
China has also started to explore the use of the DALY to represent the BOD and cooperated with the World Bank and the WHO in the Global Burden of Disease study. The following table is quoted from this international study.

<table>
<thead>
<tr>
<th>Disease</th>
<th>% of deaths</th>
<th>% of DALYs</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD</td>
<td>16.1</td>
<td>8.7</td>
</tr>
<tr>
<td>Heart disease</td>
<td>14.6</td>
<td>5.2</td>
</tr>
<tr>
<td>Stroke</td>
<td>14.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Cancer, exc Liver &amp; lung</td>
<td>10.7</td>
<td>6.5</td>
</tr>
<tr>
<td>Accidents, exc traffic</td>
<td>5.5</td>
<td>11.8</td>
</tr>
<tr>
<td>Childhood pneumonia</td>
<td>5.3</td>
<td>7.3</td>
</tr>
<tr>
<td>Suicide</td>
<td>3.9</td>
<td>4.1</td>
</tr>
<tr>
<td>Liver cancer, hep B</td>
<td>3.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>3.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Infant mortality</td>
<td>3.1</td>
<td>7.0</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>2.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Hepatitis-induced cirrhosis</td>
<td>2.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Traffic accidents</td>
<td>1.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Diarrhea diseases</td>
<td>1.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>0.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.7</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Source: Murray and Lopez, Global Burden of Disease (Murray and Lopez, 1997)

Table 5-9 Leading disease burdens in China, 1990

CCDC has engaged in an exploratory study of BOD (Health News, 2003), and intended to use BOD in disease control and prevention in accordance with the recommendation of the WHO and the WB (Ren and Li, 1999).

However, BOD is not being used by regional health planners to determine resource allocation (Liu and Jiang, 2002). The reasons include, (1) regional BOD data is unavailable in China, (2) the policy focus on RHP has been as much about encouraging productive efficiency in individual agencies as about achieving allocative efficiency with respect to the distribution of resources or aiming to achieve healthier population. Supply-oriented and institution-based RHP is significantly different from that used in some countries, such as Australia, where RHP incorporates demand-side data and is located together on specific NHPAs, focusing national collaboration on chronic diseases that have potential for health gains and improved outcomes for consumers, pose a significant burden of disease, and have the support of all jurisdictions. The Health Ministers have endorsed seven national health priority areas: asthma, cancer, cardiovascular diseases, diabetes mellitus, injury, mental health, arthritis and musculoskeletal conditions. (www.health.gov.au/pq/nhpa)
in institutionally in a democratic system with strong traditions and expectations of community participation in such planning.

**SUMMARY**

Rational resource allocation requires a fair availability of information resources. Since the 1980s, China has made good progress in developing information resources and in particular making them more widely available. Up until 1998, the government (at all levels) had created more than 3,000 databases (Gao et al., 2002a, p.8). Developing information collections and promoting their use have been identified in the National Information Development Plan as high priorities for information system development. The development of information systems dealing with the economy has been driven by both political priority and strong market demand. Information system for public administrations (including health) also achieved significant progresses.

As in other sectors, the development of HIS at the central level has been given early priority in terms of resources and technical support. There has been a policy focus on health system reform as part of steering the economic transition and strengthening data collection for health planning and decision-making has been seen as an important part of this. There has also been significant progress in some of the coastal provinces, partly because of their financial resources but also because of their national significance in leading the economic reform and modernisation.

Unfortunately much of this activity at the central level has been directed to patching up the weaknesses of the traditional reporting system using ad hoc surveys and increasingly frequent censuses. However there are some major deficiencies in terms of the availability of essential health information even at the central level. This chapter has detailed a number of serious shortfalls with respect to health information availability. These include: (1) lack of information to support health planning (critical data sets, such as costing data and activity reporting in primary care are absent); (2) data which are collected are not made available outside the office or the ministry; (3) data are of uneven quality but
information about the quality of different collections is not made available; (4) collections and databases are duplicated in different administrative systems; and (5) administrative fragmentation (both vertical and horizontal) is reflected in similarly fragmented databases (Gao et al., 2002a, p.10).

There are different availability issues for different sorts of health information.

(1) Demographic data do not reflect the real size and features of regional populations; in particular, internal migrant groups tend to be neglected. This is partly because of the way the data are collected, through the Household Registration System, but may also reflect incentives regarding the registration of deaths and births associated with social security and family planning provisions.

(2) Health planning lacks information support regarding socio-economic variables. This reflects the ‘isolated islands of information’ problem associated with departmental fragmentation; HIS do not articulate with socio-economic information systems. This chapter has demonstrated that this problem is still not fully recognised; the guidelines for RHP (NDPC et al., 1999) do not give proper guidance with respect to the involvement of the statistics department in the health planning process.

(3) Despite the work that has been put into overcoming under-reporting of deaths, serious problems remain in relation to mortality data. The data are uneven with respect to different causes of death and different geographic regions. Comprehensive and reliable cause of death data are not available which means that it is hard to gain a full understanding of mortality patterns, risk factors and possible responses. Regional health planners are not able to define clearly the burden associated with particular diseases and risk factors and this presents problems in determining priorities for resource allocation, based on need.

(4) Health planners do not have access to area wide comprehensive hospital morbidity data. The national morbidity collection is based on data from a small subset of public hospitals administered by health departments. This chapter has demonstrated that there
are grounds for concern about the quality of these data as well as their representativeness. Perhaps partly because of the lack of representativeness and the quality these data are not extensively analysed, or rather, reports of the analyses that are undertaken are generally not made public. It is a drawback of sample based hospital morbidity collections that data cannot be aggregated from all hospitals servicing the residents of a particular geographical area in order to produce a picture of the morbidity of that population (as opposed to describing the morbidity patterns of patients of particular institutions). From the point of view of regional planners, the samples upon which national (and in some cases provincial) hospital morbidity data reporting is based are far too small to provide data of any local relevance (discussed further in Chapter 7). Morbidity data are generally not available for primary care, including outpatient services, community health services and rural health services. The need for tools that can be used to document primary care morbidity is a universal challenge for health services research including in China. The incompatibilities between hospital morbidity collections, primary care morbidity reporting and self-report based morbidity collected through surveys are also a universal challenge. This chapter has shown that there are also problems with respect to the quality of self-report data generated through the NHSS. Additional technical support work including extra budgets will be needed to improve the quality and usefulness of these data.

(5) There is an almost complete absence of comparable reliable health service cost data (as opposed to subsidy data, insurance data or billing data). It is hard to undertake regional planning if there are no reliable estimates of the likely (real) costs associated with various scenarios for health service development (Yip and Hsiao, 1997).

(6) The extent and quality of the data available at the national and provincial levels about urban health insurance are very limited. This is in part a reflection of the administrative fragmentation mentioned earlier. Health insurance is managed by municipal government and it appears that very limited data are reported from this level to labour and social security bureaux at the provincial level and ministries at the national level. The limitations of the data reported to provincial and national levels may also reflect the tensions between health insurance administration at the city level and the hospitals from
which the data are sourced (see further discussion in Chapter 7). In view of the potential importance of demand side instruments in regional health planning the lack of data about health insurance coverage and services reimbursed is a serious limitation.

(7) The fragmented and patchy character of health databases is a barrier to producing useful information such as THE, BOD and institutional and indicators of system performance.

(8) Health planners do not have access to rich qualitative data regarding the attitudes and opinions of communities and other stakeholders. This is partly a consequence of the traditional approach to planning which is very much top down without a strong element of participation and consultation. In countries where health planning is more consultative planners will be provided with rich qualitative data about the perceived needs of different stakeholders and constituencies and their opinions about different planning options. It seems self-evident that having access to such data will often lead to better health planning. However, this is not just about the planners changing their planning practices; it also depends on the existence of a rich network of informal representative and advocacy organisations who are asking to participate; who are collecting and offering data about their experiences and opinions to the planners. Most of the information of this sort which is presently available in China comes from ad hoc (usually academic) projects which have conducted open ended surveys, focus groups etc. If these kinds of data are to play a greater role in health planning there will need to be more systematic approach to the collection of qualitative data including routine (rather than ad hoc) collections and more training for those responsible for undertaking such surveys.

More importantly, the availability of health information at the central level is not the same as availability at the local level. With decentralisation and economic transition, a trickle down of centrally collected health information is no longer sufficient for health planners at the local level.

From a technical perspective, the study has found that:
(1) There is no system through which health data collectors might gain feedback about the quality of raw data reports from the data processors and analysers. Similarly, the producers of information are not subject to systematic feedback about the quality and usefulness of their products from the planners and other users.

(2) If these data are analysed at all (which is not always the case) they will be cleaned up and aggregated in appropriate databases and made ready for analysis. However, these databases, incorporating unit record level data, are not made available for local planners and researchers to undertake further locally relevant analyses. Rather the information generated by the information producers is published in the form of flat tables, which are not amenable to further analysis.

(3) Sample surveys organised by central HIS authorities to address the policy questions of concern at the central level are often of little use to local users because of inadequate numbers and because the sampling framework did not reflect the characteristics of the local population.

(4) China has vast diversity among regions and great variety exists in the capacity for health data collection and utilisation. Except where technical and financial supports have been provided from central level or external donors, the data availability and quality issues are much more pressing in the less developed areas. Health information resources tend to be concentrated at the central level and in the more developed coastal areas.

Improving health information availability at the local level should be a priority for HIS development over the next 5-10 years. The findings reported in this chapter suggest the following priorities with respect to improving health information availability.

(1) National regulations governing health data collection and availability presently focus largely on the responsibilities of lower level authorities to submit raw data to high levels. There is a need for a reworking of these regulations to mandate the provision of such data to local levels.
(2) Certain critical databases need to be established and improved as a matter of urgency. A good example is the field of health economics and health care financing. There is a pressing need for better information availability in this area to support health economic analysis, priority setting and performance management. Similar examples include primary health care and hospital activity analysis.

(3) Regarding the fact that little qualitative data are available to inform planners about the attitudes and opinions of communities and stakeholders, methods of qualitative data collection and analysis needs to be remedied.

(4) There is a pressing need for HIS capacity building at the local level but there needs to be a balance in any training and development between a focus on data collection and information production on the one hand and on the utilisation of health information in planning, performance management and policy making on the other. Initiatives directed to HIS development at the local level should aim to encourage cooperation between information producers and users and to motivate local users become more involved in data collection policies and priorities.

(5) Information availability, centrally and locally, is greatly limited by the fragmentation and duplication of collection pathways and of information holdings. The solutions of complex problem will involve policy negotiation at the central level, piloting integrated collections at the local level and agreements between different bureaucratic hierarchies over data sharing and data standards. There is a great deal of inertia in this system and change will need to be driven by the users, the policy makers and planners who need improved data in order to develop more equitable and efficient health care.

(6) The results presented in this chapter show that information from centrally planned sample surveys may be of very little use to local planners where the sample size and sampling frames generate information, which is representative and reliable for national purposes but unrepresentative and perhaps unreliable for local use. Errors (associated, for example, with variations in the training of interviewers or unduly small samples) may be washed out in the context of a national collection, however, may generate highly
misleading results if these data are taken by planners as reflecting local circumstances. These problems are not so serious for the richer provinces which have adequate numbers of well trained health information officials who can devise more appropriate sample sizes and sampling frames and add questions as needed. However, these problems constitute a serious disability for the poorer provinces that do not have the resources for adding to the survey or the expertise for recognising and addressing the problem. At worst, these provinces will be left with inadequate, useless and even misleading information. It is not clear how best these risks ought to be managed. Perhaps the national level collectors need to develop guidelines and protocols to ensure that local level needs are taken fully into consideration in the planning and implementation of such national sample surveys. These could involve funding consultants to advise provincial authorities about how the national parameters for the survey might be adapted to address local needs.

(7) The need to invest in human resource development underpins all of these suggested new directions. There is an urgent need for improved training programs, particularly for staff that will work at the local levels, in the disciplines and skills of both data collection and utilisation.
CHAPTER SIX

QUALITY OF DATA FOR HEALTH PLANNING

INTRODUCTION

Quality is ‘degree or level of excellence’ (Oxford Dictionary). Maintaining and improving data quality and information quality is recognised universally as a key requirement, even in well-developed information societies like the USA, where billions of dollars are lost because of unreliable or uninterpretable data (Strong et al., 1997b). The qualities of data information are key indicators of the performance of HIS.

Many criteria have been suggested for the evaluation of data and/or information quality (Ahituv and Neumann, 1986; Qiu, 2000; Rusin and Williams, 2001; Hovenga and Lloyd, 2002), frequently based on different perspectives and developed for different purposes. Focusing on national health information evaluation, a WHO expert, Professor Steve Sapirie, has suggested that evaluators should focus on production, management, analysis, reporting and use of data (WHO, 2002).

For this research, quality has been assessed across three dimensions. Firstly, evaluation has been analysed in relation to three logical phases in the information cycle (see Figure 6-1). Quality of data includes reliability, accuracy, and objectivity, etc. Quality of information (also identified as contextual and representational qualities by Strong (1997)) concerns how meaningful and relevant information products are retrieved, delivered and presented in efficient and effective ways in order satisfy information needs. Quality of information system management focuses on how system managers conduct planning and management activities in order to assure that the information system maintains higher levels of performance in relation to the utilisation of information, in particular, in informing health planning and management (Wang et al., 1993; Wang et al., 1995; Strong et al., 1997b, 1997a; Eppler and Wittig, 2000).
For the second dimension, databases are classified in relation to the purposes for which the data and information are to be used. For instance, in commenting on the evaluation of a national information system for infectious disease control and prevention, the WHO (2002) has suggested consideration of four common HIS sub-systems defined in relation to: 1) epidemiological surveillance; 2) periodical health data reporting; 3) specific health survey; and 4) vital statistics. In the present study, which is focused on the information requirements of regional health planning, the evaluation has looked at datasets of particular relevance to health planning including: demographic, socio-economic and epidemiological data and data about health resources, hospital and healthcare activities, healthcare revenues and expenditures and health needs and demands (Eagar et al., 2001, p.119-37).

The third approach or dimension involves conceptualising data systems in terms of collectors and/or channels of collection. Each information product requires specific items that are collected, aggregated, analysed, presented through different channels. In this research, the data systems are categorised into external collections (external to the health portfolio), special health surveys and routine or administrative data. For instance, demographic data are collected from systems external to health; from special surveys, such as NHSS; and from routine health service data reports, such as medical record data, which reflect the demographic features of inpatient service clients.
Figure 6-1 Three dimensions of quality evaluation

The findings presented in this and the two following chapters are organised in accordance with the first of the three dimensions (quality of data, quality of information and quality of management). In each chapter, the other two dimensions (functional focus and collection systems) are used as to organise and analyse the findings and to organise the recommendations to health planners and managers, and to HIS designers and managers, see Figure 6-1. The research data upon which these chapters are based has been collected primarily through key informant interviews and questionnaire survey.

QUALITY OF HEALTH DATA IN GENERAL

Strong and colleagues (1997) have suggested data can be evaluated in relation to their ‘intrinsic quality’ which they conceptualise as covering: objectivity, accuracy, believability and reputation. However, the researcher argues that objectivity and accuracy are closer to mean of intrinsic quality. Objectivity (similar to validity) is achieved when the data reflect the realities they represent, without biases such as those framed by preconception and personal opinion. Where data inform decision-making, controlling and monitoring them is very important so that they reflect the realities the decision-maker is facing, unbiased by the perspectives of collectors and stakeholder. In reality, many data are loaded with particular ways of reflecting their objects, through either particular definitions or approaches to collection, and such biases may reflect the interests of
particular stakeholders. Another important indicator of intrinsic quality is accuracy, which means that provided data tallies with nominal standards, facts and axioms. Therefore, the objective data is free from external intervention, while accurate data is technically correct (Strong et al., 1997b; Cao and Wu, 2002).

All of the respondents in the interview study endorsed the importance of intrinsic data quality for health data used in health planning. To collect reliable, objective and accurate data is recognised as ‘the first step of long march’.

As my understanding, data collection is a key step for ensuring quality of health information.’ (Research institute director, central)

Whatever brilliant health system reforms or organisational reconstructions are launched by government, the grassroots foundations are likely to be the most important. [...] Data collection is a base of sound HIS. If HIS collect rubbish, how can you use rubbish for health planning? (Statistics official, city of Shanxi)

However, when assessing quality of data, interviewees split into two groups. On the one side, most HIS officials argued that, compared with other sectors, health data is generally of good quality; while on the another side, health planners, health service managers and researchers complained that quality of health and health-related data is unsatisfactory.

I have a pessimistic impression: neither the NBS nor the health department know the current situation of the nation’s sheng-lao-bing-si54. They only have probable estimations. [...] Health planners cannot gain accurate health data, and (if they have) may never use those data. (Senior manager of health project, central level)

Birth, death and disease are very important data for health planning. If you did not know potential health service utilisation and morbidity burden, how can you design and implement a rational health plan? You should not shoot at random. (Research institute director, central)

Health data have troubles! The first trouble is its objectivity. In addition, from top to bottom, nobody has paid attention on this issue! (Hospital manager, prefecture of Jiangsu)

We have to estimate the usefulness of health data provided by formal health reporting. There are many black boxes in process from data collection to information release. In my opinion, reported data are ‘roughly believable.’ (RHP researcher, Beijing)
We have made significant achievements, step by step. However, in terms of the requirements of decision-making in the transition period, both for leaders and for ordinary people, health data are far from satisfactory. Nevertheless, we are on track. (Statistics official, Guangdong)

To play political games, politicians have more advantages than bureaucrats do. To play the information game, bureaucracies have advantages over politicians. To cut off or distort information is the strategic weapon of (official) survival in officialdom. You (politicians) gain promotion and we (officials) gain stable position. Although all of us know fairly well that both ‘political achievement’ and ‘administrative achievement’ are based on questionable data, none of us cares about that. (Health official, city of Jilin)

Interviewees believed that data collected by the health sector itself is better than that collected by other sectors. In responding to the questionnaire survey, only 68% of provincial HIS officials agreed that the quality of external data (such as demographic and economic data) is ‘good or extremely good’. This percentage is lower than that for reports based on routine administrative health service data (77%) and health surveys (78%). Forty percent of PHIC officials were dissatisfied with the data provided by the department of labour and social security. Only half of provincial HIS officials agreed that health information provided by other departments (industrial and military sectors) was good or extremely good.

**QUALITY OF DEMOGRAPHIC DATA**

All PHICs (31 in total) assessed quality of data in the questionnaire survey. Findings suggest that 78% of PHICs agreed that the demographic data are objective, while 67% of them judged that the demographic data are accurate, see also Table 6-1.

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54 Health status, refers to situation of fertility, aging, disease and death.
Table 6-1 Evaluation on quality of demographic, socio-economic and epidemiological data, (Percentage of ‘good’ and ‘extremely good’ in response to Q4.1 and Q4.2, Appendix 1)

‘Demographic data is fundamental for ‘people-centred’ health planning, especially for the RHP and CHS planning’, commented a HIS director. As discussed in Chapter Five, demographic data are collected based on the household registration system and the population census. Researchers and officials stated that the demographic data are hardly used currently because of its intrinsic quality issue.

The population composition of Shenzhen is complicated. It is generally an immigrant population. Officially, the population size is 1.32 million, which based on routine statistics report aggregated from the household registration system. Another official estimate is 4.68 million, which includes registered migrants (lived in Shenzhen more than six month). However, the census population (lived in Shenzhen more than three month) is estimated about 7.01 million. (HIS director, central)

Which population size should be referenced when estimating healthcare demands? Ideally, Shenzhen RHP planners should use the census data; it is relatively accurate data and reflects best the real size of Shenzhen population, which is likely to use regional health resources. However, it can be argued that population census data is also becoming less accurate along with economic transition. The census 2000 is estimated to underestimate the population by an average of 1.81% (Yu, 2002; Zhang and Cui, 2002), which is jumping from 0.06% for the Census of 1990. This suggests that 22 million people were not counted in Census 2000, more than total population of Australia.
The household registration derived population data are ‘entirely inappropriate for health planning’, stated one health official. The household regulation system cannot effectively control population migration and does not provide accurate demographic data after the 1990s. Based on population census 2000, for instance, 2.9 million (27% of total) registered people in Beijing and 2.0 million registered people in Ningbo (31% of total) lived in another place other than their registered areas (Jin and Xu, 2000, p.277).

However, the planning department of Shenzhen chose to use 4.68 million as their population base, because planning officials believed that health services for migrants are not their ‘formal’ responsibility, or that migrants are not a target group of current healthcare planning.

*Under the pressure of the Planning Commission, we had to use the 4.68 million in the RHP, although this figure is an underestimation. We have to keep in mind that the real size of the consumer population is far more than that.* (Health official, city of Guangdong)

As well as having difficulties in estimating total population size, another PHIC official commented that ‘it is a great challenge for us to gain correct figures for births and deaths. This is an uneasy job in China’, he complained.

*[…] We collected data in all places where births and deaths happened, […] because none of reported data provide accurate data. We checked with all those sources to try to validate the number of births and deaths.* (HIS manager, Guangdong)

*[…] It is very difficult to gain reliable estimates of newborn girls and boys. The distribution of sex ratio at birth is also unreliable. We need a special survey for those data. The reported data provided by official channel is inaccurate.* (Health project manager, central)

Another important factor affecting the quality of demographic data is the national policy on family planning. Both central and provincial researchers pointed out the significant impact.

*Birth data lack accuracy. Many ‘out-of-plan’ births are underreported. For urban residences, this figure is more believable but it is also questionable when taking account of urban migrants.* (Research institute director, central)
QUALITY OF DATA FOR HEALTH PLANNING

 [...] The number of births has implications for the careers of government leaders. Planned number of birth is set up by the centre, and sent down to each province, prefecture, county, township and village. If the reported number of birth exceeds the planned number, the government leader at that level will be dismissed or punished. Therefore, births (beyond the planned numbers) will be disguised. However, health planning (especially MCH and immunisation services) should not be divided according to planned and unplanned births. One of our particular challenges is to try to find the real number of births. Can we use a same number of births for both family planning and MCH planning? No! Of course not! (HIS manager, Guangdong)

Therefore, although demographic data are available from various channels, intrinsic quality is affected by political and technical reasons. The different sources of demographic data have implications for the target population assumed by regional planners. Increased population migration is becoming a major concern of regional health planners. If healthcare consumers are identified as all potential patients (regardless of whether they are registered as urban residents or whether each infant is born as planned) then current demographic data is weak in content validity.

QUALITY OF SOCIO-ECONOMIC DATA

China’s statistics officials are proud of the progress that has been achieved in relation to official statistics during the past 50 years, especially the recent two decades (People's Daily, 2002a). All China’s economic data are now openly available on the Internet through the International Monetary Fund’s (IMF) General Data Dissemination (GDDS, 2004) since April 2002 (NBS, 2003b).

Some scholars and commentators in both the Western and domestic media question the reliability of China’s socio-economic data, including in particular China’s GDP data (Albert Keidel, 2001; Huenemann, 2001; Rawski, 2001b, 2001a; Smith, 2001; Holz, 2003). However, a NBS senior official, Qiu Xiaohua, has argued that ‘as long as one looks objectively at the overall situation regarding the current operation of China’s economy, one will conclude that China’s current statistical data basically reflect the actual conditions’. (Zhu, 2002a)
From the responses to the questionnaire survey undertaken as part of this current research, it appears that not all PHIC officials have confidence in the intrinsic quality of socio-economic data. As showed in Table 6-1, 71% of PHICs agreed that socio-economic data is verifiable, while only 62% of them agreed that the accuracy of socio-economic data is good or extremely good.

During the interview study, informants pointed out that great progress has been achieved in the national statistics system. The central statistics administration has recognised the quality issue regarding reported economic data. Two vertically structured statistics teams, USEST and RSEST, conduct large-scaled sampling surveys in order to collect accurate data, independent of local influence.

However, other factors, such as local protectionism, inappropriate supervision and official corruption, still affect the objectivity and accuracy of economic data. The following quotations from the interview study illustrate how political and economic factors affect the quality of economic data in developing areas.

[...] China’s economic data are ‘believable with a pinch of salt’, especially for those so-called ‘sensitive indicators’. Data quality is destroyed by ‘administrative intervention’. Government officials keen to spread the good news and obscure the bad news, to aggrandise positive outcomes and discount negatives. In addition, they even modify data in order to make up ‘political performance’. (Statistics official, city of Shanxi)

We still refer to the exaggerations of the Great Leap Forward, although the environment has changed dramatically (sarcastically). Economic data are more difficult to accurately collect. We find that there are many misreports (for exaggerated achievement) and under-reports (for tax evasion). (Statistics official, city of Shanxi)

One county governor boasted that his greatest political achievement was to ‘maintain the county’s poverty crown’. Actually, the county had achieved economic improvement. However, the governor deliberately modified economic data to maintain the county in the list of national poverty counties. Keeping the ‘crown’ of poverty ensures a continuing flow of subsides from central and provincial governments. (Statistics official, Jilin)
The following citation demonstrates how a corrupted government official, Wang Huaizhong, compiled fake economic data (Zhou, 2003). In 2003, Wang is sentenced to death for accepting bribes (5.17 million yuan (US$623,000)) and holding large amounts of assets (4.8 million yuan (US$578,000)) he could not account for. Wang is the latest in a string of senior officials convicted in China as part of an intensified campaign against corruption (China Daily, 2003).

Wang set up socio-economic targets, which depended on his political needs instead of the real level. In the beginning, the Planning Committee suggested a 13% GDP growth rate, and was refused by Wang because it was 'too low to meet the political need'. The Planning Committee against its better judgement adjusted this rate to 15%. However, this new 'projection' was rejected again. The third adjustment, to 18% of GDP growth, also did not fit Wang's willingness. This was an 'argy-bargy' process between the Planning Committee and Wang. Finally, Wang conceded to Planning Committee and accepted a GDP growth rate of 22%. His 'expected' rate was 28% increase in GDP! However, the real rate was 4.1%.

In the end, unrealistic targets could not be realised. When Wang was assigned as a Party Secretary to a poor county, he judged that the product value report of the township enterprises was 'too low', and changed this figure from millions to billions. This 'great achievement' was recognised as a 'model' in Anhui Province. However, Wang's faking reached a peak of perfection when he reported tax revenue. Many faked tax invoices were found later on the names of many famous politicians and historical persons such as 'Emperor Qin', 'Bill Clinton' and 'Boris Yeltsin' in tax invoices.

Although Wang's plans and achievements were faked, his promotions were real and rapid. In 1993, Wang was assigned as Vice Party Secretary of a prefecture. Two years later, he was assigned as 'First hand' (Party Secretary of a prefecture), and then three years later was assigned as vice governor of Anhui Province.

The Rogue Bureaucrat emerged in a suitable soil. Wang fully understood the 'way' of Chinese bureaucracy. After he was arrested, Wang explained his understanding of the 'principle': 'Because the principle of current political management is centralisation and the 'first hand' makes the decisions, you can win promotion and get rich when you show 'political achievements' to the 'first hand'. The key to success is to show political achievement to the superior, but not to civilians'. (Citied from Zhou Zhiren (2003), Charlatan: The Rogue Bureaucrat Wang Huaizhong)

Many information officials try to make the picture clear in all conscience. For instance, the Guangdong statistics administration developed and implemented four strategies for
gathering accurate economic data. Firstly, an independent investigation team is organised and anonymous results are released to public. This strategy protects data accuracy against the pressures of interested parties. Secondly, economic information transparency is promoted through local statistics cooperation. For instance, 12 developed prefectures of Zhujiang Delta jointly released annual socio-economic data (Guangzhou Statistics Bureau, 2002). Thirdly, triangulation is introduced in performance assessment. A group of indicators is used, instead of a single indicator (e.g. GDP), in order to guarantee objectivity and accuracy through the correlations and interdependencies of the indicators. Fourthly, a new assessment system is designed, which breaks the direct links between specific economic indicators, assessments of ‘political performance’ and leaders’ personal interests.

Leaders pay attention to GDP and some might, through pressure, seek to ensure values that are more favourable are reported. Their attention is understandable. However, we have to introduce some protections to limit such efforts and to ensure correct data are published. We collected other GDP-related indicators simultaneously, such as electronic consumption, transportation volume, bank deposit and tax income, etc. Those ‘supplementary’ indicators were ‘real gold and silver’ (cannot be modified easily). We published those indicators along with GDP value and let government and ordinary people make their own judgements. (Statistics official, Guangdong).

In summary, objective and accurate economic data will assist regional health planners to make on rational judgments regarding the macro environment and potential strategies for healthcare development, which are in accord with socio-economic development. However, the quality of some socio-economic data is questionable, particularly when they are used to evaluate officials’ ‘political performance’ and they are not protected by the kinds of precautions described by the Guangdong official.

**QUALITY OF EPIDEMIOLOGICAL DATA**

Limited and inaccurate health data are common among developing countries (Pun and Holliday, 1991; Heywood and Campbell, 1995; Allotey and Reidpath, 2000). Mortality rates are commonly underestimated and cause-specific mortalities are impossible to
determine. However, as one interviewee commented, ‘China has a tradition of assuring quality in vital statistics’. Many Chinese colleagues, such as Yan Mingqing and Li Guangyin, have devoted great efforts to improve vital statistics since the 1930s.

The responses of provincial HIS officials (in the questionnaire study) suggest that the quality of available morbidity data is better than that of mortality data. The number of respondents who believed that medical record based morbidity data is reliable (88%) was considerably more than those who judged that cause of death data (mortality) are reliable (76%), see also Table 6-1.

Epidemiological data are also judged to be acceptable by HIS managers, ‘it seems unnecessary to deliberately underreport or false-report epidemiological data’, said by a HIS director. HIS managers are proud of the advanced infectious disease notification and report system and the integrated NDSP system. This computerised network has stretched to county level, and will be extended to townships. ‘We now can gain more useful data for determining national priorities’, commented the director of a health research institute.

Compared with other sensitive data [...] health data is relatively clean. Generally, health data do not relate to important political and economic benefits. It is possible that some data quality problems will be due to the data being linked to a leader’s ‘political performance’, or the influence of a leader who is involved in serious malpractice. However, I have worked in this position for many years, and have not heard of anyone who lost his/her ‘black gauze cap’ (official position) for reason of bad quality of health data. (HIS manager, central).

Paradoxically, five month after this interview (April 2002), the health minister and Mayor of Beijing lost their ‘black gauze cap’ for their actions during SARS crisis. It is believed they manipulated the SARS data in order to obscure the extent of the epidemic in the

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55 Former Director of Beijing Health Bureau and Dean of School of Public Health of PKU.
56 Former Director of Health Statistics of Beijing Health Bureau, and Director of Health Statistics Department of School of Public Health of PKU.
57 Notified infectious disease system was established in 1950s, which was currently administrated by the DODCP of MOH, and technical implemented by the CPMA. The integrated NDSP is mentioned in Chapter Four.
early stage of the tragedy. When SARS seriously broke up in China, health minister announced to the world (on 3rd of April 2003) that ‘the SARS has been effectively controlled. To work, live and travel in China is safe’ (People's Daily, 2003). After the SARS crisis, the MOH is working hard to improve infectious disease reporting (especially to improve responsiveness to an infectious disease crisis such as SARS) and to improve accuracy and timeliness of public health information. Cases of notifiable infectious disease can now be directly reported to central level in a very short period.

Compared with morbidity data, the quality of mortality data is less satisfactory. In many developed countries, the death certification system is well established and death registrars work at track down the cause of death. Hospital mortality data are collected and maintained in appropriate ways and the cause of death determination and coding are relatively reliable. However, mortality data are inaccurate in China, especially in rural areas. On the one hand, hospitals collect and maintain limited death records, because ‘in rural areas, about half death occurred at home’, mentioned a director of research institute. On the other hand, death certification system is malfunction in rural areas, so the number and reason of death is underreported and misreported.

Vital data always appear in the interviewees’ lists of questionable data. An interviewee, who graduated from a school of public health and worked in a city health bureau (of inland China) for more than ten years, told the following story regarding government mortality data:

> How did the Mayor get to know our local life expectancy data? [...] I have inquired from his office: ‘we did not conduct any survey on mortality; we did know that there is significant underreporting of IMR. How did you know the life expectancy?’ The head of office told me: ‘I made it up! You cannot be deceived. However, I have to do it that way, because the Mayor insisted he use this figure in his presentation’. (Health official, prefecture of --)

A health project manager at central level expressed frustration with the bad quality of mortality data in China. As his stated, ‘the health planning process is a tragedy: the objectivity and accuracy of health report data are illusory’:
Although the health statistics publications are officially authorised, much published health data cannot be used. There is an understanding among domestic and international experts: to collect first hand data before carrying out a project in China. If you skip this step and use existing sources, you will find that despite your hard work, the outcomes may be worse. IMR and MMR are good examples. [...] This reflects the bad quality of health information. (Health project manager, central)

Health researchers and planners could choose between many versions of mortality or life expectancy in China and might be confused about which one would be the more accurate or reliable. There two major sources of LE data: the NBS and the NDSP, which are recognised as official data and academic data respectively. To use the NDSP data, as a health official suggested, is a better choice for health planning while the NBS data is good for political demonstration.

The NBS data are used for reports and plans for State Council, while the NDSP data are used for health planning and evaluation, and are reported to international agencies. [...] The NDSP data are accurate. We know that. We want to use accurate data for our health planning, and for international agencies. As regards of the NBS data, LE based on census, the quality is not good. The NBS also agreed that their LE data are inaccurate. However, NBS data are used as the formal official data. (HIS director, central)

Many health planners are unhappy about using untrustworthy data and therefore seek to find out objective figures for health planning. An interviewee, who is in charge of RHP formulation, conducted a survey in his city, covering 300,000 people, which is designed to investigate underreported deaths. He commented that ‘the survey is expensive but the result is useful. Compared with official LE data, the differential is highly significant’.

[...] Previously, all released health data (such as morbidity of infectious diseases) were ‘compiled’ before publication. The compiled data demonstrated ‘legitimacy and wisdom leadership of the Party’ and ‘superiority of socialist system’. [...] Now we are trying to build a HIS which serves as a decision-making support system for health planning, instead of as a political tool. [...] For right decision-making of government, community and ordinary people, health data should be accurate and objective. [...] There is no reason to compile wrong data. (Research institute director, central)

There are widespread concerns about the data quality regarding HIV/AIDS in China. According an an estimate from the CDCP, ‘90% of Chinese HIV infected people do not know they are infected’ (Channel News Asia, 2004). That figure in USA is 30%. The
Chinese government estimates that the number of HIV infections was 600,000 in 2001 and 840,000 in 2003 (MOH, 2003a). However, experts believe that the real figure may be closer to 1.5 million (Lancet Editorial, 2001). The screening data, which are collected, are kept for official and clinical usage but are not compiled into population level estimates and published.

One system issue contributing to unsatisfactory epidemiological data is that the vital statistics system does not communicate with the hospital information system. Fragmentation between the hospital system and the CDC system affects the quality of mortality and morbidity data. For instance, during the SARS epidemic CDCs and hospitals did not share their dominated data effectively and efficiently. A group of professors observed this issue during early stage of SARS crisis:

*The hospital controls all the patient details, CDC staff cannot access the patient database. Epidemiologists had to collect the patient’s history again. It wasted money and increased the risk of spreading SARS. Some patients asked why they were asked the same questions so many times.* (Professor, Beijing)

The PHICs believed that the improvement of epidemiological data could be achieved through grassroots training or guiding.

*A complicated problem could be solved in a simple way. My suggestion is to give a simple tool to data collectors, and ensure that they understand the exact definitions of the data they are collecting, such as what is the real meaning of ‘birth’. I designed a pigeon box shelf as cross-table of village by age group. Township data collectors can deliver a small briefing card (red for birth and black for death) into the corresponding cell. Data collectors welcomed this tool.* (HIS manager, Guangdong)

*It is not appropriate for us to just wait in our offices and expect our subordinates to submit data. We have to train the basic data collectors both in urban and rural areas. [...] The community doctor, midwife, and women’s cadres are the first contacts for epidemiological data. [...] If we are to control data quality, we have to work with them.* (HIS manager, Guangdong)

Besides providing more training, some PHICs have also introduced motivation schemes for improvement of epidemiological data. For instance, in order to establish a diabetes database, Shenzhen HIS designed a ‘diabetes card’.
QUALITY OF DATA FOR HEALTH PLANNING

[...] We provided free or rebated services to cardholders. This is a smart card, which can be easily handled by computerised diabetes management systems. This method improved the accuracy of diabetes data and continuity of care. In the beginning, we attempted to use the residential ID as a standard identification. However, it was not a success because we were not able to motivate the residents using the Residential ID. In most cases, patients do not bring their Residential ID with them when they visit doctors. (CDC director, city of Guangdong)

QUALITY OF HEALTH RESOURCE DATA

Institution, workforce and equipment databases are traditional components of health reporting. Resource information system has been recognised as a prerequisite of other information sub-systems (Matokovic, 1994). Asked about the intrinsic quality of these three datasets, all of the PHICs respondents agreed that workforce data have good or extremely good objectivity, while 88% and 73% of them were satisfied with the intrinsic quality of institution and equipment datasets. PHICs respondents believed that health institution data have higher accuracy (88%) than workforce and equipment data (see Table 6-2). The findings reflect the strict controls on the workforce since the introduction of the planned economy. Medical equipment data are rated as having the lowest objectivity and accuracy among these traditional resource oriented datasets. This reflects the fact that equipment purchasing by health care institutions is no longer subject to government control.

During the interview study, some provincial statistics officials and PHIC managers expressed satisfaction with the quality of health resources data. ‘Comparing with other data, health resource data is good’, a statistics official of Shanxi commented. Central HIS managers also have confidence, because health resource data are ‘politically insensitive’.
QUALITY OF DATA FOR HEALTH PLANNING

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Table 6-2 Evaluation on quality of health resources data, (Percentage of ‘good’ and ‘extremely good’ in response to Q4.1, see Appendix 1)

However, regional health planners and researchers were not in agreement with the statistics officials and HIC managers on this. They commented that different levels of health bureau and different government departments maintain resource data within the scope of their responsibility and power. Regional planners find it hard to reach all ‘accurate and reliable’ institutions data because they are managed by separated data keepers.

*How many health institutions are in the city? Who can give a clear answer? Statistics Bureau? Health bureau? Social security bureau? Civil affairs bureau? Public security bureau? Health research institutions? Military administration? Industrial departments? [...] Each of them can give you a number, but none of them can give you a whole picture. Even within the health bureau, this number is different among departments. (RHP researcher, Beijing)*

Fragmentation of the governing structure causes fragmentation of resources data. Horizontal and vertical fragmentations weaken the content validity of traditional resource datasets. Even within the health department, this kind of fragmentation affects quality of health resource data. For instance, the medical administration department of PHB supervises hospitals at higher than county level, while the primary healthcare department is in charge of township and village health services.

*You can obtain many numbers for the same things, but be careful, it is very easy for you to use the wrong number! Government does not know about regional health resources, even the number of health institutions despite this having been a classical indicator in China, collected for more than 50 years! (RHP researcher, Beijing)*
Similar quality issues exist in relation to the health financing datasets. In the questionnaire survey 78% of respondents believed that capital expenditure data is objective, but only 67% of them agreed capital expenditure data are accurate. Seventy one percent of provincial respondents agreed that the objectivity and accuracy of recurrent expenditure data is good or extremely good. See Table 6-2.

In summary, health resource datasets are probably reliable within the ‘silos’ of a vertically fragmented administrative structure. However, regional planners face serious issues with respect to reliability, validity and accuracy of available resources data in trying to understand overall resource distribution in a given region. The change on planning style (from fragmented resource allocation to integrated regional planning) creates new challenges on health resources data management.

QUALITY OF HEALTHCARE ACTIVITY DATA

The quality of healthcare activity data relies on record management procedures (Allotey and Reidpath, 2000). Quality of activity data varies across the different service sectors (hospital care, urban and rural community health care, preventive and public health activities). Data quality also depends on data collection approaches. One the basis of the questionnaire survey results we may conclude that annual reported healthcare activity data in China are less satisfactory than other routine datasets (Table 6-3). The percentages of PHICs who assessed hospital, CHS and VHS activity reporting data as ‘good or extremely good’ were 67%, 62% and 61% respectively. Health inspection activity data (a measure of public health activity) are assessed as having a higher quality (75%).

Only 65% and 77% of questionnaire respondents rated the objectivity and accuracy of hospital activity reporting data as ‘good’ or ‘extremely good’. The rates for urban community healthcare activity and rural healthcare activity datasets were even lower. 63% and 57% of provincial respondents rated the objectivity of community health activity data as ‘good’ or ‘extremely good’, while the rates for accuracy were 58% and
61%, respectively. The data about public health activity were recognised as having higher reliability (81%) and accuracy (87%).

Health planners require comprehensive and reliable activity data and a range of ad hoc surveys have been undertaken by health departments and researchers, including CHS surveys (Yang, 1999a, pp.28-30; Liu, 2003a), health institution performance surveys and health outcome surveys. PHIC officials agreed that ad hoc surveys provided more reliable activity data. The questionnaire respondents rated ad hoc surveys as more accurate in relation to rural health than annual reports (Table 6-3).

<table>
<thead>
<tr>
<th>Quality dimensions</th>
<th>Hospital service data</th>
<th>Community service data</th>
<th>Village service data</th>
<th>Health inspection data</th>
<th>Data of other departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual report</td>
<td>Performance survey</td>
<td>Outcome survey</td>
<td>Annual report</td>
<td>Special survey</td>
</tr>
<tr>
<td>Objectivity/validity</td>
<td>65</td>
<td>67</td>
<td>78</td>
<td>63</td>
<td>74</td>
</tr>
<tr>
<td>Accuracy</td>
<td>77</td>
<td>52</td>
<td>68</td>
<td>58</td>
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</tr>
<tr>
<td>Relevancy</td>
<td>68</td>
<td>65</td>
<td>56</td>
<td>63</td>
<td>67</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>62</td>
<td>75</td>
<td>78</td>
<td>54</td>
<td>56</td>
</tr>
<tr>
<td>Comprehensiveness</td>
<td>79</td>
<td>60</td>
<td>63</td>
<td>70</td>
<td>67</td>
</tr>
<tr>
<td>Development</td>
<td>44</td>
<td>53</td>
<td>65</td>
<td>46</td>
<td>65</td>
</tr>
<tr>
<td>Timeliness</td>
<td>75</td>
<td>60</td>
<td>58</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Economic Viability</td>
<td>56</td>
<td>50</td>
<td>59</td>
<td>52</td>
<td>44</td>
</tr>
<tr>
<td>Simplified</td>
<td>73</td>
<td>60</td>
<td>56</td>
<td>83</td>
<td>61</td>
</tr>
<tr>
<td>Appropriate volume</td>
<td>77</td>
<td>60</td>
<td>56</td>
<td>67</td>
<td>61</td>
</tr>
<tr>
<td>Comparability</td>
<td>62</td>
<td>60</td>
<td>61</td>
<td>74</td>
<td>67</td>
</tr>
<tr>
<td>Projectability</td>
<td>64</td>
<td>60</td>
<td>50</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Average</td>
<td>67</td>
<td>60</td>
<td>62</td>
<td>62</td>
<td>61</td>
</tr>
</tbody>
</table>

Table 6-3 Evaluation on quality of health activity data, (Percent of ‘good’ and ‘extremely good’ in relation to the indicated aspect – see Q4.1, 4.2 and Q4.3, Appendix 1)

Some HIS managers expressed their confidence in the quality of activity data during the interviews. They believed the data quality of healthcare activities is assured through computer-assisted data checking58 and professional judgment59.

There is no unexpected change in the statistics curves. Otherwise, we review and inspect quality of data at regular periods. Until now, no serious quality issue is found. (HIS official, central)

58 Check variable value fall in range and check inter-variable relations.
59 Assess data based on expert’s judgement.
We have professional morality (laughing). Some hospital data (such as outcomes and hospital infection rates) certainly have errors but the errors are not deliberate. (HIS manager, prefecture of Guangdong)

I use other sources of data to check up on our health data. For instance, it was reported (from health data reporting system) that the volume of outpatient service last year was 24 million. I obtained average visits per resident per year (through CHSS) by dividing this figure by 7 million being the city population. The two results are very close. [...] My assessment is very brief. (Health official, city of Guangdong)

However, many other interviewees questioned hospital activity data.

The health bureau does not want to release hospital data to the public, [...] one of the reasons is that the health bureau does not want to be laughed at because of their unreliable data. (Research institute director, central)

The problems of health activity reports are very serious. It is unbelievable that it is our production! We cannot believe it ourselves. (HIS manager, Shanghai)

The quality of data submitted by institutions is not good! As I know, hospital activity data are less than true. Why? Nobody uses the data for planning. Therefore, nobody has an interest to check its quality. (HIS manager, Beijing)

One of difficulties provincial health information officials face in seeking to assess the quality of hospital activity data is that the raw data on health activity are not available. Health information centres at provincial level only receive summarised statistics forms, which contain much ‘surplus exaggeration’ and generally arrive long after the period to which they refer. To improve the quality of hospital activity data, Shanghai HIC replaced traditional reporting forms with electronic reporting. ‘Therefore, we are better able to check data quality. The data are more secure, reliable and timely’, said the Director of Shanghai HIC.

A prefectural HIS director in Guangdong province noted (in the interview) that data obtained by health bureaux and hospital managers are different: ‘hospital managers would not be self-deceiving’. The interviewee believed that hospitals maintain and use quality activity data for internal management, but the same data may not be sent to HICs

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60 An interviewee used the term to express how hospital reported high volumes of services in order to bargain with government for more subsidies.
(nor be available to regional planners) if withholding the data is necessary to protect the hospital’s interests.

_Hospital presidents rely on process data provided by internal information service._ [...] However, the reported activity data are submitted by a separated office of the hospital, which does not care about the quality of submitted data [...] On the one hand, government does not require quality control; on the other hand, it suits the hospitals to keep truth in their hands (HIS manager, prefecture of Guangdong)

_See, most hospitals have installed their computer systems and now submit their data electronically. This is very convenient. However, I have not seen any improvement. We have a convenient networked system, but not better information._ (HIS manager, prefecture of Guangdong)

_Tertiary hospitals maintain accurate and reliable activity data in their internal information system. However, the hospitals have ‘information bulwarks’. Hospital presidents know more than officials in the health bureau do._ (Hospital manager, prefecture of Shanxi)

HIS managers in the developing areas, however, argued that the intrinsic quality of activity data is affected by incompetent data collectors – in particular the doctors and nurses. The wide disjunction between data collection and utilisation may contribute to their less than conscientious attitudes regarding data quality. ‘Bottlenecks of quality assurance in hospital are inappropriate data management and lack of data collection awareness’, mentioned by HIS managers.

_Data collectors in hospitals are nurses. Nurses prefers to work in the information office, because the workload is light and conditions comfortable._ (HIS manager, central)

_Most clinicians do not believe that data collection is their responsibility; rather it is an extra burden. ‘We work on patient services, not on data processing’, they argue._ (HIS manager, city of Shanxi)

_We send data to health department and nobody checks data quality. Therefore, I have taken my lead from them and have provided data to them, but as far as the quality of data is concerned, […] ha-ha […] data quality is not my business._ (Hospital manager, prefecture of Jiangsu)

As in many countries (Eagar et al., 2001, p.126), quality of primary health care, rural and urban community services data needs to be improved. A township health manager
believed there is a lack of capacity for collecting village healthcare data: ‘village doctors have no time, no ability and no interest in counting how many patients they see each month and what kinds of patients’.

Meanwhile methodologies for collecting primary care activity data are underdeveloped. The methods of data collection clearly affect the quality of data about primary health care. It is dangerous when the information collection relies completely on the reporting of administrative data, especially for rural health data collection. Additional capacity building should be undertaken before relying on these data. An alternative to relying on these routine reporting systems would be to undertake sampling surveys.

Activity data regarding preventive services face problems similar to those of curative services. Although most PHIC officials expressed satisfaction with public health activity data, the quality of data about population-based public health services faces challenges. As mentioned by an MCH information manager, ‘public health services are not ‘institution-based’ and extend to communities and families, while traditional data reflected ‘episodes’ of institutional care. MCH service activity data are even more difficult to maintain with respect to quality than curative activity data’.

PHIC officials expressed concern about the quality of activity data provided by outsiders (e.g. industrial and military hospitals). Based on the questionnaire survey, only 38% of provincial informants believed that the accuracy of outside health activity data is ‘good’ or ‘extremely good’, while only half of provincial informants believed that the data are objective. (See also Table 6-3).

In summary, although some officials believed that activity data are likely to be politically insensitive, the quality is affected by the disjunction between collection and utilisation, the lack of information infrastructure, ignoring data quality by data collectors, and the lack of monitoring of raw data for quality. Poor communication between health bureaux and other departments may contribute to the poor quality of ‘external’ data. Primary care and public health services also face challenges in gathering activity information. Health activities in community venues and in the countryside are beyond the antennae of
QUALITY OF DATA FOR HEALTH PLANNING

traditional reporting systems. The dominance of an ‘input-focused’ planning model also contributes to lower quality health activity data; process and outcome information are ignored where planners are pre-occupied with capital resource allocation. Fortunately, some hospital CEOs in developed areas are paying increased attention to health activity data. However, regional planners also need to recognise the usefulness of activity data. Ad hoc surveys are significant alternatives to relying on routine administrative sources of data, but the quality of data from such surveys depend upon technical supports and financial investments.

QUALITY OF HEALTHCARE FINANCING AND COST DATA

Many countries use THE (total health expenditure) as an important indicator in national and regional health planning (AIHW, 2001a; National Statistics, 2003b; CIHI, 2004b). The THE was first introduced into China in 1981, under the technical guidance of the World Bank (Du and Zhao, 1999; Du, 2000). THE estimates are now available for the country as a whole (MOH, 2002g) and for fourteen provinces ((Du and Zhao, 2004)) (Map 6-1, Figure 6-2).


Figure 6-2 Total health expenditure and percentage in GDP in fourteen Chinese provinces, 1998

61 China Health Accounts Taskforce was established under support of the Economic Development Institute of the World Bank. In 1995, OECD’s framework of Health Accounts was introduced into China.
Map 6-1 Provinces of China where total health expenditure data available (shaded)

The OECD Health Accounts Framework provides for health expenditure to be analysed in relation to the functions of health care, sources of health care financing and expenditure on providers of health care (National Statistics, 2003a). Chinese THE estimates focused on health financing sources initially but progress is being made in producing analyses based on functions and providers (Du and Zhao, 2004).

In China, financial statements (final accounts) of governments and institutions are inaccessible for public. Data for THE estimations are indirectly gathered from yearbooks (including yearbooks of labour statistics, socio-economic statistics and health statistics) and departmental dossiers (including from finance, health, family planning, agricultural, education and labour insurance). Some other key data are taken from unpublished sources, such as health finance final accounts (Wei and Du, 1998, pp.413-31). Insurance companies provide limited data on medical insurance. For estimating values where data are not available, the THE taskforce conducts small-scale sample surveys and/or relies on guesstimates.

Medical insurance data are collected and provided by labour and social security departments. Only 60% and 53% of PHIC officials believed that medical insurance data are objective and accurate. (See Table 6-4).

62 Health finance final accounts are annual reports submitted by government institutions (including public hospitals). All reports are maintained in secret archives, as required by the MOF related regulations.
Table 6-4 Evaluation on quality of health insurance data, (percentage of ‘good’ and ‘extremely good’ in response to Q4.3, see Appendix 1)

<table>
<thead>
<tr>
<th>Quality dimensions</th>
<th>% of good and extremely good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectivity/validity</td>
<td>60</td>
</tr>
<tr>
<td>Accuracy</td>
<td>53</td>
</tr>
<tr>
<td>Relevancy</td>
<td>46</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>54</td>
</tr>
<tr>
<td>Comprehensiveness</td>
<td>38</td>
</tr>
<tr>
<td>Development</td>
<td>46</td>
</tr>
<tr>
<td>Timeliness</td>
<td>46</td>
</tr>
<tr>
<td>Economic Viability</td>
<td>46</td>
</tr>
<tr>
<td>Simplified</td>
<td>62</td>
</tr>
<tr>
<td>Appropriate volume</td>
<td>54</td>
</tr>
<tr>
<td>Comparability</td>
<td>46</td>
</tr>
<tr>
<td>Projectability</td>
<td>42</td>
</tr>
<tr>
<td>Average</td>
<td>59</td>
</tr>
</tbody>
</table>

Interviewees stated that the quality of financial data provided by hospitals (and other institutions) is also unsatisfactory. On the one hand, financial data which was submitted by health institutions are in highly aggregated level (see Appendix 9), therefore validity is unknown because raw financial data are unavailable. On the other hand, the quality of financial data is attributed to the ‘intervention of leaders’.

 [...] Hospitals are apprehensive about submitting health economic data, because it may affect their interests. Leaders control the reporting of these data. If the data might jeopardise the interests of the institution or the leaders, the data might be blocked or modified. [...] The ‘data quality assurance’ is away from its original meaning to ‘hospital benefit assurance’: data are used for benefit protection, but not for management and planning. (Statistics official, Guangdong)

It is very hard to verify hospital financial data. They might have one financial statement when bargaining with the finance department, and another one when they are dealing with a tax bureau audit. [...] The real financial report is kept in the pocket of the hospital president. This makes it difficult when you want to check up on the objectivity of hospital financial data. (Research institute director, central)

Health planners are working in the dark with respect to health costs. Careless planners will use reported data directly, while serious planners will request the HI unit to undertake an ad hoc survey. Financial data are meaningless, because nobody checks their quality. (HIS manager, city of Guangdong)

It is not fair to say that all health data are false. Only some health data do not reflect truth, especially that of cost and financing. Unfortunately, our leaders are keen to use these problematic data. (HIS Manager, prefecture of Guangdong)
Hospital information staff in developed areas claim that they are now collecting accurate and reliable financial data with the support of modern IT technology. However, they also agree that problems do occur when they are submitting financial data to the health bureau.

Should I tell the truth to the health department? I have real data in hand, but I am afraid to submit them. If the health bureau were aware of the real situation, government subsidies would be cut. [...] I also have some data reflecting upon quality of service, which however I keep to myself. If those data were passed on to the health department or released to the public, patients will get to know of my hospital’s drawbacks and this would affect the hospital’s reputation and business. Financial data are like puppets – executives and politicians manipulate their appearance. The puppet has different masks for different scenes. Of course, I have a plain puppet, which is played by God and me. (Hospital HI official, prefecture of Jiangsu)

The finance office and the statistics office (of the hospital) provide different values for the same economic indicator. [...] The two offices provide different data to be used internally or as submitted official data. [...] Different version of data served different purpose of use. (Hospital manager, prefecture of Jilin)

I really pay attention to the hospital’s finance status and cost analyses, because I am CEO of the hospital and this is my business. [...] But government planning is not really concerned with efficiency issues. ‘You don’t care, I don’t care, and nobody cares’. (Hospital manager, city of Shanxi)

Health data are inaccurate. Consequently, all health plans look perfect, and none of them is implemented. (Health official, city of Shanxi)

Financial data regarding community health care, rural health care and private practice are worse than hospital data. As for the activity data, community health practitioners do not have the capacity or incentive to provide high quality financial data. The situation is complicated in poorer rural areas where 70-80% of farmers pay their doctor on credit because they do not have enough cash to pay the doctor’s bill (Wang and Zhu, 2004).

How you can use financial data from village doctors? [...] They might give you an estimate or impression of the service and financial situation. They are not able to provide high quality data (Hospital manager, prefecture of Jilin).

In summary, China has groped towards improved THE estimates over the last two decades and the national THE estimate is now released annually. Estimates of provincial THE for 14 provinces are also reported by the CHEI. However THE is unavailable in the
less developed areas and in prefectural level. One of important reasons is that reliability and accuracy of financial data in developing area is worse than other areas.

With the devolution of authority to hospital managers and the strengthening of their financial responsibility, hospital managers have to obtain quality financial data for their internal administration. However, because of lack of monitoring of data quality and the distortions associated with institutional interests, reported financial data do not reflect real financial status. The quality of financial data for primary care is even worse.

QUALITY OF DEMAND SIDE DATA

It is widely believed in China that household interview surveys provide more reliable and more extensive data about utilisation patterns than patient data reported by hospitals (MOH, 1999, pp.7-94). National health information officials believe that NHSS provides quality data on perceived needs, utilisation and attitudes to health services although they acknowledge that there is scope for further improvement:

NHSS is our great contribution for informed health planning. If you ask me how can do it better, I think there are some technical issues to attend to, such as unclear definitions of questions or sampling framework. (HI official, central)

However, as shown in Table 6-5, almost 30% of provincial HI respondents questioned the validity of household interview surveys, while nearly 40% of them believed the household data are less than accurate.

<table>
<thead>
<tr>
<th>Quality dimensions</th>
<th>% of good and extremely good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectivity/validity</td>
<td>71</td>
</tr>
<tr>
<td>Accuracy</td>
<td>62</td>
</tr>
<tr>
<td>Relevancy</td>
<td>60</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>60</td>
</tr>
<tr>
<td>Comprehensiveness</td>
<td>60</td>
</tr>
<tr>
<td>Development</td>
<td>58</td>
</tr>
<tr>
<td>Timeliness</td>
<td>65</td>
</tr>
<tr>
<td>Economic Viability</td>
<td>62</td>
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<tr>
<td>Simplified</td>
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<tr>
<td>Appropriate volume</td>
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</tr>
<tr>
<td>Comparability</td>
<td>80</td>
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<tr>
<td>Projectability</td>
<td>60</td>
</tr>
<tr>
<td>Average</td>
<td>62</td>
</tr>
</tbody>
</table>

Table 6-5 Evaluation of quality of household interview data, (percent of ‘good’ and ‘extremely good’ in response of Q4.2, see Appendix 1)
Opinions of PHICs on data quality of household interview survey are affected by way of need definition for health planning.

*Morbidity data collected through the NHSS reflect a non-professional perspective. People’s feeling (about their disease or condition) is not necessarily consistent with a doctor’s diagnosis, indeed people may not be aware of certain diseases diagnosed by the doctor.* (Health official, Guangdong)

*I would rather listen to the professional’s advice. [...] They (ordinary people) know what? [...] For health planning, the doctor is the authority.* (Health official, Jilin)

*Doctors are trained through a formal education program; therefore, their diagnosis is standard. People’s feelings are all kinds of strange things. Can you make a plan relying solely on layperson’s feeling?* (HIS manager, prefecture of Guangdong)

Demand side data can be gained from the medical record report (HS-5) but prefectural HI officials also believe that the hospital separation data are of poor quality.

*Doctors may falsely fill in diagnostic data. In some circumstances, doctors might hide something and not tell the truth, such as malpractices, unlawful oversupplies, ‘under-the-table’ transactions, etc.* (HIS manager, prefecture of Jiangsu)

*Outcome data regarding inpatient services are highly subjective. Doctors can report that all of their patients ‘improved’.* (Hospital HIS manager, Shanxi)

*We have found that hospitals conduct patient satisfaction surveys, as required by the MOH for hospital accreditation. All the rates are over 95%. In household interviews or media reports however, the results are always negative. Who is lying? Which is the right way of finding truth?* (HI official, prefecture of Jilin)

*Not all hospitals have standardised medical records management. How can we ensure that aggregate patient data are of high quality in a region?* (HIS official, prefecture of Guangdong)

Community appraisals are another approach to community needs assessment that emphasises the involvement of local people (Wright and Walley, 1998). However, it appears that this approach has not been used for health planning in China. The CHSI started to collect community data as part of the NHSS in 2003 (MOH, 2003d), but no reports could be found.

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As discussed in Chapter Five, physicians mark ‘cured’, ‘improved’ or ‘unchanged’ in the front-page based on their personal judgement.
In circumstances of demand-side data shortage, population-based interview surveys are recognised as providing useful evidence for regional health planning. However, the interview data are discounted as ‘non-professional’ data by some provincial HI officials. Perceived needs are not recognised as authoritative and objective benchmarks for resource allocation. On the other side, hospital separation data are also viewed as problematic, especially those regarding outcomes and satisfaction.

**SUMMARY**

Regional health planners can access data from a widening range of different channels and in different formats. However, there is significant room for improving the intrinsic quality of the data.

Health planning reform raises new demands with respect to the availability and quality of data. Regional datasets should be collected to support health planning, and departmental and hierarchical obstacles should be removed. Traditional ‘resource statistics’ data should be migrated from fragmented databases to integrated data warehousing. Traditional paper reporting forms should be changed to electronic forms.

The intrinsic quality of data is affected by technical, economic and political factors. Clarity regarding the major driving forces is necessary when developing strategies for improving the quality of health data.