

## CHAPTER SEVEN

# QUALITY OF HEALTH INFORMATION

### INTRODUCTION

The quality of health information is the focus of this chapter, building on the discussion in the previous chapter of the ‘quality of data’ for health planning.

‘Data’ and ‘information’ are often used interchangeably in public, media and academic articles<sup>64</sup>; while others argue that, the distinction between data and information is context dependent (Avison and Fitzgerald, 1988). In this study, the researcher highlights the distinction between the two terms in order to clarify the logic of the evaluation. *Data* is used to refer to information at an early stage of processing (collection, aggregation, storage), and evaluation on data quality focuses on its intrinsic natures (discussed in Chapter Six). *Information* refers to products at a later stage of processing (Strong et al., 1997a), while evaluation of information quality is undertaken from a utilisation perspective, examining how meaningful information can be effectively and efficiently retrieved, delivered, presented and used for decision-making.

A wide range of possible dimensions has been suggested for evaluating the quality of information (Strong et al., 1997b, p.107; Cao and Wu, 2002), ranging from technical to political aspects (Donato and Walker, 2003). In the study, the researcher uses the following nine dimensions: relevance, comprehensiveness (completeness), sensitivity, development, timeliness, economic viability, simplicity (understandable), standardised

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<sup>64</sup> This terminological confusion is also found in Chinese language. Data could be directly translated as ‘*Shu Ju*’, which is understood as raw quantitative data. ‘*Su Cai*’ in Chinese is more closely matching the data term – raw data, both qualitative and quantitative. ‘*Qing Bao*’ or ‘*Xin Xi*’ are perfectly matching on information.

(consistent, comparable), projectability (future trends) (for detailed explanation, see Chapter Three).

*Useful data is information, while useless data is rubbish. The success of a HIS depends on whether the system provides useful information (not only data and not rubbish) to planners. We have to spend time to create a well-structured decision support system, which provides real and useful information. (Hospital IS manager, prefecture of Jiangsu)*

## QUALITY OF DEMOGRAPHIC INFORMATION

In the questionnaire survey, 75% of provincial respondents agreed that demographic information can be obtained in good time and is sensitive enough for health planning. Almost 70% of them agreed the information available is relevant and affordable. However, 37% of provincial respondents suggested that demographic information is not comprehensive, too complicated and overloaded; 44% of them suggested the information is not comparable, while the same percentage of PHICs believed information on population projection is unavailable. In addition, 50% of them suggested demographic data should be further analysed before being made available (Table 6-1).

Extensive demographic information is available in most areas including information that may be necessary for evaluating the equity and allocative efficiency of health resource allocation, such as age and gender composition, education, employment and income. However, most RHP documents have used only a limited range of demographic information, including typically total population size, urban and rural population, and permanent and temporary registered population sizes.

There are significant differences in the population information required by different planners. For instance, Shenzhen's regional health planners faced significant issues associated with immigrant populations associated with its rapid economic development, and so the health planners requested further information including current and future estimates of migration rates and immigrant levels.

Another issue in relation to population information is comparability among different sources. For instance, the 'temporary' residence is defined differently in the registration system and the population census (Shenzhen Social Science Association, 2004).

## QUALITY OF SOCIO-ECONOMIC INFORMATION

As regional health planning becomes more integrated in planning for social and economic development, health planners will need to draw upon more macro socio-economic information than has been the case hitherto. Health planners will need knowledge of the social sciences and be able to analyse and use socio-economic information. Researchers in the field of regional health planning have pointed out the need for the production of appropriate information regarding the socio-economic situation.

*It cannot be imagined that a RHP will consider the impact of all potential changes in population and socio-economic factors on demand, propensity to use services, mortality and morbidity patterns. However, if a RHP is concerned only with the population/bed ratio, it will not be a good plan. (Health project manager, central)*

Unfortunately, current provincial information systems are not able to meet this requirement. While information systems are starting to address the new information demands, relevant 'social' information has not been provided as needed. In the questionnaire survey, 26% of PHICs suggested that socio-economic information is too complicated to be understood; 32% of them recognised that available information cannot be used for comparative purposes, cannot provide a picture of future socio-economic development, and are not provided in a timely manner; 37% of them recognised that available information is lacking in relevance and sensitivity in relation to health planning, is not comprehensive, is expensive to gain; is insufficient in terms of volume; only 53% of them agreed the information is well-analysed (Table 6-1).

One of the problems is associated with information system design: socio-economic information is not generally delivered to users. Information reports of different range and quality are generated for different users.

*We only provide information to State Council, provincial party committee and mayor's office. Other government departments and institutions cannot obtain our reports. However, we publish positive information through the common media and on the Internet. Government departments, institutions and the common people cannot obtain the negative results (Statistics official, city of Shanxi).*

*We usually prepare two editions of our reports, one for the public and another for the Party and government. Our leader (of statistics bureau) understands the mystic black, 'shut the door and tell the truth'. (Statistics official, city of Shanxi)*

*Information provided to the public and mass media is rough and focuses on positive information. Concerning data reflecting problems, especially some sharp social problems, we prefer to keep quiet. (Statistics official, Guangdong)*

A second reason for low level of provision of socio-economic information is that the current information system does not have the required capacity to provide it; in particular, many statistics offices are weak with respect to qualitative data collection and analysis. Statistics officials are aware of the weakness and describe statistics bureaux as machines for producing quantitative information.

*Most statistics staff are 'X-ray cameras' other than 'radiologists'. They can take a picture and tell you what is on it, but they cannot explain why and how it is (Statistics official, city of Shanxi)*

With increased demands for socio-economic information, many HI offices have tried to analyse and present useful socio-economic information but their limitations in 'social statistics' and sociology have constrained any improvements in information quality. Most HI staff are only familiar with quantitative health data. It is difficult for the HIS to provide comprehensive analysis of socio-economic impacts on healthcare.

*Data provided to planners are quantitative, with very little qualitative information. It is hard therefore for health planners to get a feel for the social picture and the real needs and demands of the population. [...] We do not have practical methodologies for measuring and assessing trends in social demands. Understandably, therefore, service design and resource allocation have had to follow the perspectives of the planners, and is lacking firm data regarding market circumstances. Some local health planners have to 'copy' the strategies and assumptions of their neighbours, regardless of socio-economic differences. (Health project manager, central)*

*It is difficult to involve social science experts as my planning advisors. Most health officials and health information staff graduated from medical universities, majoring*

*in medical science or public health. It is not easy to jump the wall of the medical professional. (CDC director, city of Guangdong)*

The third reason for unsatisfactory socio-economic information can be traced to the user's side: the regional health planners are not really looking for such information. Health planners are familiar with numeric indicators and believe that more 'numbers' made their plans looks more 'scientific'. On the other hand, they set up unreachable objectives and unmeasurable targets for making up their 'beautiful' plans.

*In a specific community, how many people move in and move out? What is the population structure and disease composition? What are major factors affecting community development? [...] The health planner has to understand, because these factors affected health demands and therefore resources allocation. However, our health planners do not have awareness of market and macro-environment information. For drafting a RHP document, little knowledge is need. (Health project manager, central)*

*It is not very easy when I use government information. Firstly, the real meaning of the indicators is unclear. The process of data collection and analysis is unknown. Secondly, it is hard to access these resources. Thirdly, we have no guidance about how to link health planning to these indicators. (Research institute official, central)*

Therefore, for both producer and user related reasons, there is an underproduction and underutilisation of socio-economic information. Most interviewees would have agreed with the prefectural health official who said that most health plans could not be implemented successfully because 'we have not factored in the social, economic and political contexts'.

However, there are positive moves in Guangdong province. An experienced interviewee tells a story about how economic policies significantly affected health plans. It reflects the fact that health planners in developed areas have a stronger awareness of the importance of economic policy and have sought relevant information.

*In the initial stage of the Shenzhen SEZ (1980s), economic policy was to encourage 'labour intensive industry'<sup>65</sup>. Migrant workers flowed into cities and were jammed in*

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<sup>65</sup> Industry in Shenzhen, featured as 'San Lai Yi Bu' policy, which develop enterprises categorised as processing with supplied materials, drawing and samples, assembling with supplied parts, and compensation trade.

*production lines. Those low-educated workers had lower demands on healthcare, but the production lines brought terrible occupational hazards to new comers. After the 1990s, this policy was replaced by 'knowledge intensive industry'. Occupational health issues then changed to mental health problems. The health demands also changed along with the increasing number of high-tech and educated workers. Therefore, health planning has had to follow those changes. Consequently, health plans are based on social, political and economic aspects, on not only medical knowledge or the management experiences of hospital presidents. (CDC director, city of Guangdong)*

This interviewee had another story, which illustrates how social factors affect health status and health service. He believed that understanding these social contexts is a key to success in public health planning.

*Sexually Transmitted Diseases (STDs) are one of the public health priorities in Shenzhen. At the frontline of the opening-up policy, Shenzhen has informally acquiesced in the existence of sexual services. Interestingly, we have observed transitions in both the prostitutes and their clients. In the 1980s, most clients were factory bosses, managers and government officials. Now the majority are less educated grassroots workers. The prostitutes have also changed. In the beginning, most of them were naive girls from the countryside. They found their first job here on the production lines. Because of the low salary, hard work and execrable conditions, they changed their job from factory to restaurant and some to them provided 'accompanying services'<sup>66</sup>. Later on, they discovered that these services were also lower paid than sex services. This kind of woman however is hard to find now. Most prostitutes now are more sophisticated, because the rampant sex services are now common in the inland. The prostitutes also migrate from one place to another in order to dodge the 'periodic attack'<sup>67</sup>. The prevention and control of STDs should be based on an understanding of the contexts. (CDC director, city of Guangdong)*

Management, political, economic and sociological sciences have been introduced into the public health field in recent decades. Health information workers need a clear understanding of this academic and practical transition. If not, the production of health information will lag far behind the demands of modern health planning and management. 'It is easy to say but hard to do. We feel that it is important, but it might not be so in other cities', said a CDC director.

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<sup>66</sup> *San Pei*, refers to serve guests for drinking, eating and playing.

<sup>67</sup> *Yan Da*, refers to public security actions for clamping down sex services.

In summary, statistics-based information systems deal primarily with quantitative socio-economic information. Quantitative information however is vulnerable when tracking political, socioeconomic and cultural contexts in health planning. The limited use of socio-economic information in health planning can be attributed to the lack of confidence of the users in utilising qualitative socio-economic sociological studies for health planning, and the relatively weak capacity of the health information systems in analysing and presenting that sort of information. Health planners in developed areas (Shenzhen) are more aware of the relationship between socio-economic development and health planning. They are incorporating socio-economic information into their health planning.

Socio-economic information needs to be shared among all potential users. One possibility is the network partnership for regional socio-economic information such as the ‘information exchange partnership’ in Zhujiang Delta (Guangzhou Statistics Bureau, 2002). The partnership (involving 12 prefectures) publishes an annual report that includes key socio-economic and social information (including health information). The publications provide some scope for benchmarking when formulating regional plans.

### QUALITY OF EPIDEMIOLOGICAL INFORMATION

The CDC notifiable infectious disease report system and the NDSP have been greatly improved in recent years (Lee, 2004) partly due to the ‘prevention first’ health policy, and partly because of the national health information development strategy of ‘implement health informationalisation first for infectious disease reporting’. The CDC bases its annual reports and extensive technical reports on infectious and non-communicable diseases on the NDSP findings.

*Our (prefectural) information centre connects directly with the National CDC infectious disease reporting system. [...] This is a real-time system. We can submit infectious disease data though the network, and download reports at different administrative levels according to access authority. We have also conducted infectious disease surveillance, including TB, STD and AIDS. We also plan to establish NCD (such as hypertension, stroke, diabetes and cancer) surveillance system. [...] This is our significant achievement. We are proud of it! (CDC director, city of Guangdong)*

Williams and Wright, (1998) and Wright and Walley (1998) have argued that while routine sources of health information can suffer from inaccuracy and inappropriateness, they still describe health in a defined population. Although mortality data collection can be questioned regarding its reliability and accuracy (see Chapter Five and Six), useful information reports can still be derived from these raw data. Two strategies, which are used to allow for the weaknesses of these data, are to conduct follow-up and/or sampling surveys for adjustment purpose, and to present trend information instead of exact figures.

*Although data are not satisfactory with respect to accuracy and objectivity, we still can dig up some useful messages. For instance, I traced trends of IMR, MMR and CMRU5 from 1992 to 1996, and found a relationship between increase of healthcare coverage and decrease in mortality. (HIS manager, Guangdong)*

However, not all PHICs are satisfied with these traditional sources of health information. In responding to the questionnaire survey 71% of PHICs recognised that the mortality and morbidity information is relevant to health planning and suitable for comparative studies, 67% of them agreed that the information is easy to be understood. However, 38% of them suggested that the information does not provide sensitive meaning on health planning (i.e. RHP cannot bring significant changes in mortality and morbidity). The same amount of PHICs believed that epidemiological information report is less than comprehensive (such as lack of information on NCD and new infectious diseases)<sup>68</sup>. Forty three percent of them complained the information could not be provided in a timely manner; 48% of them stated that the information had not been sufficiently analysed; and 50% of them complained about its cost. (Table 6-1)

During the interviews, it emerged that epidemiological information becomes a focus of argument with respect to planning when arbitrary mortality improvements are adopted as targets for national and regional health planning.

*On average, the MMR in MCH project counties (using official sources) is nine per ten thousand. Actually, in Guangdong this indicator is higher than the average (at 20*

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<sup>68</sup> The term of Epidemiology in Chinese (*liu xing bing xue*) is easily misunderstood as epidemic (*liu xing bing*). Therefore, epidemiological information may be regarded as an infectious disease report.

to 30 per ten thousand)[...] The national health plan aims for a 50% decrease by the year 2000 and further 25% decrease by the year 2010. This was an unrealistic daydream! [...] Another example is the IMR. Official data suggests IMR is 15 per thousand, while in Guangdong the real level is around 30 per thousand (with around 50% underreporting). The National health plan expects a decrease of such and such percent. Unfortunately, we found those indicators are fluctuating somewhat as we get better data but not constantly going down. Government leaders are angry about my information report: 'I cannot use your information! How can I explain it to my citizens and my superior?' I suggested them telling the truth. However, they finally gave up on my report, and made up a 'beautiful' achievement. (HIS manager, Guangdong)

You can find that most counties of China satisfied the requirement to reduce IMR by 25% by year 2000 (from a 1990 base) through their PHC programs. However, based on my observation, this is not true. Firstly, IMR cannot change in that degree across such a short period of time; secondly, the PHC programs do not contain enough force to make this change; and thirdly, we have improved our information systems since the 1990s, and have found even more infant deaths. However, government officials laughed at me: 'PHC is a political target, not an academic project. Do not be so naive'. (HIS manager, Guangdong)

Epidemiological information about infectious disease is good with respect to data reporting but not so good in terms of monitoring and setting off alarms at an early stage of an outbreak. The database design is also inadequate for providing sufficient information for epidemiological and clinical studies (Li, 2003a). The SARS crisis of 2003 revealed some of the drawbacks of the CDC information system. Following SARS, health officials and health information managers have understood that the quality of information does not rely solely on health informatics (Lee, 2004). Many factors, such as legislation and regulation, political and economic influences, and organisational arrangements contribute to the quality of epidemiological information. For instance, the underreporting of SARS in a military hospital was because the military doctors were 'barred from talking about what they've seen in detail without the permission of the Defense Ministry' (Taylor, 2003). The adequacy of epidemiological information is affected by vertical fragmentation of the hospital system and by the separation between the curative and preventive systems.

In comparison with other sets of information for health planning, the epidemiological information system has made good progress. However, epidemiological studies have

been neglected by some health planners. The separation of the curative from the preventive system in China is part of the reason that epidemiological information infrastructure has been ignored in curative resource allocation in regional health plans. While the government has emphasised the need to improve information systems to support public health emergency responses, the value of epidemiological information for regional health planning should also be recognised.

## QUALITY OF SUPPLY SIDE INFORMATION

Health planners frequently use supply side information to examine how effectively, efficiently and fairly resources are being allocated and utilised. Although supply side information has improved significantly in recent years, there is a need for closer study of information quality and quality improvement practices with respect to these datasets.

The quality of supply side information has received some attention in the last decade (Wang et al., 1995). Most supply side information is generated from institutional datasets. The information is informally published in the Health Statistical Digest and Health Statistical Collection<sup>69</sup> and formally published in Health Statistical Yearbook. The NBS also publishes (formally) key health inventory indicators, nine months after the reference period (GDDS, 2004). The CHSI and PHIC units release an annual Official Health Communiqué, which is recognised by a provincial health official (in this interview study) as being ‘too general to use for local health planning’. Most information products are available in Chinese only. The information publications serve several different users:

*Health officials prefer the small book (Digest) because it is a useful pocket reference book to help remember some important figures; health information staff use the big white book (Collection) when drafting plans or speech notes for senior officials; many researchers feel that the Collection is very useful for digging out specific figures. The yearbook, I think, is good for lodging in the library. We are hoping to*

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<sup>69</sup> The Health Statistical Digest and Health Statistical Collection were recognised as officially secret material before the 1980s, and now are ‘internal publications’ (unavailable from public bookstore). The Collection contains detailed cross-tables of health data and the Digest is a simplified data presentation which summarises major commonly used health indicators.

*produce a Health Information Brochure, which may be useful for planners when they face new problems or are drafting new plans. However, the Brochure has not yet been realised. (HIS director, central)*

*I prefer the small book. [...] Too many data make me dizzy. (Health official, prefecture of Jilin)*

*Before a speech, I may skim over the small book [...] To add some statistical data in my speech. [...] I will look more adept. (Planning official, Guangdong)*

However, current health information works are not the complete picture of information production<sup>70</sup>. Although masses of resource data are collected, most of them have not been converted to useful information. Provincial responses to the questionnaire survey suggest that there are only 46%, 42% and 36% of provincial health information managers who believe that institute, workforce and equipment data respectively have been sufficiently analysed. Only 50% and 60% of them agreed that capital and recurrent information has been appropriately analysed. (Table 6-2)

*It felt it was a pity when I saw so much data asleep in the dossier. You know, both health planners and health information officials are fire brigades. We have not enough time and workforce to conduct data analysis. We are always busy on quickly collecting, briefly analysing and then turning to next quick collection and brief analysis [...] we have spent huge money to conduct many surveys with huge sample sizes. Surely, comparing cost with outcome, we have not gained much useful stuff. (HIS official, central)*

*The Collection and the Digest are data reports only; they are not real meaningful information. Many people ask us to go forward: not only to report data, but also analyse data. However, based on our current capacity, we cannot handle that mission. [...] We do not have enough financial resources or workforce. If health planners request us to provide a detailed information report, it will consume a long period in preparation, and the information will be out-of-date when they get it. (HIS director, central)*

*It would be not difficult if you intend to do so. [...] Of course, government should provide financial support on that. However, in our country, it is not a simple issue. The cost of new information may be higher than statistics table presentation. The workload may be heavier than 'resource statistics'. Many people do not agree that government should spend money on those information productions. They are keen to spend such money on for-profit industry or hospitals. (HIS director, central)*

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<sup>70</sup> See also industrial dynamics model of information production in Chapter Three.

Along with the economic transition and deepening health reform, health planners have asked HIS to provide new evidence to support their ad hoc decision-making. Decision-makers want to know what is happening, how it happened, and why and what alternatives are available to solve the problems and what is the best choice. However, with a traditional pattern focused around ‘resource statistics’, provincial HIS cannot meet the new needs. As one senior official stated, ‘Data collection is important but not enough. The next critical issue is how to aggregate or analyse data so it provides useful information for health planning’.

*Health ministers have mentioned this issue several times: ‘Health information experts should discuss how to analyse those masses of stored data and materials, in order to provide useful information for decision-making. If you just store those data in the health information unit office, you will waste time and money.’ (HIS director, central)*

*‘Cashbox keeper’ is an inappropriate role for health information officials in this age of reform. We must introduce new functions, such as costing, equity study, performance evaluation, etc. This is our on-going improvement. [...] We have to keep learning and exploring. (HIS manager, city of Guangdong)*

However, developing new information products requires new resources. Lack of relevant information reflected weakness with respect to information processing capacity. The key to the successful information production would be the availability of a person who knows what are issues, what are the immediate information needs, and what are the best sources of information to meet those demands. ‘It is not easy in this job’ mentioned a senior health information official. However, Shanghai HIS has successfully produced health information updates, because it ‘has staff who have competency for the job’ (mentioned by a Shanghai HIS official).

Another aspect of information quality is simplification or understandability. Based on questionnaire survey, only 53% of PHICs agreed financial report is easily understood (Table 6-2). Many planners and managers find it difficult to draw the full meaning from a series of rows and columns in a financial report. They need well-presented, simplified and understandable information, e.g., graphs and maps. Of course, they also need training on resource management theories and practices.

*The economist's report is too obscure to understand. I need a storyteller who is able to translate jargon into an interesting tale. (Health official, prefecture of Jilin)*

Interviewees argued about the standardisation of information production. Standardised and comparable information is critical when regional planners aggregate information from multi channels, and share information with different stakeholders. The questionnaire survey showed, 69%, 73% and 65% of PHICs agreed that institutional, workforce and equipment information are comparable. 56% and 50% of them suggested capital and recurrent financial information are comparable (Table 6-2).

*I have consulted many international experts. Many of them told me that establishing standards in the early stage of information system development is a critical step. I believe their experiences are lessons of their previous failures. They advise me 'do not copy our mistake'. (Research institute official, central)*

*The major technical reason is lack of definitions and standards. I think this is a critical issue. Under these circumstances, it is hard to produce anything but non-comparable and fragmentary data. (HIS manager, city of Guangdong)*

Weakness on standardisation is partly due to the fragmented HIS development plan. For instance, all of the major hospital systems in Beijing, including Peking Union Hospital system, PKU system, Beijing Metropolitan system, military system, etc. (Computer World, 2003) developed computerised hospital information systems separately. 'All terms used for diagnosis, prescription and examination are different among systems, instead of the 'fever with unconfirmed reasons'<sup>71</sup>, said by a RHP researcher.

#### HEALTH RESOURCE INFORMATION – QUALITY OF INVENTORY

All regional health plans surveyed have used inventory information for describing the distribution of regional health resources, including institutions, hospital beds, high-tech equipment and workforce. Most (88%) of provincial respondents, in the questionnaire study, agreed that institution and workforce information is relevant to health planning (Table 6-2). THE (per capita and as a percentage of GDP), health budget as percentage of

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<sup>71</sup> A term of symptom diagnosis (*fa shao dai cha*) commonly used when a patient has fever with unknown reason.

government finance, government funds as percentage of hospital revenue, etc. are used as health financing resources description. When local information (such as THE at provincial or prefectural levels) is lacking, national information is used as a reference. However, RHP researchers still challenge information issues. They suggest that inventory information should provide a more integrated and more functional picture of health service resources.

*The number of hospital beds does not identify the quality of service. The solo number is not the whole story. [...] The meaning of 'hospital bed' is different when comparing current hospital resources with statistics from previous reports. It also represents a different quality of service between rural and urban, and between tertiary and community hospitals. (HIS official, central)*

*Previously, we used to set up 'number of doctors' as a standard for workforce allocation. However, the term of 'doctor' (yi sheng) was blurry and did not reflect the quality of health professional. Now, we use the term of 'physician' (yi shi) and 'assistant physician' (zhu li yi shi), both of which are clearly identified in the Physician Law. [...] Health planners and health information officials have to take care of those differences when they collect, aggregate, present and use the data. (RHP researcher, Beijing)*

A second problem with available inventory information is that it does not present an overall picture of a given region, mainly because of administrative fragmentation and the exclusion of health service resources that are owned by non-health sectors. Regional financial information is even worse. In the questionnaire survey, 50% of provincial respondents believed that 'outside information' is lacking in sensitivity, comprehensiveness, timeliness and simplification. Near 40% of them do not and cannot consider 'outside resource' when setting up RHP standards.

*I tried to collect information about military health resources. The chief refused, 'this is a military secret'. (HIS manager, city of Shanxi)*

*I can count money in my own pocket but cannot do that of others. (Hospital name) is the biggest hospital in this industrial city, and is administrated by the board of the corporation. It is beyond the scope of health statistics report. (Health official, city of Shanxi)*

A third problem with inventory information is the difference in information quality between urban and rural. Detailed urban resource information is available, while such

information as exists about rural resources is limited and poorly structured. It is a weak point in the reporting system.

### HEALTHCARE ACTIVITY AND PERFORMANCE

In a given region, information about health service activity levels and performance are dispersed across a number of separate systems. PHICs commonly find it very difficult to gain activity and performance information from centrally administrated, military and industrial health institutions or from private practices. Table 7-1 demonstrates the fragmented nature of this information ‘system’.

Categories of information	Administration of Health Institutions					
	Health*	Military**		Industrial**		Private****
Input (personal, financing & assets)	Yes	External**	Yes	Socialised***	Yes	No
		Internal	No	Industrial	No	
Process and monitoring	Partial	No		No		No
Output and outcome	Partial	No		No		No

\*: Formally administrated and financed by health bureau.

\*\* : Military hospital administrated and financed by military administration. External service is provided to general population, and internal service is provided to military camps.

\*\*\*: Socialised institutions refer to facilities that have been handed over from the enterprise to the health department, while industrial institutions are administrated and financed by industrial corporations.

\*\*\*\*: Private refers to privately owned enterprises including private practitioners and privately owned institutions.

**Table 7-1 Access by health bureaux to information in different silos**

#### *Information about service volumes*

The volume of services provided is commonly used in health planning as a measure of capacity for service provision. In Guangdong and Shandong, simple linear trend analysis is used to forecast service utilisation. Although it is criticised by some sophisticated scholars, local planners argue that it is a practical tool and suitable for the task.

However, health planners do recognise that volume information is insufficient for RHP formulation. They wish to have more activity information, such as process, effectiveness, efficiency, and quality of services. In the questionnaire only 44% of provincial respondents agreed that volume information is well presented and used (Table 6-3).

*We want to know not only how many patients were treated, but also how they were treated, and what were the benefits to their health. Existing health information systems cannot provide such information. Likewise, we want to know how health services are performed [...] (RHP researcher, Beijing)*

*Information products are not as useful as we had expected. Why do I say that? I have some information in my hand, but when I REALLY (emphasised tone) want to use them for decision-making, they are still insufficient. I pushed them (HIS) to conduct a new survey and further analysis. [...] Do not only compare the number of visits and admissions with other hospitals; do not only show how many we have done; it is meaningless. I need to know costs and the process of care; I need to know how quality of care improved; I need to know how the hospital contributes to community development and the people's health (Hospital manager, prefecture of Jiangsu)*

*I think that admission numbers and bed occupancy rates can be used in regional health planning but it is not always clear how to interpret them. The key indicator of RHP success should be effectiveness and efficiency. [...] We have concern about quality of care (Planning official, Guangdong)*

#### *Information about performance*

Health planners have begun to pay attention to both system and institutional performance since the WHO published its famous Health Report 2000 – Improving Performance. WHO's low ranking of China with respect to performance and financing equity (WHO, 2000) was a big shock to the nation. 'We lost face', said by a provincial health official, 'we do not want to lose face again'.

*The health department urgently organised workshops, calculated indicators based on 'reliable' data, and attempted to correct WHO's ranking [...] do not be so stupid! Re-calculation cannot obliterate the fact. If you have time, please find ways of performance and equity improvement. (Planning official, central)*

*We need performance analysis at both macro and micro levels. Such information should be very helpful for resource allocation. (Health project manager, central)*

Health planners have recognised the importance of performance and equity in health care as important determinants of population health outcome. The planners' concern has encouraged health information units to develop new information products.

Health planners are particularly looking for institutional performance information, rather than system performance. Institutions set up a 'performance bonus' (as percentage of

revenue) for encouraging staff to work harder. With the support of Shandong Medical University, the MOH has conducted a primary study on institutional performance. It is a good start for China to consider institution level performance in long-term planning. However, one of the conclusions of this study was that ‘it is premature to expect too much from performance management, because performance information is not available’ (Meng, Liu and Shi, 2000; Meng, Sun and Hearst, 2002).

*Financing information is funny information. You know, most patients pay out-of-pocket. Therefore, the more a hospital earned, the heavier the people’s burden, but quality of care may be unchanged or even worse. Therefore, hospital revenue information is irrelevant when it is presented as a measure of hospital performance. It presents a very inappropriate signal, especially when it used in relation to public hospitals. (Health official, prefecture of Guangdong)*

*‘To live or to die, this is a problem’. My priority is the survival of public hospitals in circumstances of increased competition and decreased government subsidies. If we have no money, there is no business for us. (Health official, city of Shanxi)*

*Public hospitals will no longer be sons of government. Nobody can save you, [...] but patients. Survival depends on overall performance improvement, including appropriate procedures, continuous learning, and people-centred ideology. (Health official, Guangdong)*

Based on balanced scorecard (BSC) theory (Kaplan and Norton, 1996, pp.47-6), HIS should provide valid, comprehensive and timely information on finance, customer, business process and learning and growth, especially information of quality of care, outcomes and access (Zelman et al., 2003). However, many health planners appear to have paid more attention to ‘increased hospital revenue’ as an indicator of performance and ignored quality of care and patient information. Fortunately, some coastal cities are leading the way with analyses of process and quality of care.

System performance has not been widely considered by provincial planners. In the questionnaire survey, 65% of provincial respondents agreed that performance information is relevant to health planning, and only 53% of them agreed that performance data were well developed (Table 6-3).

*I believe the measure of success is not only economic prosperity. We have to give the matter further thought. Health information should provide a right signal to planners. [...] A sustainable strategy is to encourage institutions and professionals to keep learning. (Health project manager, central)*

*[...] How do you feel when a hospital that is not satisfying its customers earns billion of yuan? (HIS manager, prefecture of Guangdong)*

### *Transparency of health information*

One aspect of information quality is transparency. Information can be very important in ensuring the accountability of government. Better information flow represents better planning and governing. Transparent information could be used as one of powerful tools of government (Islam, 2003). Information on how decisions are made, about the inputs and outcomes of such decisions are critical for monitoring purposes.

The adoption of Freedom of Information (FOI) legislation is quite recent in most countries. Forty-two countries (Australia in 1982) have adopted this law (Islam, 2003, page 16). The purpose of all such laws is to define a framework for information sharing.

For a long time, information publications in China are strictly controlled. The Keeping National Secrets Act 1988 regulated the principle of keeping national (government) secrets. Planning in China is a significantly non-transparent political process, especially in critical key stages where decisions are made ‘within a black box’ following latent rules.

Based on Wu Si (2001), formal rule and latent rule of government planning exist simultaneously. These two procedures need different sorts of information. Health information officials at the provincial have often found that the decision-makers have bypassed the information report and made a political decision. Health information staff know that those ‘bamboo telegraphs’ or ‘grapevine news’ might be the greatest determinants of health planning, however, they also believe ‘it is out of our range of responsibility’. As mentioned in previous chapters, health information staff are generally not familiar with politics and policy analysis. Therefore, they are not creating information products that are relevant to the more political and policy-oriented dimensions of the planning process.

*Health information systems have not made great improvement. Why? Planning in Shenzhen has relied on leaders' intuition. 'We need to build a shopping centre here, we need to built a hospital there, we need to construct a wider road [...].' This intuitive planning is free from information support, I think. We cannot encompass the political issues in our information reports. (HIS manager, city of Guangdong)*

In China, Freedom of information has been discussed in the late 1990s. The central government has tried to encourage media 'to open the Pandora's box' and release information transparently (CCTV, 1997; People's Daily, 1998). A FOI legislation study has been launched (Beijing Youth Daily, 2002) and a drafted FOI law was considered by the State Council in 2002. The proposed Chinese FOI regulation (to be adopted by the State Council) is described as a revolution in government activity, because the previous norm 'keep it secret as a principle' has to be replaced by 'keep it transparent as principle'.

However, the legislation agenda has been postponed, with strong resistance from within the government itself. 'Some government departments and officials regard public information as 'private property' and as the basis for their authority, and even some of them use it as rent for their benefit' (Beijing Youth Daily, 2002). Fortunately, local FOI has been implemented in the developed coastal cities of Guangzhou (University Newsletter of Zhongshan University, 2003) and Shanghai (Chen, 2004).

Health service activity information is currently the preserve of a small number of people who have access to such information. Most of the population, health institutions (especially those in the private sector) and even local health departments do not have access to such information.

*I hold authority of data collection and analysis. Therefore, I have a right to publish the data. This is my resource. Some subordinates sought detailed reports or databases. Sorry, they have to pay for that. (Statistics official, city of Shanxi)*

'Health information should not be kept secret; and everyone should have the right to obtain it', was mentioned by a health project official. However, more interviewees argued that the move to health information transparency is not fast enough:

*I think that information should be published completely and objectively. The published information should include information indicating positive and negative*

*results. You have the chance to solve the problem when you let everyone know WHAT IS the problem. Why were the issues exposed in The Focus Discussion<sup>72</sup> solved in such a short period? This is the power of transparent information. This is the age of information. All hospital secrets will be discovered, eventually. (HIS manager, city of Guangdong)*

*PHICs store much health data in their dossier, especially at the central level; while healthcare providers and common people cannot access that stuff for their decision-making. (Health project manager, central)*

### *Sharing performance information and standardisation*

Selected healthcare activity information is submitted upwards through the vertical line, from health providers to health bureaux. Hospital information systems do not link across, or among hospitals. Therefore, the information rarely flows horizontally among health providers. In developed areas, health bureaux provide some feedback information to tertiary hospitals. However, secondary and community hospitals cannot obtain regional information (about health service activities) through either vertical feedback or horizontal sharing.

*We can compare our current situation with our past; and we can compare our situation with requirement of MOH. However, we do not have horizontal data for inter-hospital comparing. The last comparison is the most important, in my opinion, especially in a market system. Although historical information could be found in my hospital, most hospitals in China, I believe, do not maintain relevant historical information. If we have no reference points for comparison, how can we make judgments? (Hospital manager, prefecture of Guangdong)*

An initial attempt is taking place in a coastal city. Within the newly established hospital group, performance analysis is conducted in a teaching hospital. Under the Group's agreement, all member hospitals submit activity data to the teaching hospital. The information unit at the teaching hospital delivered performance report to all member hospitals. 'I think this is a real group', commented the CEO of a teaching hospital in Shunde city of Guangdong province.

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<sup>72</sup> Focus Discussion, a famous TV program in China, which engaged on disclosing social problems.

One technical reason for the lack of information sharing is the lack of standardisation. Information standardisation is a prerequisite for information sharing and communication among hospitals and stakeholders. Standardisation of healthcare activity information has been improved in China in recent years. More international and national standards are being implemented in health information systems. The CHMI (as the director introduced in interview survey) has conducted studies on health information standardisation, for instance 219 groups of coding standards, from the simplest (gender) to the most complicated (disease classification and procedures).

However ‘action on standardisation is still lagging’, a RHP researcher commented. Without standardisation across these fragmented systems, information sharing becomes very problematic. A recent example is that of a SARS hospital in Xiaotangshan of Beijing. The professional staff (experienced doctors and nurses from tertiary and military hospitals nationwide) had to return to manual procedures when they found that the SARS hospital’s information system was incompatible and entirely different from their hospitals’ (Hu, 2003c; Li, 2003a; Xin, 2003).

*Some hospitals favour the ‘Military One’ hospital information system. However, the system is only suitable in the military system. There are serious problems when social hospitals (administrated by the health department) acquire and implement the system. It does not satisfy the requirements of the health department. (Hospital information department staff, prefecture of Jiangsu)*

*This is a national responsibility: to regulate a program and standards for HIS development, to poll all potential users regarding HIS design, implementation and evaluation, and to promote maximum information sharing and utilisation. (Hospital IS staff, prefecture of Jiangsu)*

*Information standardisation is not a one-off task. When we studied billing items in Beijing People’s Hospital<sup>73</sup>, we spent three months to identify more than 6000 items. When the study moved to Beijing Union Hospital<sup>74</sup>, more than 7000 billing items were found. The billing items were different among seasons, hospitals and regions. This huge and continuous task cannot gain immediate benefit. (Research institute official, central)*

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<sup>73</sup> The second teaching hospital of Peking University.

<sup>74</sup> The teaching hospital of Union Medical University.

*Information regarding community and rural health activity*

According to the questionnaire study, about one third of provincial respondents believe that community and rural health service information are not relevant to regional planning. The questionnaire survey showed that only 63% and 67% of respondents agreed that routine reports and special surveys regarding CHS are relevant to health planning, while the percentage for rural health survey report was 70% (Table 6-3).

Both health service providers and health departments can access limited information about urban community health care and rural health care activities. Community and rural health information systems are recognised as poorly developed and inadequately resourced (Table 6-3).

Hospital information systems are not linked with community services. Meanwhile, because of the deficiencies with respect to outpatient activity information in hospitals, hospital information is not available to help with community health services planning.

*Outpatient information should be the most important, because the outpatient department has close contacts with the communities. I think the morbidity information from the outpatient service is important. I need real-time information regarding outpatient services, especially prescription and billing information. Unfortunately, the outpatient information system is the weakest part of hospital information system. (Hospital manager, prefecture of Guangdong)*

Most provinces elect to establish a new information system for community and/or rural health services, because it is relative 'easy' to develop (Li, Chen, Chen et al., 2003; . However, because of insufficient coordination, lack of standardisation and poor interface design, the new systems built new fences that further isolated them from existing information systems.

HEALTH ECONOMIC INFORMATION

The role of health finance managers in China has experienced dramatic change over the last two decades, from simply maintaining accounts to undertaking complex health economic analyses. The establishment of the CHEI in 1991 was a milestone in the

development of health economics in China (Wei, Y. and Du, L.X., 1998, page 7). The CHEI and nine universities<sup>75</sup> have conducted a range of health economics studies in partnership with central and provincial HICs (Peng, Chen and He, 1999; Hu, Xu and Pan, 2001; Xu, Zhao and Yan, 2001; Yan, Pan and Xu, 2001; Zhang, Xu and Liu, 2001; Pan, Hu and Yu, 2002; Xiong, Guo and Yang, 2002; Chen, Yang and Shi, 2003). Increasingly, policy making and planning depends on health economic studies.

*In relation to farmers' medical insurance, we informed decision-makers how the rural medical insurance is financed, what is the appropriate benefit package and cost for rural insurance. [...] The information is very important for central policy making on rural medical insurance. (HIS director, central)*

*I use the hospital information system for cost control and financial management. I obtain data from the intranet about the drug price and financial statements. I monitor patient costs through the system. For instance, inpatient cost should be controlled under the rate of the Insurance Plan. If I find one patient's expenditure is in excess of the ceiling, I immediately contact with director of this department to minimise the further services. (Hospital manager, city of Guangdong)*

However, health economic study has not developed so well at the provincial level, especially in developing areas. In Shanxi and Xinjiang for instance, health economic information is viewed as 'too complex to be understood' by informants of the health bureau.

Another factor affecting the utilisation of health economic information is the lack of any capacity to moderate funding flows as implementation strategy in health planning and management in China. Casemix funding has not been adopted and there is no capacity to adjust the prices charged to reflect the real costs or to regulate the volumes purchased. The separation of medical insurance from the health department<sup>76</sup> induced a new bureaucratic barrier to integrated health planning and information sharing. In the questionnaire survey, 54% of provincial respondents indicated that medical insurance information is irrelevant to RHP (Table 6-4).

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<sup>75</sup> in Beijing, Shanghai, Hubei, Sichuan, Shanxi, Heilongjiang, Liaoning, Shandong and Hunan.

<sup>76</sup> Administration of medical insurance was handed over to the MOLSS from the MOH in 1998.

*The health institutions and medical insurance organisations are ‘natural enemies’. MOLSS manages money and MOH uses money. They restrict each other. The MOLSS asks health institutions to provide data. Although the health department does not want to provide data to MOLSS, it has to do that finally. However, the MOLSS does not share their information with health department. This is unfair. (Hospital manager, prefecture of Guangdong)*

*I am happy to know that government promises to provide financial support to urban poor and rural CMS. However, this policy needs appropriate financial information support for designing, implementing and monitoring. One of my worries is that the medical insurance information is in short supply for the health planner. In the case of rural health, the ‘new CMS’ might be a ‘new Waterloo’ if it lacks sufficient information support. (HIS expert, central)*

It is unfair to criticise the social security departments, because they truly cannot obtain detailed information from their subordinates. Social security programs are managed at prefectural level, where fund collection and accounting is handled. Central and provincial social security administrations are unable to collect details from prefectural governments.

RHP formulators have difficulty accessing financial information from other government departments. As one RHP researcher expressed it, ‘health financing information is a great headache for RHP planners’.

*Ideally, health planners have the right to access financial information from the MOF and planning commission and MOLSS. Actually, they cannot. The finance department may give you a figure (total government budget for health institution); the planning department may give you another figure (total government budget for construction project). Do you think these figures are enough? [...] Dr. --<sup>77</sup> faced enormous difficulties when he gathered data from ministries for calculating total health expenditure. How difficult is it! [...] The real story is always hidden in a black box. (Research institute director, central)*

*Within and between hospitals, departments of health and other government bureaus, financial information sharing is almost impossible (Hospital IS manager, prefecture of Jiangsu).*

The limited scope of financial planning in health also affects the quality of economic analyses that are available. Most economic analysis is undertaken within departments,

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<sup>77</sup> The person who is former director of DOHPF and MOH and former director of Chinese Health Economics Institute.

institutions or projects and remains locked away. Financial planning (as part of regional health planning) needs to take a wide scope of consideration. Academic analysis should link with negotiation-oriented resource allocation.

*Different government departments have different financing plans and strategies. [...] The health department has a strategy of health development for the next 5 years, and wish the strategy could be realised as soon as possible. The planning department has a 'global plan' for socio-economic development, the financing department has another 'global plan' for government budgeting, and industrial departments have one more 'global plans' for industrialisation. [...] However, PHICs do not know these department plans. In my opinion, health information producers have to expand their scope of data/information collection and analysis. If our eyes are only focused on health budgets or hospital budgets, it will not be helpful for successful RHP formulation. (Health official, city of Guangdong)*

In summary, China has started to strengthen its capacity to produce relevant, comprehensive, transparent and understandable supply side information. However, existing capacity of provincial health information units limits information productions. While some coastal provinces and cities have developed an advanced capacity, most others are still looking towards such achievement.

Health information officials recognise that some qualitative data is necessary if the inventory is to be more sensitive and useful, rather than just relying on numerical description. Meanwhile, the limitations of inventory information caused by the fragmented administrative system should not be ignored.

There is increasing recognition of the need for system and institutional level performance information. Currently available information is not adequate for comprehensive judgments of efficiency, effectiveness and equity of resource allocation. Most available performance reports have emphasised on financial aspect. Comparing institutional performance studies and regional system performance studies are rarely found.

The wider use of the information that is available, particularly supply side information, has not been helped by the slow development of the FOI mechanism. Guangzhou and Shanghai have led in promoting transparency in government information but health

information transparency is still far from what might be desired. Most provincial health information systems are not set up to handle system performance analysis, but some far-sighted hospitals, especially urban hospital groups, have embarked on institutional performance analysis and management. Standardisation is an essential prerequisite for the wider utilisation of supply side information. The dispersed and uncoordinated software development for hospital information systems constitutes a major barrier to standardisation of information items and therefore aggregation and therefore wider and productive utilisation.

Supply side information regarding community and rural health services and services for vulnerable populations is not well collected and analysed and therefore not used effectively in regional planning.

The study of health economics has gained considerable ground over the last two decades. However, the capacity for health economics analysis as an input to regional planning is still weak in most provincial health information systems. It is still difficult to aggregate and provide regional financial information because of departmental fragmentation. The absence of financial levers with which regional planners might influence regional health financing and resource allocation is a further reason why health economic information has not been used as fully as it might.

### **QUALITY OF DEMAND SIDE INFORMATION**

To use demand side information is an essential and necessary element of people-centred health planning, which has been defined as ‘a systematic approach to ensuring that the health service uses its resources to improve the health of the population in the most efficient way’ (Wright, Williams and Wilkinson, 1998). Chinese health planners have increasingly recognised the importance of demand side information for planning in recent decades. The NHSS has provided significant support to health planning (Liu, Rao and Fei, 1998; Rao, Liu, Chen et al., 1998; MOH, 1999; Gao et al., 2002b). This household survey

has provided invaluable information to decision makers to help them understand perceived needs, utilisation patterns, consumer attitudes and health behaviours.

Technical reports are published (informally) by NHSS in the year after cross-sectional data collection (GDDS, 2004), overcame weaknesses of surveillance and reporting systems. In the questionnaire study most (80%) of the provincial respondents believed that the standardised NHSS provided comparable information among provinces and periods (Table 6-5). A central HIS manager praised the NHSS is ‘a significant new contribution to national health planning’ which ‘provides relevant and comprehensive demand-side information and benchmarks for regional resource allocation’.

However, not all central and local informants agree with this opinion. A health project official expressed his contrary opinion and suggested that improvements in the quality of demand side information might be based on the experience of industrial sectors.

*Community and market information is important for health planning. [...] Current indicators are not sensitive to rapid changes. HIS has to learn from industrial information system. For instance, the automobile industry has information about car demand from various market sectors. Government officials, businesspersons, doctors, teachers, and ordinary people have different patterns of demand, depending on their ability and willingness to pay. This variety of demand also exists in the health industry. (Health project manager, central)*

Provincial HIC officials also identified quality issues with respect to demand-side information. In the questionnaire survey, 40% of provincial respondents suggested that available household information is not relevant to health planning. The same number of PHICs believed that available demand-side information did not sensitively reflect effects of health reforms. Forty five percent of PHICs did not agree that NHSS information is simple, while the same number of them believed the volume of demand-side information is inappropriate (i.e. less than expected). Thirty five percent of PHICs complained about the long time span between data collection and information reporting, while 38% of them believed that household surveys consumed too much money and workforce (comparing with ‘value’ of information outputs). In addition, only 58% of provincial respondents agreed that the NHSS data have been sufficiently analysed (Table 6-5).

*We have a serious shortage of quality demand-side information. If health planners REALLY want to provide a good health service to the population, if demand information REALLY directs resource allocation, they have to understand more about the population's needs and demands. From this point, I think the health information experts need to conduct more surveys, collect more data, and carry out more analysis. Then we can really know what the clients want, and what system problems we have. Then we can develop a good plan to overcome those problems. [...] This is a puzzle, a difficult puzzle. Improving the quality of health care should not be based solely on assumptions. [...] Although it is difficult, we have to do it now. A thousand mile journey starts with the first step. (Health official, city of Guangdong)*

The main weakness of NHSS (identified by provincial health information officials) is its lack of representativeness. The NHSS aims 'to provide information which is representative at the national level' (MOH, 1999, p.2). 'We provide a national picture. We also present information regarding different types of areas', was the comment of one central health information official. However, local regional planning researchers complained that the NHSS is difficult to use for local planning: 'we are unsure whether the NHSS information reflects our situation'. If provinces want provincially representative data they have to enlarge the sample surveyed in their province if they are able to afford the extra expense and workload, or if there are occasional chances (such as NHSS 2003 expended sampling size in West of China under financial support from the IDS of UK).

Another problem with the NHSS is that health demand and utilisation information should be expressed in relation to the demographic and socio-economic features of population. For improving equity of access and prioritising resource allocation, health planners need to understand the needs of specific population (disadvantaged including low income, unemployed, urban migrants, rural poor, and cultural-specific group). However, 'neither the NHSS nor the health reporting system provides this kind of information', a RHP researcher complained.

This view should be qualified. Local health planners do have access to an enormous collection of ad hoc survey reports, technical supported by domestic and international experts (Zhan, Sun and Erik, 2002). A literature search reported on a Chinese website

([www.wanfangdata.com.cn](http://www.wanfangdata.com.cn)), reports finding 129 articles reporting population-based studies since 1999. ‘I believed that there are more which have not been published’, said one provincial HIS manager. This kind of local research often provides extensive and specific information, such as levels of demand and of utilisation in an aging population (Shen, Li and Zhang, 1999; Lin and Jiang, 2001; Tang, Jiao, Li et al., 2001; Zhao, Zhou, Zhang et al., 2001; Liu and Wu, 2002; Liu, Zhu, Chen et al., 2002; Lu, Wang and Zhang, 2002; Zhang, Tan, Han et al., 2002; Fu, Jiang, Liao et al., 2003; Xu, Chen, Wang et al., 2003; Zhang and Li, 2003; Zhu, Shou, Yang et al., 2003; An and Du, 2004; Dong, Wang, Wang et al., 2004; Wu, Li and Li, 2004); urban populations (Lin and Tang, 2002; Liu, Cheng, Peng et al., 2002; Pan, Tian, Zhang et al., 2002; Shentu, Xu, Zhang et al., 2002; Chen, Cheng, Xu et al., 2003; Feng and Du, 2003; Jiang, Yan, Zuo et al., 2003; Li, Cheng, Cai et al., 2003; Yang, 2003b; Zhang, Wang, Chen et al., 2003; Cheng, 2004; Li, 2004b); rural populations ((Jue, Xu, Wu et al., 2000; Liu, Li, Cheng et al., 2001; Li, Zhang and Wang, 2002; Wang, Dai and Zhang, 2002; Chai, Xu, Mao et al., 2003; Chen, He, Sun et al., 2003; Chen, Fu, Huang et al., 2003; Li, Wu and Zhang, 2003; Qin, Ding, Li et al., 2003; Yang, Xu, Ni et al., 2003; Wang, Ma and Xing, 2004; Zuo, Deng and Yao, 2004), economically disadvantaged populations such as the rural poor (Ma, Wang, Huang et al., 2003; Liu, Huang, Song et al., 2004) and urban poor (An, Meng, Zhao et al., 2003; Li, Yan, Liu et al., 2004); specific sub groups, such as rural women (Jiang and Yao, 2003; Zhou and Qian, 2003), employees (Wu, She, Lu et al., 2000; Yang, Liu and Xu, 2001; Shi, Quan, Shen et al., 2003), soldiers and veterans (Hui, Liu and Jia, 1999; Tian, Tian, Zhou et al., 2002; Ding, Mao, Kong et al., 2003), minority populations (Lin and Tang, 2004), migrant populations (Wang, Cheng and Wang, 2003), students (Meng and Jiang, 2003); and other specific sub groups of patient.

Comparability of local surveys presents technical problems. Not only the household questionnaire has to be standardised but also unless training, field protocols, analysing and supervising are also standardised the data questions will hang over aggregation and any comparisons. For instance, all of the rural counties and urban districts of Beijing have been subject to household surveys conducted by various researchers. However, ‘we

worry about the quality of these surveys so we had to design another one for RHP formulation', a RHP researcher reported.

Besides the household interview survey, health providers also hold demand side information, which can be obtained through medical record analysis and ad hoc patient satisfaction survey. However, the information is only valuable when it sensitively and correctly reflects changes in the fundamental construct being measured (Hargreaves, 2001). Unlike that in Australia (AIHW, 2002b, pp.64-6), the patient medical record in Chinese hospitals does not contain sufficient variables regarding the patient's identification and relevant data (such as employment status, (HS-5)), and cannot link with social security databases. Therefore, hospital information has limited usefulness when used for population-based and regional planning.

In summary, the NHSS has provided an enormous range of demand side information for national health planning and has overcome many of the drawbacks of surveillance and institution-based information. However, health planners are still looking towards further improvement. The usefulness of national NHSS data is limited at provincial and prefectural levels as it may not be representative for given areas. Local health planners and scholars have conducted many ad hoc surveys collecting specific information regarding particular populations. However, the information quality of such local studies needs to be further assured. Many of these weaknesses would be avoided if researchers were to consult with local health planners when designing national surveys; were to conduct further analyses; make national data more widely available; and to provide assistance regarding information collection and analysis at the local level. Improvements are also needed in the data structure of patient records with a view to achieving some articulation between health and social data. Finally, there is a need to standardise patient satisfaction surveys so planners can develop population-based pictures of healthcare demands from institution-based information.

Where health planning is driven by the need to realised 'top-down' accountability, it is unlikely to collect community information or to involve communities in other ways.

However, health resource allocation based on this sort of ‘supply side’ information necessarily ignores the implications of demand side information for efficient and equitable resource allocation. If communities were more involved into planning it might be possible to move towards resource allocation based more on health outcomes (Renhard, 2003) rather than the distribution of assets. Certainly, the relationships between health outcome data and service quality need to be further discussed.

## QUALITY OF QUALITATIVE HEALTH INFORMATION

If collected and processed in appropriate ways, valuable, reliable and timely qualitative information can be produced (Wright and Walley, 1998). Qualitative health information for regional health planning may throw light upon community demands the processes of service provision and the issues, which matter to various stakeholders in relation to health resource allocation issues.

Chinese health information products are generally based in the quantitative approach. The questions of ‘why’ are rarely answered by traditional HIS reports. Therefore, health planners and managers gain limited support in seeking to understand the processes that shape health resource allocation, and in the absence of such understanding must draw upon their own personal experiences.

*We have known many mathematic models and health indicators. Theoretically speaking, the models and indicators are rational and useful. However, the models and indicators did not tell us reasons and determinants of problems. Health programs are usually influenced by multiple factors. Numeric figures are insufficient for making right decisions. (Hospital manager, prefecture of Jiangsu)*

Respondents recognised that for some purposes qualitative information can be even more important than quantitative information.

*Before making decisions, we have to fully understand contexts, including systems, environments and determinants. [...] Compared with the quantitative approach, qualitative methods can be more appropriate for presenting the essence. It can tell the stories behind the statistical data. (Research institute director, central)*

*At that time (the 1980s), we believed that the qualitative method was invalid and qualitative approach was equal to subjective, blindfold and arbitrary decision-making. In retrospect, we were deficient in understanding contexts and reasons in RHP, because we did not conduct qualitative studies (Health project manager, central).*

However, the qualitative approach is not accepted by all health planners and managers, even those at central and senior level. Some appear to confuse concepts of experience-based health planning with qualitative evidence informed health planning. For instance, one central planning official expressed a preference for traditional epidemiological methods and questionnaire surveys.

*Academics argue that we have too many quantitative studies and suggest that we need to strengthen qualitative studies. My opinion is just as the reverse of that. Previous planning was mainly based on experiences, and I think this corresponds to the qualitative approach. Right now, we intend to strengthen health planning on a scientific basis. Therefore, we have to collect more quantitative data, to conduct more data analysis, in order to prevent the mistakes driven by empiricism. (Planning official, central)*

Experts are invited for consultation in the process of RHP formulation but the selection of experts is a tricky process. To invite famous 'experts' is good for gaining the appearance of operating at a high level of 'science and technology'. Unfortunately, many such consultants and experts are medical and come from a clinical background with little expertise in qualitative method or appreciation of its strengths.

*They are experts of clinical sciences but not of management and social sciences. Can you image that a national health reform project was drafted by a group of clinicians? Ridiculous! Doctors are limited with respect to broadly based and critical thinking. They are confused when formulating population planning and strategy. If health planners depend on those 'knowledge handicapped experts', both information provision and health planning would go the wrong way. (RHP researcher, Beijing)*

## SUMMARY

The quality of information for regional planning needs to be further improved. Health planners raise new demands for information provision when they formulate, implement and evaluate regional health plans. Existing data maintained in HIS and by other

information producers could be developed as useful information products if provincial HISs were to improve their capacities and skills in data processing and retrieval and in production, delivering and presenting. New information demands, such as demand-side information, could be met through regular and standardised population-based surveys organised for supporting regional health planning.

Quality of information is closely related to quality of data. In order to improve the quality of information, reliable and accurate data should be effectively and efficiently collected, aggregated and maintained. Database structures should be updated in order to include necessary variables. Databases should be integrated, standardised and organised in order to produce quality information that addresses users' needs.

Quality of information also depends on particular models of planning. Service quality, effectiveness, efficiency and equity are increasing concerns displacing the previous focus on numeric increases in the health assets inventory. System performance considerations lead decision-makers to seeking more evidence about health outcomes. Planners need more qualitative information in order to understand contexts and stakeholders if they are to steering the planning process through department coordination and regional partnerships. The increasing emphasis on decentralised planning requires stronger provincial health information services, which are able to properly inform local planners.

## CHAPTER EIGHT

# QUALITY OF INFORMATION SYSTEM MANAGEMENT

### INTRODUCTION

Health information systems fail because of bad management rather than technical failure (Beynon-Davies and Lloyd-Williams, 1999). After examining the quality of data and the quality of information in Chapters Six and Seven, in this chapter we turn our focus to the management of provincial health information systems.

From an Australian perspective, the criteria for evaluating an information system include relevance, integrity, access for all, professionalism and trust of providers (Trewin, 2001). In China, the State Council has decreed that information systems should achieve ‘timeliness, conciseness and veracity’ (NBS, 2002b).

HIS evaluation could also follow a strategic planning model (Clark and DeMarco, 2001). This might involve examining the planning, implementation and evaluation stages of the work of the HIS to gain a clear picture of strengths and weaknesses.

Health information systems can be evaluated at social, economic, organisational, project and technical levels, because determinants exist in all those levels. Lyytinen and Hirschheim argued the construct of system failure is a relative construct (Lyytinen and Hirschheim, 1987). A system could be identified as failure when it does not meet the expectations of any one of particular stakeholders (users). Otherwise, managing the information system also involves managing users. To involve users in the system development and evaluation process is becoming a strongly recommended strategy (Beynon-Davies and Lloyd-Williams, 1999).

Any evaluation of the management of health information systems in China should also have regard to how they are adapting to the ongoing transformation of China from a planned to a market economy and what kinds of demands the market transition is placing and will place on health information systems.

One aspect of this reorientation, which has already been discussed, is the move away from a principal focus on assets and resources towards a more comprehensive information package including social statistics and demand side data. These moves have become particularly important with the increasing involvement of health planning.

A second reorientation, which is happening in response to technological development, is the replacement of manual health data report system with electronic system and intra and inter networks. Electronic health databases (workforce, equipment, institution and health economic) are held at each administrative level.

The capacity of health information systems at the National level has been greatly improved in recent years with increased support from the central government and international assistance.

The research reported in this chapter has been driven by questions arising from all of these different perspectives and frameworks. However, in reporting the findings of the research in this chapter we focus on the HIS management problems which have emerged from this enquiry.

## **SYSTEM DIRECTION AND LONG-TERM STRATEGY**

Information system development needs to be planned strategically. Clarity with respect to mission, objectives and strategy is an important foundation for HIS management. Traditionally, the PHICs have existed as subsidiary offices of the PHBs, and a middle level element in the national statistics system. Consequently, many PHICs have lacked any clear sense of mission, objectives and development strategies. Although many PHICs have been restructured as semi autonomous government institutions in the late 1990s (as

mentioned in Chapter Four), clear statements on system vision, mission, objectives and strategy are rarely found.

In any health care system, the objectives of the health information systems will reflect the information demands from users, which will reflect what those users are trying to do (Mooney, 2003). Many health planners are managers who are confused about their objectives and priorities; the engine of health sector reform stalled in a dilemma of multiple contradictions. One interviewee argued that ‘perplexed health planning induces a perplexed health information system’. It was a terrible shock when SARS made a surprise attack on China’s health management but after the SARS attack managers returned to plugging the leaks and continued to ignore long-term strategies.

*We have to learn from the SARS crisis and take a system perspective and look for solutions in the long-term and at the regional level. During the SARS crisis, integrated regional information system was operating while the traditional reporting system collapsed. Too many of us (include leading health information officials) have been fixated on the personal assessments and directions of various political leaders. That is not appropriate for sustainable system development. We have to think calmly with long-range views. (HIS official, central)*

*We need an overall and strategic plan. We need a redesigned data collection system and new approaches to analysis. The first task of HIS design is the data collection design. The information products we plan on producing should reflect the needs of our users. Previous health policies were based on those three resource figures, which are understood now as meaningless for health planning. We need to know detailed information, for example, about effectiveness and efficiency of health resource utilisation, and whether the health resource investments are yielding the expected outcomes. Without that information, how can we allocate health resources efficiently? (Research institute director, central)*

Any strategic plan for HISs must meet the changing needs of the decision-makers. In the present period of health sector reform and macro system transition, the government is conducting multiple reform agendas in the health sector. The health information system does not have the capacity to handle all information inquiries; therefore, prioritising system development plans is an urgent and practical task of for system managers.

*The health care system is public institution dominated. Workforce, finance and facility development are planned and allocated by government. Government has to*

*know whether those resources are allocated appropriately, used efficiently, and achieve expected outcomes effectively and fairly. Additionally, government should encourage the private sector. Government has to do the right thing and do it in the right way. This is the new challenge for our provincial HIS. (HIS manager, Shanghai)*

*Current health problems include unbalanced distribution, unfair accessibility, unexpected cost rising, and unsatisfactory efficiency and effectiveness. HIS development has to respond to these challenges. [...] Improvements in health status and system performance are benchmarks for health sector reform and development. The HIS therefore should shift its orientation from resource statistics to comprehensive functions (Research institute director, central)*

*Health officials get lost in the new environment. They are masters of bureaucracy under planned economy, and illiterates of governance under the market economy. Therefore, they have to 'go with feeling', 'follow the majority' or 'ask for order'. Do they 'touch stones to cross river'? No, they touch nothing to cross the sea. [...] Both health planning and HIS need a clear direction. Quality information is a lighthouse for decision-makers. (Health project manager, central)*

Strategic planning for system development is a process of understanding both internal strengths and weaknesses and external opportunities and threats. To identify and negotiate with stakeholders is an important task in system planning. However, this procedure is very weak in China. Without a clear vision and mission and lacking the skills of policy analysis, provincial health information managers cannot set their own objectives and strategies and fall back on the commands of their superiors. This singular orientation has affected their communication with other departments, think tanks, and communities and with the population at large.

## **MANAGING THE USER-SYSTEM INTERACTION**

Interaction between users (regional health planners) and information system managers (including HIS designers) is critical for system success (Tan and Modrow, 1999). One of the key requirements for HIS management is to establish and maintain dialog windows and friendly interfaces for these interactions in order to transfer the expectations and demands of users and provide information products that meet those needs. Active and continuous communication between producer and user will help to ensure bilateral understanding and mutual support, and finally reach a 'double win' outcome.

Interaction should be taking place during all phases (design, implementation and evaluation) of the health planning cycle and the information production cycle. This kind of interaction was observed in prefectural hospitals during fieldwork undertaken as part of this research. For instance in tertiary hospitals of Jiangsu and Guangdong, hospital managers (presidents and department directors) and information system officials (director of information centre) were working closely. Healthy interaction promotes informed hospital management and high performance of hospital information system.

*Some hospital information units have provided strong support to hospital management. [...] However, such hospitals are a small percentage of all hospitals in China. A prerequisite for successful hospital IS is strong teamwork and cooperation between information managers and hospital managers. If the CEO does not express his/her needs with respect to information support, how can the information unit provide any reports? (Research institute director, central)*

However, the interaction model in hospitals cannot be easily generalised into the circumstances of regional health planning. Because of poor interaction between regional health planners and provincial health information managers, information produced is commonly irrelevant to the needs of the users.

*Leaders may not understand information reports. Maybe they (the leaders) never read those reports. The information report only provides technical support to the leaders, while the leaders make critical decision based on personal or political perspectives. (HIS manager, prefecture of Guangdong)*

The interaction is worse in the developing regions where HISs operate as a closed system, which passively receives and submits statistics forms. There is no active channel between provincial decision-makers and information system managers. Health planners rarely use their information system, because they believe the system is 'not suited to decision-making support' (mentioned by a provincial health official). In Shanxi, Jilin and Beijing, health officials were confident that decision-making could be free from health information support.

*I am an experienced planner. I am a senior official and familiar with all details of each hospital in the City. All information is stored in my brain. It is very easy for me to formulate a health plan, based on my experiences. (Health official, city of Shanxi)*

*Does decision-making rely on information? No, that is not true in my area. It relies on our experiences and the intentions of central government. Actually, we cannot make real decisions. (Health official, Jilin)*

*I am not sure how the health bureau uses information for health planning. The leaders of the health bureau think that the HIS is not important. [...] Industrial information is important because it relates to the productivity of enterprises, while health information is also important for the productivity of healthcare, I think. [...] We live in the information age. Everybody understands the importance of information. Nevertheless, health officials do not think so. (Hospital IS manager, Shanxi)*

*They (head of health bureau) think that health information is easy work. [...] Sure, it is easy if we just submit data and ignore its quality. It is not easy if we see the HIS as a real supporter of decision-making. (HIS manager, Beijing)*

*I argue with the health director. My intention is to know what can HIS do for planning and management. However, the director does not care about my suggestions. All their decisions and plans must follow the direction of the central level. (HIS manager, Beijing)*

The reasons for ignoring HIS support in health planning can be found in the political context. As explained by a prefectural health information staff, ‘health information, especially about effectiveness, equity and quality of service, does not enhance the official’s position and benefit’. ‘The majority of officials do not plan health services depending on people’s needs, but on bureaucratic rules’.

When planners really need some information for embellishing their documentation, they tend to set up ad hoc working groups and/or steering groups. Unfortunately, provincial and prefectural RHP steering groups tend to keep information officials out of their working groups.

*Q: Do you know about regional health planning in the city?*

*A: I do not know. This is the business of the leaders of the health bureau.*

*Q: Are you involved in surveys for the RHP?*

*A: No. Leaders said the surveys are not our task, but someone else’s.*

*Q: Do your leaders ask you to provide data for the annual health plan?*

*A: Yes. Those data are needed for their annual working report.*

*Q: Do you analyse health data?*

*A: Yes, some. I have conducted some analysis of trends in outpatient services.*

*Q: Do you report your analysis to your leaders?*

*A: Yes, I presented it to the bureau’s director. However, they never used them.*

*Q: Did you know why they never used?*

*A: Ah [...] it is hard to say. (HIS manager, prefecture of Jilin)*

*The directors of health departments did not clarify our responsibility and ask us to provide relevant information for health planning. Right now, they (health directors) want to formulate the RHP, and ask us to hand over some data. However, they did not allow us to get involved in the regional planning process. Our unit was not represented on the working group for the RHP. (HIS manager, Beijing)*

Provincial health information officials are not happy about being ignored. Interviewees provide their opinions for improving user-system interaction, such as leadership development on informed health planning, actively providing information tools, and bridge building. As a RHP researcher suggested, ‘actively responding to new information demands and providing quality information products are the only ways of HIS survival’. To solve the logjam, health information managers have to establish windows between the users and the information experts, to fully understand the users’ information requirements, and more importantly, to provide relevant, timely and comprehensive information products. To strengthen the professionalism of health information units and to build trust in the information providers should be long-term strategies for HIS development.

*The development of HIS depends on the attention of the leadership. However, in my opinion, active involvement in health planning will be the most important chance for HIS survival. Health information units need to demonstrate their ability to support health planning; then the leaders will recognise HIS as an indispensable helper. [...] Health information officials need to understand the needs of the planners and provide quality information to them. (RHP researcher, Beijing)*

For improving the interaction, the following suggestions were offered by interviewees: (1) to establish a communication channel, (2) to develop information utilisation tools, (3) to build bridge between two sides, and (4) to invite users into HIS management.

Information analysis is not ever recognised as an activity solely conducted by statisticians. Users are widely involved in the process of information analysis. Interviewees suggest developing practical and simple information utilisation tools for health planners. These tools could be widely found in developed countries, such as HealthWIZ provided by Department of Health and Ageing of Australia (DHA, 2004). The HealthWIZ, a health statistical data library with a powerful and easy-to-use software engine, enables users to interrogate data and present information in tables, maps charts and graphs. This gives

health planners (and other users) the ability to compare health measures across population groups and geographic areas. Another example of an information tool is the MIS Guidelines (Guidelines for Management Information Systems in Canadian Health Service Organisations) provided by the CIHI. Like a health encyclopaedia, the Guideline (CD-ROM version) automatically indexes every word, and users can find any piece of information quickly using the software's search engine (CIHI, 2004a).

A health project official at the central level suggested that information reports and information utilisation tools should be provided to planners simultaneously. 'The HIS has responsibility of tool development. These tools help users to use information effectively', he said.

Facing the problem of bureaucratic fencing and professional gaps, some interviewees suggested building bridges between users and information experts. Cases were observed during fieldwork where such bridges have been well established in some hospitals. For instance, a surgeon works informally for the hospital information centre; the CEO arranged for him to be appointed as a part-time member of staff of the centre because he really knows what needs are and how to respond to those needs. However, ways of building bridges between regional planners and provincial health information units need further study.

Most provincial health information interviewees agreed that it would make sense to invite users (health planners) to participate in health information planning. This could involve inviting health planners to attend health information planning conferences (previously recognised as a 'professional workshop' among health statisticians) in order to create a chance of interaction.

*Why do we not invite health planners to participate in health information training sessions and workshops? Let the decision-makers know what HIS can do for them, and let HIS managers listen to the information needs of planners. (HIS expert, Beijing)*

## INFORMATION SYSTEM FUNCTION RE-DESIGNING

Provincial health information services have not been very responsive to on-going health sector reform and health policy development. In the face of rapidly changing information needs, the provincial information systems have kept on doing what they always have done. For instance, many traditional data collections and health indicators have hardly changed over the last 50 years, and information products (which mainly focus on supply side assets) have lagged behind information demands; data analysis has not been significantly strengthened, information presentation has been neglected. While the planners are trying to understand the market situation and regional health services, the HIS still provides information of health department-administrated health institutions. While the planners are trying to improve the effectiveness and equity of health services, HIS only provides data on volume of services referenced to an overall average population. Meanwhile, HIS staff, most of them having a health statistics, accounting or computer science background, do not access sufficient training in the techniques and skills of information presentation, qualitative study, information utilisation tool development and interaction with users.

*The HIS does not provide enough industrial and military sector information, performance and outcome information, private sector information, community health information, rural health information, etc. That's a pity! (RHP researcher, Beijing)*

*The environment has changed, [...] we have to reform health data collection and analysis; we have done some studies on health indicators; [...] we have to optimise our health data collection, and make the health information more relevant and useful. (HIS official, central)*

*The macro environment has changed dramatically but the health reporting system has retained its old face. Definitely, we need a new one. [...] The System is out-of-date. This is not a cost-efficient process. [...] Information products should be upgraded from raw materials (statistics tables) to elaborate works (high quality information report) (HIS manager, city of Guangdong)*

*The HIS is handicapped. HIS has no awareness to do analysis while the decision-makers have no requirement for them to do so. [...] This is an issue of system management [...]. (HIS manager, prefecture of Guangdong)*

*There is not a formal regulation or requirement on HIS reform. There is no agenda for HIS reform to meet the needs of the current period. (HIS manager, Jilin)*

*I am not very familiar with information analysis and presentation. However, I know that some people need that familiarity. [...] It is OK for me when I have finalised the tasks of data collection and have submitted these data as required. However, I want to do more than that. [...] All of my efforts are contributed voluntarily. Nobody pays me to do analysis and presentation because these functions are out of range of my job description and because the outcomes of these functions are invisible and have no direct financial impact. (HIS manager, Guangdong)*

*Our job is to collect and submit data. [...] What are the meanings of those data? Nobody does the job. (Health official, city of Shanxi)*

*As matter of fact, there are raw data in hospitals and even in reported data diskettes. However, most statisticians of hospitals and health bureaux do not know the diskettes contained raw data. Their jobs are to aggregate data and submit data. (HIS manager, prefecture of Guangdong)*

A HIS manager from Shenzhen pointed out that, ‘information systems should play a key role in health planning under the SME’. As stated by this manager, comprehensive and intensive sector and situation analysis in the preparatory period of planning can directly contribute to understanding the health planning environment and setting up practical and rational objectives and strategies.

A provincial RHP researcher also suggested that the role of HIS should be oriented as ‘managing information for managing health planning’. He pointed out that ‘HIS is a learning machine of planners and a monitor of health planning implementation’. Health planners should learn from their implementation experience and adjust activities based upon feedback information. Health planning also needs to learn from history and experience, which will lead to minds that are more open and a higher jumping-off point.

*The learning machine should be regularly updated, following changes of environment, changes of technologies and changes of information demands. HIS managers should not focus on stability of traditional databases. They should encourage innovation. (RHP researcher, Beijing)*

The survival and improvement of provincial HIS will depend on this ongoing learning process. One of interviewees shared with researcher a lovely story, which illustrated how he understood the importance of system learning.

*I am surprised that some less-educated stockholders can adroitly handle their business in the stock market. The bases of their judgment are simply curves but they master their business more 'professionally' than experts in mathematics and statistics [...] one of the major reasons is that those stockholders are keen to learn. Compared with those stockholders, the HIS is far behind. (HIS manager, city of Guangdong)*

## **BALANCING HEALTH INFORMATION SYSTEM DEVELOPMENT AROUND CHINA**

At the central level, health information services have gained considerable financial, technical and academic support. The situation is different for provincial HIS development. Most inland provinces have not attracted the same kind of support as that at the central level and in coastal areas. Within specific provinces, similar unbalanced development exists between prefectures.

*HIS is regarded as laborious and unrewarding and there is little interest in taking this job in hand during health bureau restructuring. [...] The development of HIS does not reflect increased information demand, but depends upon political benefit sharing. [...] The quality of information has become worse recently because only two formally retired people are working in the health information office. [...] As an illustration, the city health statistics collection (2000) had to be recalled, because of its countless mistakes. (RHP researcher, Beijing)*

At a recent national HIS workshop (observed in the course of the fieldwork for this research) representatives of PHICs from outback and West of China gathered at a corner, separate from those from the richer coastal provinces. They acknowledged a sense of inferiority. 'We lived in a different world', complained a representative from Henan province, 'we have different interests from those from the developed areas. They are powerful, modern and rich. We are weak, poor and fall behind.'

HIS development in poor provinces is held back by resource shortages. Neither the health nor the statistics bureau provides enough technical and financial resources and administrative support for PHIC development.

*The statistics bureau has limited knowledge regarding health information management. How can we rely on it (the statistics bureau) when the responsible organ has even poorer knowledge than we? [...] The city health bureau has been*

*downsized. [...] One fulltime or part-time staff member is assigned to be in charge of health information. This person does not know anything about health information management. The health bureau does not care about HIS development. The provincial HIS might have some resources but their discretion is limited; they are under strict control. (Hospital manager, prefecture of Jiangsu)*

*In most developed countries, as I know, most information reports are freely accessible to the public, financially supported by government budget. If I had enough money and staff, I could also do it. [...] To release health information should be a government responsibility. However, health information may not be the priority of government (or the people). They think that the money would be better spent somewhere else. (HIS manager, Jilin)*

The unbalanced development of regional health information systems ultimately results in an overall decline in information quality. In reality, the scope for intervention by the superior bodies is limited. The major restrictions arise in the fragmented bureaucratic and financial arrangements. Superior information managers cannot provide the kind of administrative pressure and financial assistance that the weaker sub-systems need. Central HIS interviewees suggested providing ‘softer’ interventions (such as training) or external assistance (such as through international health projects) to disadvantaged provinces and/or prefectures. A RHP researcher, who went to Australia on a study tour focused on the evaluation of RHPs, expressed his view on the Australian model thus:

*The Australian system is structured around Commonwealth-State negotiations and agreements. However, in China, negotiation and agreement between central and provincial governments, and between provincial and prefecture government is unrealistic. The two countries have different contexts of political and administrative structures. (RHP researcher, Beijing)*

## **EXPECTED ROLES OF STATISTICS DEPARTMENT**

Statistics bureaux are the formal managers of the government information system. However, statistics bureaux at central and local levels are not actively involved in the health planning process. It is found that USEST of Lanzhou was involved in the RHP process but that is a rare case. Generally, most PSB are not heavily involved in social statistics (such as cultural, education, sports and health statistics). The more important responsibilities of PSB are to produce economic statistics and conduct market surveys.

*We focus on market-oriented information, as well as sensitive issues about which the Party secretary and governor are concerned [...]. (Statistics official, city of Shanxi)*

*Health information is not our priority. The provincial economy is underdeveloped so the government is mainly interested in getting economic information. When local people have money in their pockets, it will not be too late to pay attention to health service issues. (Statistic official, Jilin)*

*Health information belongs to the social statistics area, which is less important in the statistics bureau. We often argue with the statistics bureau: 'why are you only concerned with economic data? If we do not provide health statistics data to you, how can you have an overall picture of socio-economic development?' (HIS manager, central)*

*The statistics department is only interested in economic development, but not social development. Why? It is because currently the government is 'economic government'. Who cares about common people and social problems? (HIS official, central)*

Statistics bureaux are rarely involved in the RHP, partly because the statistics department is not assigned to be a member of the RHP taskforce, and partly because it is assumed that the statistics department cannot provide worthwhile support for health planning.

*We felt quite limited when collecting data and producing information for RHP formulation. [...] We are competent for departmental planning, but not for regional planning. The situation could be quite different if the PSB was involved as a coordinator and organiser. I think the PSB would be a competent and valuable partner for regional planning. The PSB has formal authority on information management and rich experiences on regional data aggregation. I cannot understand why the PSB is out of health planning process. (HIS manager, city of Guangdong)*

Without the involvement and support of the statistics department, the provincial HIS faces serious difficulties in trying to improve the quality of information for regional health planning, in particular, with respect to providing more big picture information regarding the macro economic context of regional health planning

## **COLLABORATION WITH ACADEMIC INSTITUTIONS AND UNIVERSITIES**

It is important for the PHICs to cooperate with other information producers, especially research institutes and universities, in generating information to support regional

planning. Successful regional planning depends on this kind of partnership and the cooperative involvement of all available information systems. Collaboration between the bureaucratic information custodians and academics and research partners is an important strategy for information system capacity building (Wei, Wright, Heaton et al., 1996). A review of all available RHP documents, undertaken as part of this research found that all of the regional health plans reviewed, with no exception, were strongly supported by universities. This partnership should be able to assist PHICs to seek support in areas of weakness (data analysis, information presentation, qualitative study, etc) while the academics also benefit from working with information managers, healthcare managers and health administrators, through gaining access to training opportunities for students and research opportunities for academic achievement.

The Shenzhen RHP is an example of a successful partnership. Shenzhen government has contracted with multiple universities (at both national and provincial levels) as training bases. During the cooperation, health information officials work with professors and postgraduate students to jointly answer specific practical questions in arising in the course of formulating the plan.

*We can benefit each other. We need scientific solutions of practical issues and they need administrative support for academic studies. (CDC director, city of Guangdong)*

*Health planners have gained significant benefit from the cooperation with universities. Recently, we also conducted some other projects, such as situation analysis. Now we have strong academic support for health planning and management, such as RHP, in Shenzhen. (CDC official, city of Guangdong)*

*I do not use universities as supplementary resources. Actually, I work with them for introducing innovative ideas and critical thinking. (HIS manager, city of Guangdong)*

This kind of cooperation is found more frequently in the developed areas. In the questionnaire survey, 60% of PHICs reported that they cooperate with provincial universities. However, some provincial and most prefectural health information units (in the developing areas) have not established stable and active relationships with universities. None of provincial health information units reported cooperation with national and/or international universities.

*Many intelligent and competent people gather at the provincial level. In my opinion, provincial people do understand strategic planning and management. At the same time, there are many management and planning researchers in provincial universities and research institutions. Regional health planning should be conducted through cooperation between provincial officials and provincial academics. (Health project manager, central)*

Some bureaucratic planners prefer not to work with academic persons. They complain that academic persons are too 'naïve', and academic reports are not useful in the real world planning process.

*Most scholars do not understand the art of political games. They are too scholastic. They conduct many academic studies, use wonderful mathematics and economic models and present beautiful academic reports. However, in the view of our officials and planners, those studies are useless. You know, the health system is not a closed system; it has consanguineous interactions with the social and political environment. However, they tell the story based only on their research data - that is a dead end. Why do they not open their eyes widely and try to explain their findings in macro contexts? They isolate themselves within narrow boundaries. (Planning official, central)*

*Xue-xue (pure intellect) has a social conscience and tends to bitingly criticise everything. They are too naive to provide practical suggestions. Guan-xue (intellect who provides positive support to the official) is the most welcomed. On the other side, most officials belong to xue-guan (knowledgeable official) and some senior officials play as guan-guan (political official). [...] I prefer subservient academic support. Critical comments give me a funny feeling. (Health official, Jilin)*

## COMMUNITY INVOLVEMENT IN HEALTH PLANNING

Community participation in health planning offers opportunities of helping community to develop problem-solving skills, to make them take responsibility for their health and welfare (Sule, 2004). If the community is fully involved in the process of regional planning, the need and problems of the community could be adequately addressed, the strategies and methods used could be culturally and socially appropriate or acceptable and finally it enhances sustainability.

An informed and involved community is a defining feature of contemporary and people-centred health planning in a democratic society. In the process of formulating and

implementing regional health plans, the community's information system (both quantitative information collected through household surveys and qualitative information gathered through community appraisal and debates) advises decision-makers to justify the legitimacy of planning, to assess implementing program against target population and measuring gains in expected outcomes. Therefore, on the one hand, it is the responsibility of the information system to make sure that people are informed, consulted and persuaded through transparent and timely information services. On the other hand, the information system has to ensure that planners well understand and communicate with the community.

However, one health information manager in Guangdong province put it, 'there is a wide gap between planner and community'. On the one hand, health planners have difficulty in accessing the real voice of the community during planning and implementation; on the other hand, communities do not get the chance to present their opinions and feedbacks about planning to decision-makers. 'This is a heritage of centralised top-down planning', this HIS manager concluded. The top-down style of health planning is free from community information and lacks community participation. The community has not been recognised as a stakeholder with respect to health development.

The regional health planning initiative was intended to innovate and refresh ways of health planning. One of the responsibilities of health information units is to create a communication link between the community and the health planners. Fortunately, several of the developed coastal cities have actively sought to implement community involvement in health planning. Shenzhen HIS has published hospital billing information with a view to supporting consumers' judgment and selection. Shanghai HIS developed a 'sunshine health administration', which releases utilisation and price information on its website. Regular public hearings have been conducted in the process of health planning. 'Both common people and government leaders can browse through the material we have put onto the Internet; can access the health planning information and implementation plans, and have their say', a HIS manager in Shanghai commented.

Shenzhen city has also invited the community to participate in the regional health planning and other health policy development and monitoring processes. The health bureau believes ‘the answer is in the hands of the people’ and ‘the common people have a fair judgement’.

*According to the national health reform policy, medical and drug services should be disjoined, and drug stock should invite public bidding. In most circumstances, the bidding is meaningless, because government or hospitals controlled the process. The common people may have no interests on the process because they comprehend that it is a done deal. However, for the benefit of the people, a ‘sunshine government’ should publicise all plans and let all stakeholders make a judgment. Can the HIS have these functions? Yes! The health information unit needs to aggregate quality data and to demonstrate the facts to all, from mayor to common people. (HIS manager, city of Guangdong)*

## **MANAGING THE HUMAN RESOURCES OF THE INFORMATION SYSTEM**

Staffing is one of important practical functions of system managers, while human resources management is a critical strategic activity for improving system performance, providing quality information products and maintaining sustainable system development.

In China, ‘personnel affairs are the most headachy affairs’, a PHIC official commented. Many interviewees suggested that workforce development should be the priority in seeking to improve the work of provincial HIS. As discussed in Chapter Four, provincial HIS needs more competent staff. Staff with medical, statistics and accounting backgrounds all need to renew their knowledge in order to respond to the new information demands.

*‘We have no person, no money, no computer and no software to conduct health data analysis’. (HIS manager, Xinjiang)*

*The knowledge structure of HI staff is out of date. We should expand the HI team and recruit new staff with knowledge of health management and policy analysis. The health information unit needs new blood, people who are familiar with health management and policy analysis. The HIS has to have the ability to follow the hot pots of health reform and development. (RHP researcher, Beijing)*

*The HIS will be washed out if staff do not upgrade their skills and techniques. [...] HIS staffs tend to stick with the old style of working. It is not their fault that their educational background is limited and insufficient for current needs. [...] However, investing in capacity improvement on such low level background is a waste of time and money. (Health official, city of Guangdong)*

Human resource development requires a long-term perspective. It is affected by and works through education system reform, staff recruitment, continuous education, personnel exchange regulation, motivation policy and even retirement policy.

*It is almost impossible to fire people and it is difficult to recruit new people. To fire staff in China is seen as a risk to social stability. (Health official, city of Guangdong)*

*We suggested that the provincial health bureau strengthen the health information team. However, the provincial health bureau does not allocate a 'planned position' for the health information unit, and competent persons are hard to find within the province. (HIS official, central)*

Initiatives aimed at supporting provincial HIS were found, including training programs and software development. It was the expectation of the central health information unit, that 'the software may be helpful for improving data analysis and information presentation'. With WHO support, annual training workshops have been organised in recent years. However, vast differences in capacity to benefit from such initiatives were evident during the fieldwork undertaken for this research. Access to training and software may not yield the same outcome in all provinces.

## SUMMARY

The ubiquity of information system failure (Beynon-Davies and Lloyd-Williams, 1999)<sup>78</sup> (Hovenga and Lloyd, 2002)<sup>79</sup> underscores the importance of addressing information system management issues. The health information system in China should change from being a closed system for upwards reporting of resource statistics to a more open system

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<sup>78</sup> 75% of all system development undertaken is either never completed or the resulting systems are not used. 60% of organisations internationally and 67% of them in UK had suffered at least one systems project that failed to deliver planned business benefits or had experienced significant cost and time overruns.

serving regional health planning and health service and health system management. It is not enough to only assess internal operations and quality control measures based on technical aspects. The interaction between health information experts and the users of their data, the organisational fit between structure and function and the impact of the information revolution should all be addressed. Strategic planning is a critical step in information system development. Following through the life cycle of planning, implementation and evaluation is particularly useful in trying to create a system that is responsive to needs and can achieve the required outcomes.

There have been significant achievements in information system development over the last two decades. Health information systems at the central level have advanced much more than local level systems, in infrastructure, production and support to decision-making. However, with further reforms in health planning on the agenda (decentralisation, people-centred planning, allocative efficiency and evidence-based management and planning), now is an appropriate time to put a new emphasis on local HIS development.

There is wide variation in HIS development across the provinces. The most significant differences are in the qualities of system management and human resources. Most provincial HIS do not have any long-term strategic plans. This is recognised as a reflection of their previous affiliation with the health bureaucracy over such a long period. Although it can be argued that ‘incremental health planning leads to incremental information system improvement’, it is nonetheless important for provincial health information units to clarify their mission, set their objectives and adopt the appropriate strategies, for instance developing a strategy for human resources development.

User involvement is recognised as a key principle in the development of modern and open information systems (Ahituv and Neumann, 1986, pp.384-90). One of the significant weaknesses of provincial health information systems is the lack of interaction and communication between health information managers and the planners and the

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<sup>79</sup> 70% implementation failure rate of IT systems.

community in planning, implementation and evaluation of regional health planning and management initiatives. This poor interaction contributes to the relative information-independence of the traditional planning style. Conversely, it is caused by the inability of health information systems to provide timely and relevant information to the health planner. Trust is a necessary foundation for this interaction. To demonstrate excellent information products, to seek to understand the users' needs and to build bridges could all be applied as strategies for interaction improvement.

Provincial health information systems need to provide useful information to support all stages of health planning and management: planning, implementation and evaluation. This underscores the importance of strengthening capacities of policy analysis and qualitative study.

The health information system encompasses the contribution of other administrative and academic stakeholders as well as the provincial health information unit. The statistics department does not yet play its proper role in health planning. Domestic (provincial) universities are indispensable academic resources for regional health planning. External technical assistances may be needed in some provinces where university resources are scarce (such as Weihai, Liuzhou and Lanzhou). However, 40% of provincial health information units do not have any links with local universities. It is evident that cooperation between universities and regional planners can yield a 'double win' outcome.

The community is an important stakeholder with respect to regional health development. The feasibility of health plans and their implementation depend in many respects on community participation. The provincial health information unit has a role to play in mediating community-planner interaction during RHP formulation, implementation and evaluation.

The management of provincial HIS is constrained by other macro determinants such as fragmented government administration, which affects data collection and information analysis. Regional health planning calls for a comprehensive regional health information system.

Fortunately, some advanced areas, such as Guangdong and Shanghai, have acquired very useful experiences in managing a contemporary HIS during the present transition period.

In this and the two previous chapters we have explored data quality, information quality and health information system management at the provincial level. We have covered a wide range of health information, including demographic, socio-economic, epidemiologic, health resources and activity, and demand side information. Many issues from data collection and analysis to information system management have been identified and contexts analysed ranging from the technical to the political. Strategic planning, infrastructure improvement, regulation and standardisation, and the wider application of information technology are recognised as ways of problem solving.

Based on these findings, some directions for progress can be identified: (1) provincial health information units need to develop long-term strategic plans, especially human resource development plans; (2) health information units need to develop better interaction and communication with the users of their information products; (3) to expend and improve system functions based on demands; (4) regional health information systems need to include all of the sectors and agencies that contribute to health care in that region (or province), not just the health bureaux; (5) regional health information units which don't have such links should be encouraged to explore closer cooperation with academic institutions; and (6) health information managers should develop their collection, analysis and dissemination of information in ways which promote community participation in health planning, implementation and management .

## CHAPTER NINE

# **MACRO IMPACTS ON HEALTH PLANNING AND HEALTH INFORMATION SYSTEM DEVELOPMENT**

### **INTRODUCTION**

In previous chapters (Four to Seven) findings with respect to health information organisation, health data availability, quality of health data, quality of information and the management of health information systems have been presented. These chapters have explored many of the more technical issues that need to be addressed in strengthening health information systems. However, health planning and the provision of information support to health planners are not purely technical processes. Health information should not be regarded as ‘good quality’ if it cannot be used by planners. Because health planners face situations of great complexity and high uncertainty, information systems have to encompass a wide range of influences, options and futures if they are to meet the needs of the planners.

An important theme of the research reported in this thesis has been an exploration of the macro factors affecting health planning and implementation; drawing primarily on interviews, document analysis and fieldwork observation. To understand the present state of health information systems and to develop reasonable and practical recommendations requires some contextualisation of the technical issues within the wider macro context. The findings of this research with respect to the wider context are reported in this chapter. Much of the material included in this chapter involves a synthesis of material from a very wide range of sources ranging from basic history to every day observation. This is necessary to provide an appropriate framework for more specific findings from interviews, document analysis and field observations regarding the macro factors shaping

health information system development. These factors are framed by the Chinese political system and by Chinese traditional culture.

## POLITICAL SYSTEM AND DECISION-MAKING PROCESS

The nature of the political system shapes the direction and pattern of decision-making of government, society and people (Oberlander, 2002). Political issues are still taboo in many circumstances and environments in China, including academe (Jin, 2003; Zhi, 2004). However, it is necessary to discuss certain political issues which are closely related to health planning and information systems because they are critical to understanding the problems being addressed in this research and developing rational and practical recommendations.

Broadly speaking, the state power in China is shared among the Party, the State and the Army (Word IQ, 2004). However, in health decision-making processes, there are three key players involved: the Party Committee, the Government and the People's Congress. The roles of these players are commonly identified as 'the Party makes it (the decision), the Congress approves it, and the Government implements it' (Liu and Zhu, 1999, p.3). Figure 9-1 demonstrates the broad political framework (BBC, 2004).

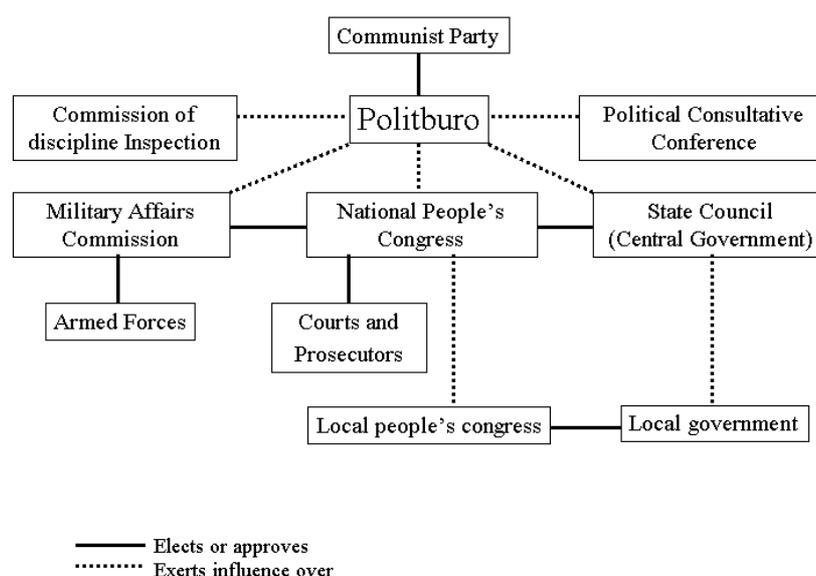


Figure 9-1 Political Structure of China

## THE ROLE OF CHINESE COMMUNIST PARTY

The Chinese Communist Party (CCP), with 63 million members, is the largest political party in power anywhere in the world. As distinct from Western systems, the CCP plays a leading role before and after the election of people's congress or the establishment of a new government. The role of the CCP is defined in the Chinese Communist Party Charter<sup>80</sup> as well as Chinese Constitution<sup>81</sup>. The Politburo of Central Committee of CCP directs and leads China's political decision-making process.

The borderline between the Party and government is subject to change. Before the 1980s, 'all important and major decisions were made by the Party' (Liu and Zhu, 1999, p.2). From the early 1980s to the early 1990s, in accordance with the Constitution of 1982 which introduced the 'government head responsible system'<sup>82</sup>, the government was seen to have governance role independent of the Party. A clear scope of party's responsibility has been identified in the Thirteenth National Congress of CCP in 1987 (He, 2004). During the 1990s, the Party's influence on decision-making was strengthened again and the idea of a separation between the Party and Government was not to be mentioned at conferences or in documents of party and government.

In the last two decades greater economic autonomy has been delegated to local government but it is unlikely that the level of political control exercised by the Party will be reduced in the near to mid term. In all governmental institutions, Party committees exercise an important role, and Party membership is a definite advantage with respect to promotion and participating in crucial policy setting meetings.

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<sup>80</sup> CCP Charter Amendment, 2002, Preamble, paragraph 1

<sup>81</sup> China Constitution 1982, Preamble, paragraph 7

<sup>82</sup> Constitution 1982, Chapter 3, Article 86: The Premier assumes overall responsibility for the work of the State Council. The ministers assume overall responsibility for the work of the ministries and commissions. Constitution 1982, Chapter 5, Article 105: Governors, mayors and head of counties, districts, townships and towns assume overall responsibility for local people's government at various level.

Party's Role on Health Planning and Management

In health departments (as in other government departments) there are three decision-making forums for health planning and each of them has specific purpose and topic.

The *Party Meeting* is the top decision-making group chaired by the Party Secretary of ministry or health bureaux. The meeting has responsibility for making all important, strategic and final decisions. Ministers (or directors) with party membership attend the meeting.

The *Minister's (or Director's) Meeting* is responsible for administrative coordination. All ministers (or bureau directors) and the directors of departments attend this meeting.

The *Work Meeting* is convened by a vice-minister (at central level) or deputy director (at local level) who in charge of a specific field of health administration. Department directors whose responsibilities are seen as relevant to the agenda attend the meeting.

Interviewees described how RHP standards and proposals are approved by the Party Meeting, at all levels from the Ministry to the prefectural health department. Interviewees noted that other important health plans (five-year health plan, rural health plan, hospital reform plan, etc) also have to be approved by the Party Meeting. A senior health information official reported that, 'although the department of planning and finance has administrative responsibility for health planning, all final decisions regarding RHP should be approved by Party Meeting'.

The Party Meeting is supposed to reflect collective decision-making within the Party based on the principle of 'inner-Party democracy', and power sharing with management boards and mass society through 'democratic centralism'. However, the 'first hand' retains the right of final decision. As described by the CEO of a prefectural hospital, 'the quality of management and leadership is critical for institution development':

*All members of the Party Meeting and vice-presidents should keep the organisation's aims and annual plans in their minds. [...] Although the Party shares power with*

MACRO IMPACTS ON HEALTH PLANNING AND HEALTH INFORMATION SYSTEM DEVELOPMENT  
*other administrators, everyone in the organisation should follow the regulations that determined by the Party Meeting. (Hospital manager, prefecture of Jiangsu)*

*No matter how beautiful a job you have done, the Party Meeting makes the final judgement. (Health project manager, central)*

Health directors and institution managers are familiar with these arrangements. They try to have their proposals considered at the Party Meeting and push top leaders to approve and implement their plan, because the Party is more powerful than government.

*When a director of clinical department is promoted to vice-president of the hospital, he/she may control all resources for his/her own interests and easily gain professional and personal benefits. [...] In order to manage this issue, we prepared a new regulation: 'when a departmental director is promoted to vice-president of the hospital, he/she will simultaneously resign from the position of department director.' In the beginning, the policy faced strong resistance. [...] We then submitted a report to the Party Meeting and gained 'authorised power' to implement this policy compulsorily. (Hospital manager, prefecture of Jiangsu)*

Some local health officials criticised this system of Party dominance but they also believe that this system is a reality. They have to follow the rule.

*I do not think that the current RHP reflects the kind of planning described in textbooks and talked about by your academics. It is following the old way of the planned economy and under control of the Party. Why? The Party-State governing system is not able to adapt. All of us know that this political system is not good enough; however, we also know that other political systems cannot operate in China. (Health official, city of Shanxi)*

The continuity of health policy is affected by new appointments to the position of 'first hand'. The implementation of RHP stalls when a new leader seeks to carve out new opportunities for 'political achievement'. When a new 'first hand' takes up the position, he/she may not wish to continue to implement the policy of his/her predecessors. The new comers will be looking instead to create new 'political achievements' with his/her label. If he/she simply follows his/her predecessors, he/she will be characterised as 'attempt and accomplish nothing'.

*This is terrible for management. The 'first hand' always thinks that 'I want to make something by myself; I will not accept the plans and policies of my predecessors', whether the plans and policies are right or not. [...] Assessment and promotion of*

*leaders requires 'political achievement'. If the building is unchanged after your assignment, you seem to have done nothing. [...] This is a weakness of our political structure. The difficulty of the RHP reflects the weakness of the People's Congress and the dominance of the 'first hand'. (Health official, city of Shanxi)*

*According to our RHP, this area needs 2-3 CT machines. However, all leaders would like to approve hospitals installing more CT machines so that they can then label the new CT as his/her 'political achievement'. This achievement is visible and easily gained, but really wastes resources! [...] Improving rural health? They can deliver beautiful speech, but none of them does the 'stupid' thing. Leaders can disregard the approved policy of previous Congresses [...] for the sake of their political career. (Planning official, Guangdong)*

*Even if the People's Congress approves it, my plan still is at risk, because the new leader of Party and government might reject the plan according to their preference. I cannot ensure my RHP will run well after I leave. (Research institute official, central)*

#### Party's impact on information system development

In circumstances where the 'first-hand' dominates decisions, health information system development may depend on having a wise party secretary. A former CHSI director recalled how the Party Meeting approved the central health information establishment:

*In the late 1980s, the MOH Party Meeting made the decision to establish the CHSI. The department of planning and finance suggested that China should establish a National Centre of Health Information although we cannot build such a huge organisation as some countries. It became a topic of discussion in the Party Meeting. [...] After the Party Meeting, the MOH Party secretary (same person as minister) found me and authorised me to prepare the establishment of the Centre of Health Statistical Information. (HIS director, central)*

However, not all provinces and prefectures have been so fortunate. If health information is not seen as a priority by the first hand and if the deputy director in charge of health information at the provincial level is not a party member then HIS development may face difficulties. Two examples are found in the study provinces:

*Madam -- was satisfied with our work. She promises funding for HIS development. However, Madam -- does not attend the Party Meeting because she is not a party member. She can only provide her suggestions to the first hand; she cannot make the decision herself and she does not have voting right in the Party Meeting. Her impact is discounted and our HIS remains significantly weak [...]. (HIS manager, Beijing)*

*All department directors in the health bureau are party members and all of them attend the Party Meeting. [...] Our proposal for HIS development could be discussed in the top meeting. (HIS manager, prefecture of Guangdong)*

Thus, the political arrangements within the health bureau constitute one of the critical determinants of provincial health information system development. Without the Party's support, provincial HIS development cannot be adopted as a priority for health system development. Most provincial health information managers do not attend strategic decision-making meetings:

*HI managers in our province and at prefectural level also are not involved in the decision-making process. While the leaders sometimes enquire after specific data, they (the decision-makers) do not allow us to attend important meetings organised by the Party leader. (HIS manager, Xinjiang)*

*Health information system development has never been discussed in the Party Meeting because the Party secretary believed that health information is not a sufficiently important issue. (Hospital manager, prefecture of Jiangsu)*

An important political tool of the Chinese governing system strictly controls access to information. The Party's traditional approach in this respect has retarded further improvement in health information transparency. As one of my interviewees mentioned:

*Our producing information is not the same as criticising the leadership on all issues or problems. Our responsibility is to produce and release information and act as a medium for its distribution. However, newspapers and magazines in our county are controlled by the Party, actually, they disseminate information on behalf of the Party. We have to distinguish between our information system and the Party's media. The information system for health is not a tool of the Party, and does not have a political standpoint. The only thing we want to do is to make information more transparent. (HIS manager, city of Guangdong)*

In summary, during the transition from 'the rule of man' to 'the rule of law', the Party is still at the core of decision-making in China, whether on political or technical issues. The Party's influence extends to every corner of health management and planning, especially the appointment of senior managers and conducting external negotiations for the department's benefit. The Party's interest and the characteristics of the person who is 'first-hand' determine the direction of health planning and the opportunities for HIS development. Wise HI directors will work to improve their personal relationship (*guanxi*)

with the first hand with a view to gaining his/her support on HIS development. The Party controls information flows from bottom to top but does not have a tradition of supporting information sharing, distribution and transparency.

## THE ROLE OF PEOPLE'S CONGRESSES

According to China's 1982 Constitution, the People's Congress (Congress of the People's Representatives as full title) is the highest authority. The congress, including its standing committees is lawmaker, decision-maker, appointer and supervisor (Guangdong People's Congress, 2004). The People's Congress has been accused of being a 'rubber stamp' (BBC, 2004) because of its dependency of the Party but in recent decades, the People's Congress has shown signs of growing independence and changing from rubber stamp to real player. Since 1979, when the drive to establish a functioning legal system began, more than 300 laws and regulations have been promulgated. The 1982 Constitution emphasises the concept of the rule of law by which the Party and State authorities are all subject to the law.

A committee in National People's Congress (NPC) and local people's congresses, entitled the Education, Science, Culture and Health Working Committee, is in charge of legislating, discussing, reviewing and supervising health activities (Beijing People's Congress, 2002; Guangdong People's Congress, 2004). Currently, China has nine health-related laws<sup>83</sup> (People's Daily, 2002b), 31 health-related regulations (promulgated by the State Council) and many local health-related regulations (Cao, 2003). However, the health system and its activities are still handicapped by lack of legislative regulation; some health-related laws contradict each other; and responsibilities and rights have not been clarified. The NPC has received lots proposals for drafting the Health Law of China

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<sup>83</sup> Chinese health related laws established within two decades: Pharmaceutical Administration Law (1984), Frontier Health and Quarantine Law (1986), Communicable Disease Prevention Law (1989), Red Cross Society Law (1993), Maternal and Infant Healthcare Law (1994), Food Hygiene Law (1995), Blood Donation Law (1997), Licensed Physician Law (1998), Prevention and Treatment of Occupational Disease Law (2001), according to the MOH <http://61.49.18.68/wsflfg/>, retrieved on 20/04/03.

(People's Daily, 2002b) but still cannot schedule its promulgation within five years (Xinhua Net, 2003, 2004).

An important role of the People's Congress is to review and debate the government's health policy from the perspective of the people's interests. From the interviews conducted as part of this research, it appears that the interests of People's Congress representatives are different with government RHP officials.

*When the People's Congress was reviewing the RHP, we felt some contradictions between the interests of the representatives and government officials. [...] The representatives were critical that the RHP does not meet the need of the people. [...] They pointed out that the RHP formulators do not sufficiently concern themselves with the opinions of ordinary people. The representatives were concerned about how to control wild health care costs, how to protect women and children, how unemployed people might access medical care, how farmers access quality services, how to improve the quality of care, how to improve the doctor's attitude [...]. They criticised the RHP as only an urban hospital planning tool for government resource. They said that the RHP entered a wrong way. The debate forced us to re-think the orientation; what is the meaning of 'efficiency' and who is the beneficiary of the RHP? (Health official, city of Guangdong)*

The representatives raised fundamental questions for the RHP formulator: how to design and implement a health plan that addresses the interests of the community. In their inquiries and resolutions, the People's Congress representatives were focusing on availability, accessibility and equity of social resources allocation and its impacts on the health of people. However, the principal focus of the government officials was on generation of surplus and release from political and financial risks. The information presented by the RHP formulator was significantly out of step with the thinking of the representatives.

Unfortunately, studies on allocative efficiency of social health resources distribution have been weak (or non-existent) during RHP formulation. With the strengthening of the People's Congress, the government may get to hear more voices may be subject to more pressures from the community. Health planners will need to re-think the orientation of the RHP and health information systems will need to provide information which will support the kind of RHP which addresses the concerns of the representatives and community.

The reviewing and approving of RHPs by the People's Congress was not one of the recommendations of the RHP Guideline (NDPC et al., 1999). However, an official of the Development and Planning Commission of Guangdong confirmed that in most prefectures RHPs have been submitted to local People's Congresses, and some of them have been approved. Officials thought that the 'additional step' was not for widening debate and improving need-based planning, but for authorising and empowering the RHP. They believed that an approved RHP has lawful force, either as bargaining ploy or as a negotiating shield' in bargaining and negotiation, meaning that congress approval can enhance the status of the RHP in selling its ideas, or can serve as a powerful shield for fighting other stakeholders for resources and authority.

*Do not regard the noises. Representatives know nothing about our business. The diathesis of the common people is questionable. They always care about themselves, and care little about macro issues. Most of their requests are lifestyle and environmental issues and their own benefits. They are only concerned that medical service should be available in their community; they are only concerned with the 'red pocket' issues; and they are only concerned with convenience of service. They do not know what RHP is. They are too practical. Their perspectives are understandable, because their vision is narrow and limited. Only our government officials can think macro issues, like the RHP. [...] If I am an ordinary worker or farmer, I would not like to think about the RHP. [...] Planning is a function and know-how of government. My core opinion is that we need not care about the debate in the people's congress. Just push the People's Congress to approve the RHP, and then make the plan powerful. (Health official, Guangdong)*

*Although the RHP Guideline did not require that prefectural RHP be approved by the People's Congress, we hope that the Congress will approve it. This can make RHP policy more stable and powerful. (Research institute director, central)*

*We intend to get approval from the People's Congress, because if so, we have greater weight when negotiating with government departments. [...] If I want more staff, I can show a copy of approved RHP to the Personal Affairs Bureau, 'take a look please, this is a plan approved by the People's Congress; please allocate more working positions in the institution in accordance with the RHP'. (CDC director, city of Guangdong)*

*We sometimes use the hand of the People's Congress in hospital development. When we want to buy new hi-tech equipment and seek more funds, an approved RHP is a great brick knocking at the door. [...] We then feel assured and bold with justice*

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*when we ask the government to allocate more money. (Hospital manager, prefecture of Guangdong)*

Different government departments and institutions have different levels of influence in the People's Congress. The NDPC is more powerful than other ministries (MOF and MOH) and as a former CHSI director said, 'the People's Congress preferred to listen to the suggestions of the NDPC'.

*It seems that the health department lost power with the planning commission leading the RHP. But I am happy with this arrangement. The health department is weak among government departments and cannot lead health sector reform. We need a powerful leader for health reform. A health project led by the planning commission could gain significant attention in the people's congress. (Health official, Guangdong)*

*The RHP calls for extensive coordination and the NDPC has the capacity to coordinate with other ministries. More importantly, if NDPC leads the RHP, instead of MOH, the RHP can be put onto the agenda of the People's Congress and can be supported by people with power. The NDPC is happy to be involved as leader, because the work is done by the MOH, and the political achievement belongs to the NDPC. (HIS director, central)*

However, having nominally the highest authority, the People's Congress is still under the shadow of the Party (see Figure 9-1). The 'first hand' can change or modify any 'inappropriate' legislated rule and agreement, even reject the socio-economical plan approved by the People's Congress, although its rejection is 'unlawful'.

*You know, all regulations and plans approved by the People's Congress can be changed or rejected. RHP is still hard to implement, whatever or not it is approved by the People's Congress. Doing something in China is so difficult! [...] We have a fundamental principle when want to do something: get the attention of the 'first hand'. I think we need to go beyond this practice. If a country is regulated by law, to make up to the 'first hand' is abnormal. (CDC director, city of Guangdong)*

Quite apart from the RHP, the People's Congress also has supervisory power in relation to health information development. The NBS authorised the CHSI and PHICs to monitor the implementation of the Statistics Law in the health sector. The CHSI has sought to use this requirement to report to the People's Congress to increase the pressure on government in relation to the quality of health statistics.

*Once a year, health information units at all levels have to conduct monitoring activities in relation to the Statistics Law. The results will be reported to national government and the People's Congress. If some illegitimate events were found, they (local government) will lose face. (HIS director, central)*

*The Statistics Law is a useful tool for our statistics work inspection. If subordinates do not obey health statistics regulation, we can criticise them 'breaking law' or 'breaking rule'. This is serious. Nobody wants to take on this notoriety. (HIS manager, city of Guangdong)*

In summary, interviewees suggest that one of main reasons for the slow implementation of RHP is the lack of legislative support. Local health planners seek to empower their plans through People's Congress approvals. The planning commission is a more powerful player than the health department in People's Congress lobbying. The people's voice will tend to have greater impact on health planning. Debates in congress have raised increased consideration of allocative efficiency with respect to health resource allocation. It is pushing RHP to a more people-centred plan. However, the power of the congress is limited, especially in relation to Party secretaries fixated on their political achievements. Meanwhile, the annual assessment of the Statistic Law implementation provides health information units with an important lever for improving the quality of health information.

## **THE ROLE OF THE PEOPLE'S GOVERNMENT**

### Overview of Chinese government

The role of government in public health has been described as 'to identify priority health problem; formulate effective health policies; respond to public health emergencies; select, implement and evaluate cost-effective interventions to prevent and control disease and injury; and to allocate human and financial resources' (Pappaioanou et al., 2003). The Chinese government, appointed and supervised by the People's Congress, plays an important role in health management in China (World Bank, 1993, p.52). However there are some unique features of the government role in health development arising from the unique characteristics of Chinese government.

Firstly, the government's role in health is played out within a complicated bureaucratic system. There are five levels of governments (as illustrated in Table 9-1) and a complex network of commissions and ministries. This system is criticised for administrative inefficiency, lack of policy transparency and poor communication (Hu, 1998). Information flow through the government system is characterised by slowness and distortion. The reformation of China's administrative regionalism is presently underway based on strategies of: 'reduce provincial size, unite counties, simplify administrative level, innovate city administration and autonomous governing townships' (Dai, 2004; Zhong, 2004).

Level	Title of government	Number
<i>People's Governments</i>		
1	State Council, central government	1
2	Provincial government	22
	Municipality government directly under the central government	4
	Autonomous region government	5
3	Prefectural government	331
4	County government (in rural area)	2,109
	City government (in urban area)	663
5	Township government (in rural area)	43,511
	District government (in urban area)	5,902
<i>Resident's self-governance bodies (autonomous organs)</i>		
6	Village resident's committee (in rural area)	732,000
	Urban resident's committee (in urban area)	108,000

Source: Statistics Yearbook 2000, State Bureau of Statistics, 2000. Statistics Yearbook 2000, Ministry of Civil Affairs, 2000

Note: Does not include Hong Kong, Macao and Taiwan

**Table 9-1 Hierarchy of China's governments**

All governments below the State Council are referred to as 'local people's government'. According to the Constitution<sup>84</sup>, local governments are the executive organs of the People's Congress and state administrative organs at the corresponding levels. However, local government are in many ways 'branches' of the central government, as they have limited leeway to issue new regulations locally. In reality, local government are led and supervised by the Party committee, by the local people's congress and by the superior

<sup>84</sup> The Constitution 1954, Chapter 4, Article 62; the Constitution 1975, Chapter 2, Article 22; the Constitution 1978, Chapter 3, Article 37; and the constitution 1982, Chapter 3, Article 105.

level of government. No local government had the right to adopt legislation and administrative regulation until 1982. The provincial capital cities and some large cities (in 1982) and provinces (in 1995) have been allowed to issue local regulations and legislations.

As well as this slow devolution of legally defined authority, there has also been a process of increasing local autonomy because of economic development (as in other developing countries (Schwartz, Guilkey and Racelis, 2002)). Financial reform in the 1980s (Li, 2003d) is a critical component of China's transition, including reforms in public sector financing and taxation and these too are changing the relationships between the central and the local. The trend towards decentralisation has given provincial governments greater scope to make plans based on their own local conditions. Innovative health planning is evident in the developed area of China, in but in the inland and less developed provinces. Health planning remains closely tied to the centrally determined guidelines.

The Chinese healthcare system evolved as part of the planned economy over 28 years (Liu and Zhu, 1999, p.75) and during this time proved to be efficient and effective for controlling and preventing infectious diseases and ensuring access to primary health care with limited health resources (Yin, 2003).

During the early stage of the transition towards a market economy, Chinese health planners recognised the need to be flexible and respond positively to social, economic and political change (Koplan, Hinman, Parker et al., 1985). However, the transition has been slow, uncertain and halting in the health sector in comparison with the industrial sector (Gong, 2003a, 2003b).

The barriers and difficulties being encountered in the implementation of RHP highlights a number of contradictions and challenges with respect to the government role in health administration generally.

Fragmented health administration

Regional health planning needs strong coordination, cooperation and communication among government departments at the regional level. In reality however, the health system is divided up into many isolated silos and blocks by the boundaries between vertical and horizontal administrations. Each silo and block has formulated policies and many of them are controversial. This fragmentation affects the formulation and implementation of regional health plans.

*The RHP is not a Utopia; it exists in a reality. [...] Departmental cooperation is very difficult at the city level, unless there is a 'red title document'<sup>85</sup> from top level. (CDC director, city of Guangdong)*

*It is ridiculous for us to try to formulate an overall regional health resource allocation plan. We cannot touch the health resources of the industrial sectors and the military department; we cannot touch hospitals administrated at the central and provincial levels. [...] If you have not a TV set while your neighbour has two, how can you move one of those TV to your home? (Health official, city of Shanxi)*

*I cannot touch the provincial hospital in my region. It is invested and administrated by the provincial health bureau. I have gained limited power on regional health resources allocation. I used same way to handle my subordinates. I invested money for improving the city hospital. How can the district and private hospital survive? (Health official, city of Shanxi)*

Visible achievements

It appears that like the Party secretary, government officials prefer to be identified with visible 'administrative achievements', which will lead to further promotion. Preventive service and basic medical care are cost-effective but invisible (at least in short-term) and government officials may prefer to allocate more resources in more visible fields, such as constructing giant hospital buildings or purchasing hi-tech equipment.

*Although experts present lots of evidence on the cost-effectiveness of preventive and basic medical care, governors still believe those investments are inappropriate. The*

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<sup>85</sup> The Party and government release documents, which titles always printed as red characters. The commands from central party and government is informally called red title document.

*governor of the district government said 'I approved the construction plan for the district hospital. What a beautiful building it is! How advanced the equipments which has been installed! It is capable of providing comprehensive care for senior leaders.'* (Health official, city of Guangdong)

*[...] After I was assigned as head of the information unit, I have been frequently criticised by my boss (the health bureau director). The director told me that I am not as good a manager as the previous guy. As I know, my predecessor was keen to fawn upon the director. His information reports always demonstrated positive results and he sometimes modified data to show positive results. I argued with the director: 'my troubling work should be praised, while my predecessor should be censured.'* My boss lectured me, 'young man, do not be naive. You have not found the right 'way''. (HIS manager, prefecture of Guangdong)

### Contested territory between central and local government

Despite the central government's endorsement of regional health planning and its identification of the prefecture as the level at which regional health planning would be focused there has been no move to rationalise the powers and responsibilities of different levels of government with respect to health care. Despite the movement towards decentralisation, the superior levels of government have not given up their powers and involvements at the local level, while local governments have sought to exercise greater authority with respect to local service systems. However, regional health planners have not had the power to force powerful provincial and even central authorities to comply with regional plans formulated in terms of the needs of local communities.

*The provincial (government) budget supports the provincial hospital, the prefectural budget supports the prefectural hospital, the city budget supports the city hospital, the district budget supports the city hospital, and the township budget support the township health centre. However, the prefectural RHP can only influence prefectural government resources. How can we implement the RHP in that circumstance?* (Health official, prefecture of Jilin)

On the other hand, the SARS epidemic exemplifies an issue which required national coordination but which faced significant barriers associated with local level parochialism. During the epidemic, there were stories, from the provincial level to township and even village levels, of local authorities refusing permission for SARS patients to stay in or even pass through their areas.

Special interest groups also affect regional planning.

*A Taiwan millionaire intended to invest one billion to build a new hospital in our city. As health director, I cannot withstand such pressure, even if the is already over-supplied. If I persist in accordance with the RHP, I will be dismissed. (Health official, city of Guangdong)*

*We emphasised control of entry policies – institution entry, equipment entry, workforce entry. However, those measures could not really be implemented. The ‘gang of princes’ is too formidable! They have high-level patronage which they deploy as needed. Who can stand against that? (CDC director, city of Guangdong)*

### Regulatory capture

There is a strong culture in China of ties of patronage and loyalty between sectoral bureaucracies and the industrial sectors which they regulate. A former health minister alleged that ‘I am not a general hospital president for the whole country. I am a health minister who serves China’s people’ (Zhu, 2002b). The State Council and the MOH tried to restructure the relationship between health department and medical institutions. However, when Dr. Zhang tried to advocate this people-centred health policy in the MOH, he faced strong resistance. A similar situation exists in other government departments. Government departments (including military administration) are likely to protect ‘their children’ from having to comply with the disciplines and restrictions of the RHP.

*For the people? It is only a slogan. My direct duty is to ensure the public hospital’s business and the public doctor’s benefit. (Health official, city of Shanxi)*

Health planning, like planning in other sectors, is a political process. Planning and management are ruled not (solely) by law but (in part) by stakeholder bargaining.

*The DOMA has conducted many detailed investigations in order to develop a realistic hospital reform plan. However, the departmental plan was never approved nor implemented. Why? This department is not the real decision-maker, although notionally the department has full responsibility for hospital planning. This is a political process; the real plan for hospital reform was the result of bargaining among eight ministries. This is the real situation of health planning. (Research institute director, central)*

*The MOLSS and the MOH have reached agreement on financial and information sharing aspects for implementing urban medical insurance. However, the problem was not solved. There are strong contradictions between hospital and insurance manager. (Planning official, central)*

*I like the RHP, because it provides me with a powerful tool for playing games. For instance, in the morning, a private doctor (who has 'guanxi' with me) called me for opening his clinic in urban community. I positively approved his application and told him 'that is what we want based on RHP'. However, you know, I refused many other applications (which were sent by doctors without guanxi), and told them 'that is not what we want based on RHP'. (Health official, city of Shanxi)*

### Planning in part completed transformation

Previously, healthcare was provided entirely through government health institutions and was regulated through hierarchical control. Government planners determined everything, from the number of hospitals, to beds and equipment, to service type and price.

The transition from a planned economy to a market economy calls for different approaches to health planning but the health sector has not completed the transition; it is only part of the way. On the way from market-free planning to market-based health planning, planners are uncertain about methods, indicators and approaches, particularly approaches to implementation. The health minister has suggested that government and market forces should be considered simultaneously. However, planners who are working at the conjunction of neither government nor market have little to guide them.

Compared with industrial sectors, the health sector lacks a tradition of private enterprise, especially in the urban areas. Negotiating the transition in the health sector appears to be harder and slower than in other sectors (such as education). Whether China's health reform should be market-oriented or not is still sensitive and a topic of continuing debate (Zhang, 1992, p.102).

Reforms in other sectors (such as financing, taxation and monetary system reform, establishment of contemporary enterprise management system, marketisation of capital, labour and materials, reform on social security system) have significant impacts on the

health sector, some of which exacerbate the problems the planners are trying to deal with and others continually change the field of implementation. A major feature of this changing environment is the progressive reduction in government funding in the face of increasing pressure of health needs. Health sector reform is being pushed by top leaders and by other departments, in particular, pushing for improvements in efficiency and performance. Health planners who are accustomed to a more extensive approach to planning (focusing on capital and facility development) are being expected to adopt a more intensive model (improving efficiency, effectiveness and performance).

Both the visible and the invisible hand have a role in shaping social and economic development and hence in implementing plans but both hands have their own weaknesses. Risks of market failure and of government failure hang over the planner who over-emphasises one hand and ignores the other. Health service products are not typical market commodities. The Chinese government understands that the nature of health care requires a continuing government presence, in particular to ensure efficiency, effectiveness and equity of access. They believe, from the experience of other countries, that regional health planning is an important vehicle through which government can regulate health services. 'RHP is becoming an international trend' (Yang, 1999b, p.7).

Nevertheless, the borderline between government and market is unclear. Some officials questioned the contradiction between policies of regional planning and creating a medical market. Others criticise the logic of the regional health planning policy.

*In my view, to force provincial officials to formulate RHPs and resource allocation standards under strict central guideline was not appropriate. It may provide more help to the provinces if the central level were to provide procedures, principles, tools and measures for regional health planning. The RHP procedure should not be comprised of strict unique steps, but a guide which tells provinces what they should be concerned about at what steps, what tools could be used at what steps, what appropriate indicators could be measured at what steps, what the RHP might look [...]. Such help, I believe, may gain better effects than the current strict standards. (Health project manager, central)*

The current position of government in relation to health care has been criticised as 'malposition (*cuo wei*), offside (*yue wei*) and imperfect (*que wei*)' (Yin, 2003). On the

one hand, governments at every level own many medical institutions and allocate huge amounts of funding, which lack of competition and low efficiency result in low levels of public satisfaction. On the other hand, inadequate resources are being allocated to disease control and prevention, and to health law and inspection. The current system is not well positioned to mount an appropriate response to public health crises.

System wide changes shape the role of government in planning. With the transition to the market economy, hospitals depend less and less on government subsidies so the use of financial power as an implementation tool to force particular directions with respect to service provision and location is greatly weakened. Administrative orders and regulation of entry have been seen as major implementation tools but they are tools with limitations and adverse effects if used inappropriately.

Health sector reform is not an internal change happening only in the health sector. External policy supports such as the public financing framework, distribution system (including prices), human resource management and property rights reform all affect what can be achieved in the health sector. A professor of Tsinghua University has appealed: 'please give time for reform to take effect; there are limits on what can be achieved immediately' (CCTV, 2003). It is expected that a well-performing 'law-based government' will be established within ten years (Takunpao, 2004a).

In summary, the formulation and implementation of health planning depends on appropriate government structuring and functioning, within and beyond the health sector. Health planners do not have experience in health planning in a market system nor in a system that is part government and part market. The five-level government system imposes a number of complications which have to be addressed including tensions between the Party, People's Congress and government and between central and local authority. The parent child relationship between particular bureaucracies and the sectors that they supposedly regulate ('regulatory capture') is a further limitation on implementation of health plans. Administrative fragmentation makes cooperation, coordination and communication difficult. Planners also confront limitations on

implementation where powerful stakeholders deploy political influence to over-ride the directions of the plan.

These considerations are all relevant also to the development of information systems to support regional health planning. Information system development also requires the projection of clear vision and objectives by government with respect to health administration including health planning.

## **SOCIOLOGICAL PERSPECTIVE ON HEALTH PLANNING AND INFORMATION SUPPORT**

### **SOCIOLOGY IN CHINA**

Sociology provides a theoretical framework for theorising social reform and an important component of the curriculum for training in policy analysis and policy reform (Yang, 2000; Liang, 2003). Two pioneers in Chinese sociology, Yan Fu<sup>86</sup> and Cai Yuanpei<sup>87</sup>, emphasised the practical contribution of academic studies in the discipline to the navigation and steering of social development. With a principle of ‘to learn from the west for eastern incremental change’ (*xi xue dong jian*), Chinese sociological precursors introduced Western works, initiated new educational programs, and conducted many well-known demonstration studies, which contributed significantly to the localisation of theories and the theorising of practical experience (Wu, 1999a; Wu, 1999c).

Chinese sociologists actively explored new and entirely different ways of conceiving the future of the nation and people. The ‘Rural Reconstruction Movement’ suggested that rural China should be the standpoint for problem solving. Yan Yangchu (Y.C. James Yen, 1893-1990) led the Dingxian Experiment (1929-1936), an integrated social program for enabling people to end their ‘unwisdom, poverty, sickness and selfishness’. The

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<sup>86</sup> Yan Fu (1853-1921), famous ideologist, educator and translator, president of Fudan University in 1906 and first president of PKU in 1912.

<sup>87</sup> Cai Yuan Pei (1868-1940), president of PKU in 1917.

Experiment included activities in education, health, livelihood and local self-government that were run by people themselves (Jiang, 2003; Liu, 2003c). Working with Yan, Dr. Chen Zhiqian (C.C. Chen, 1903-2001) tested a new rural health system (primary health care and barefoot doctor), which focused on improving sanitary conditions, health education, village doctor training and family planning. This system is still recognised by many as an appropriate model for China's rural healthcare system. Dingxian Experiment also reflected the early spirit of evidence-based health planning in China, in which health policy and planning are rooted in an understanding of local cultural, social and economic development (Liu, 2003c).

Sociology was re-awakened in China from 1979. In the initial stage of China's opening-up and reform, Chinese sociologists carried out studies addressing new and oncoming social and political questions (Qi, 1996; Liu, 1999b; Li, 2000; Wang, 2001; Li, 2003c; PKU, 2003). From the 1990s, sociologists have theorised about and conducted empirical studies on various social transformations, from the planned economy to the market economy, from agricultural society to industrial and information society, from the rule of man to the rule of law (Cheng and Cai, 2000; Li, 2000; Yang, 2000).

## **GOLDEN MEAN – SOUL OF ORIENTAL CULTURE**

One of the ways in which traditional Chinese culture impacts on health planning is the traditional harmony and unity ideology. In this context, the utmost centralisation would be a deviation from the golden mean of Confucius (*zhong yong*). Therefore, decentralisation involves 'walking through the middle of the road' (Wu, 1999b). Interviewees stated that health planning is a process of finding the 'middle way' between extremes:

*We have to find ways between government and market, between centralisation and decentralisation, between institutional development and the people's health, between efficiency and equity, between rural and urban, between short-term and long-term benefits. [...] With Chinese philosophy, we do not intend to eliminate something. We want all things to exist harmoniously. (Health official, city of Guangdong)*

To reach this ideal realm is difficult. Although the ultimate centralisation has been broken and local initiative has been stimulated, the adverse effects of decentralisation have already appeared. Conflicts between central and local and among local governments are many. Subordinates are always able to deploy counter-measures against central policies, in order to protect or advance their local benefits. Local leaders interpret central or higher level policies in ways which favour their own interests.

‘It is long way to reach the harmonious goal’, a university professor of Guangdong commented during the interview study. ‘The political system of future China will still involve the dominion of the centre with some degree of decentralisation. Centralised planning will remain as one of the most important tools of governance’, this professor stated. A provincial planning official agreed with this opinion: ‘all sectors have to work in accordance with agreed principles and be subject to the direction, supervision and sometimes necessary intervention by the central level’.

*The tension between centralisation and decentralisation has a significant impact on health planning. We always try to solve the puzzle, because to find the middle way is our philosophy. (Planning official, Guangdong)*

## **REGIONAL CULTURE AND REGIONAL PLANNING**

Regional culture has a significant impact on regional planning. The impacts of culture on health planning in different areas of China are diverse. A former CHSI director commented that: ‘cultural and political factors exist simultaneously and interactively’. People of eastern China tend to pay their political attention ‘downwards’ (responsible for people and community) and tend to take risks for subordinates, while people of Western China tend to pay their political attention more ‘upwards’ (responsible for the Party and superiors), and tend to take risks for their boss’.

*City B has more advantages. However compared with City S, City B has fallen behind City S by at least 10 to 15 years! (Laughing). The health planners and officials of City S are keen to express their own opinions on health planning and management, whether their opinions turn out to be right or wrong. They have a tradition of argument and debate. They always keep thinking. How about City B? Apart from*

MACRO IMPACTS ON HEALTH PLANNING AND HEALTH INFORMATION SYSTEM DEVELOPMENT  
*alcohol drinking, they do not have any other advantages over City S (forced smile). (RHP researcher, Beijing)*

*People of City B are given to ‘more talking than doing’, while people of City S are prone to ‘more doing than talking’. Therefore, in City B health planning is specious, while in City S health planning is actuality. (HIS manager, city of Guangdong)*

*People of Western China persist in waiting for commands from the upper level. [...] They always ask me ‘what “imperial edict” have you brought to me?’ (Laughing). They are too lazy! They are always waiting and waiting. They never do something that was not mentioned by the upper level. (HIS director, central)*

Health planners of Shenzhen city complain that ‘it is a culture-poor place’. Located in Zhujiang Delta, Shenzhen was a tiny fishing village before the 1980s. The city quickly developed after 1980s (as a special economic zone) based on mass production industry. Huge numbers of migrants helped Shenzhen realise primary capital accumulation. When Shenzhen became a new and hi-tech industries city, it was found that cultural foundations are poor, because most labourers are indigenous farmers and most middle classes are adventurers and upstarts.

*Cities of the inland cannot learn from Shenzhen, I think. The sprit of Shenzhen is innovation and adventure. We can revoke unfair household registration regulation; we can issue FOI [...]. However, in most traditional cities, they do not dare to do so. (HIS manager, city of Guangdong)*

*This situation also affects our health planning and management, and we have to consider this in the RHP. What are the needs and demands of this particular population in this particular place? Our challenge is how to formulate and implement a practical and scientific RHP in culture-lacking Shenzhen. Although we have the money to invite many scholars to help us, our officials and scholars need to spend time and energy knitting a RHP into the social fabric of Shenzhen. In the two Deltas<sup>88</sup>, the ‘fabrics’ are different, so the threads are also different. (Health official, city of Guangdong)*

## **MEDICAL CULTURE AND REGIONAL PLANNING**

When the interviewees were asked to identify the main players involved in RHP, none of them mentioned any professional associations. The role of Chinese professional

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<sup>88</sup> Changjiang Delta and Zhujiang Delta, refer to China’s two developed geographic areas.

associations in the regulation and planning process is somewhat different from that in the Western world. Traditional Chinese medicine (TCM) practitioners providing medical services in China work as solo practitioners. Teamwork is unnecessary. TCM practitioners have not seen the need for an association which would exercise self-regulation and communicate with society and other professionals on behalf of the discipline.

*Chinese doctors lack a sense of solidarity. For a thousand years, there is not a real doctor's society. Actually, they are not needed. (Health official, city of Shanxi)*

*As I know, many health reforms in the Western world are processes of negotiating between government and professional associations. In China, government cannot find targets of negotiation. (Professor, Guangdong)*

*The government runs the medical association in China. The association is too weak to impact on the management and regulation of medical practice. [...] In fact, the medical association in China is a semi-governmental institution and largely plays the role of government. The association is a dependent organisation, because most leaders of the association are former officials of health departments. The association is not very active. It only follows the direction of the health department. These associations are not strong enough in relation to their capacities for professional governance and independent functioning. (Health official, Guangdong)*

Strong professional associations can play an important role in policy formation, government accountability and in articulating a professional view about infrastructure development such as information system development. In Western countries professional associations representing management professionals and public health professionals as well as clinical disciplines can play such a role. In China, the government (health bureau) handles the role of the professional association.

## **COMMUNICATION CULTURE**

Chinese cultural traditions also contribute to the structure and pattern of health information collection and reporting. The general pattern of reporting and communication has been one-way, from bottom to top. For a long time, rulers did not admit their dependency on information. A thousand years ago, rulers were recognised or self-

flaunted as the ‘Sons of Heaven’. They were sovereigns and knew everything that happened in the world, so they did not need an information system to support their dominion. Later on, statistics organs were established on the base of imperial power. A major aim of the information system was to ensure the collection of tax.

*With the long history of China, this tradition of ‘bottom-up reporting’ is hard to change. Everyone accepts the one-way pattern as normal. People will feel oddness when the direction is reversed. (Statistics official, city of Shanxi)*

## UNDERSTANDING THE IMPORTANCE OF CULTURAL INFLUENCES

Findings from the interview study suggest that health planners are aware of the possible contribution of sociological thinking in health planning. This finding is consistent with other Chinese studies (Zhang, 2000a; Li and Wang, 2001; Wang, 2002a; Liu, 2003b). Interviewees acknowledge that cultural factors influence health planning in all settings, including other sectors and other countries.

*Why are we not able to directly copy the experience of other countries? Why cannot the RHP of one prefecture be directly introduced into another prefecture? It is (because of) cultural difference. (Health official, city of Jilin)*

*Many health planners emphasise the particularity of health services, and disagree that the experiences of other sectors and other countries can be borrowed. However, I believed that there are not any specific differences. [...] We have knowledge of demand elasticity, consumptive willingness and ability to pay. However more importantly, we have to understand more about traditional factors such as culture and values. From this point of view, there is not any difference in terms of how we think about planning from the other sectors. (Health project manager, central)*

*Development of an enterprise needs three strategic plans: institutional arrangements, long-term development, and most importantly cultural construction. The cultural and social factors may determine the future of a career or an institution, because the cohesiveness and trustworthiness (internally and externally) determine the sustainability and practicability of long-term planning and development. Some famous enterprises have implemented their cultural strategy, such as the Haier Corporation [...]. The industry’s approach could be used in government planning. For national and regional health development, we also need to focus on institutional arrangements, long-term planning and cultural development. (HIS director, central)*

Interviewees suggested that RHP design and implementation should base on a multidisciplinary principle, involve geographical and cultural concepts in planning the region's health development, instead of treating it in one-dimensional way as an administrative region.

*What is the 'region' of the RHP? It is defined as an administrative area – the prefectural area. However, I think the definition may not an appropriate one. Region is a complex concept, which should reflect geographic, cultural and political aspects. (Professor, Guangdong)*

*A pluralistic approach to regional health planning is taken in many other countries. The geographic perspective is useful for health planning and management [...]. However, the distribution and magnitude of health needs and demands do not necessarily correspond to administrative arrangements and institution ownerships. They depend more on cultural and ethnic features. Although health planners may not be experts in sociology and anthropology, they have to be able to take a pluralistic approach to the RHP, and consult and learn from experts when designing and implementing the RHP. (Health project manager, central)*

*The success of RHP depends on having an appropriate management system. The RHP was recognised, by most people, as being an administrative activity of one specific government department, in circumstances of departmental fragmentation. The RHP was recognised as a process of formulating, reviewing, documenting and approving. I think however, the RHP should not be recognised as this way. The RHP should not be abstracted as a specific administrative activity. [...] This process is complicated and relates to many organisational, structural and cultural contexts. [...] We have to understand its background, including social, economic, political, cultural and historical contexts. We have to understand the macro complexion of health development; and we have to clarify roles and policy priorities of the RHP in circumstance of the macro environment. (Planning official, central)*

One of interviewees, who has rich experience working on the RHP in a prefecture of Hebei Province, argued that the current RHP did not address the real needs of the population and society, because it failed to consider social and cultural factors.

*We have to re-think the RHP! Currently the RHP is lacking in practical and scientific features. Some officials complain that governments do not pay attention to the RHP and it is difficult to implement. According to my understanding, the sticking point is that we do not appropriately formulate and implement it. The RHP is a good thing [...] in its demand- or people-centred ideology. However, without a clear understanding on community needs and their cultural and political context, how can you say that the RHP is a good plan? (Research institute director, central)*

Many interviewees suggested that this failure to properly consider the cultural, political and economic context could also be seen in rural health planning, in particular, in the re-establishment of Cooperative Medical System (CMS) in rural China, and was likely to lead to disappointment in this field as well.

*The history of the CMS of booming and collapsing provides us with profound experiences. Those experiences should teach us to understand the context of health policy. More importantly, you have to know about people's beliefs and values. (Health official, central)*

*The Chinese people prefer to save money in a bank. It is not only a result of the weak social security system, but also a cultural tradition. It is not appropriate to just release a new medical insurance policy while ignoring this tradition. (Health official, Guangdong)*

*'Without medication visiting the doctor is meaningless', 'a doctor who prescribes expensive medicines should be one with high skills'. That is our cultural tradition. We recommend people visit CHSs for continuous care and cheaper healthcare. However, people look down on GPs and prefer instead to crowd into the tertiary hospital. (Hospital manager, prefecture of Guangdong)*

*When I attended a meeting that focused on rural health planning in a province, local health officials were ashamed of the unsuccessful CMS recovery. [...] I told them: 'Please do not criticise yourselves in that simple way. You took on a responsibility that you should not have taken on. Why do you not look on the changing environment and chat with peasants? Do they really want the CMS? If yes, what kind of? If no, why? You did not find the hinges of success. CMS is not only a health plan, it lives in a real world and should be recognised as a component of community. You cannot expect to simply copy a rational CMS model to your county'. (HIS official, central)*

*Lack of community participation and involvement contributes to lack of community support. Lack of contextual understanding leads to subjective and bureaucratic decision-making. The decision model is changed, the unsatisfactory RHP formulation and implementation were the result of a dependency on superior direction and missing information on the cultural, economic and political context. (Research institute director, central)*

The information provided to regional health planners has been primarily quantitative and lacking an analysis of cultural and social factors. It is going further away from the Dingxian model. This deficiency in the RHP process was recognised by all interviewees at the central level and most interviewees in developed areas of China.

*We must have regard to our history and culture when we introduce new theories and tools into health planning and management. The process of planning is a re-learning process. We have to review our history and cultural background. This is a process of examining the soil before planting a new type of imported flower. We have to invite experts in political science, social science and management science. We have to understand the meaning, value and impact of the RHP from a multidisciplinary perspective. (HIS official, central)*

*If our health program decision-makers want to authentically improve their performance in health planning, the current information support is less than adequate. I think we need to conduct more sociological surveys, in order to gain a better understanding of the real needs and demands of populations for healthcare, and their opinions on health services and systems. On a broadly based understanding, we then can formulate and implement a practical RHP and improve the effectiveness of health planning. (Health official, city of Guangdong)*

Increasingly, central and local health planners tended to use some ‘external’ data (economic and demographic data) for the RHP. However, relevant ‘external’ and qualitative data should be systematically collected and analysed. Although information planners are beginning to pay attention to social factors, in the words of senior central health information official, ‘the understanding of social influences on health services has been extremely poor’.

In the RHP Guidelines, the collection, analysis and utilisation of sociological information was not highlighted as important evidence for health planning. However, the findings of this study suggest that social and cultural factors sometimes play a key role in health planning and implementation. Regional culture, social psychology and local cultures all influence planning outcomes and with great regional diversity. The traditional ‘urban-rural-split’ social structure is not always appropriate in regional health planning. Rapid urbanisation, as in Shenzhen, suggests that health planners should consider the new urban culture when they are formulating their plan.

Neglecting sociological factors in health planning and information system development has many causes. For a long period, social science has been neglected and distorted training programs have been weakened (Fang, 2003). Fortunately, many Chinese officials, experts and planners are now paying attention to this issue. Interviewees in this study

have argued for a multiple perspectives approach in health planning rather than considering regional features only in terms of administrative boundaries. They have argued for sociological research directed to understanding social factors in health planning. They have pointed to the need to involve communities and people in the processes of health planning. These arguments have profound implications for health information production. This is a significant challenge for current HIS management. As mentioned by one of the interviewees:

*Compared with the past, we have more competent and well-educated staff for health planning and information. They work hard and are dedicated. However, this does not mean that we have better health planning and implementation. We need to look more closely at our community. But it is too complex ! It is too unpredictable! (HIS manager, city of Guangdong)*

In summary, as one interviewee commented, ‘civilisation is a long-term process of historical accumulation’. Sociological factors and cultural traditions are broad concepts, far too broad to have been systematically evaluated and analysed in this study. The purpose of this research is to evaluate, analyse and draw conclusions regarding health planning and health information. The influences of sociological factors on health planning and information system are obvious. It is partly because healthcare and information systems are themselves important components of society and culture. Improved understanding of the cultural context of decision-making and information support will help planners and managers developing plans that are more realistic.

## SUMMARY

Health planning and information system do not exist in a void. Their development is shaped by many macro factors. As observed in this study, macro political effects, historical and cultural influences all have significant impacts on health planning and ways of information support.

The political aspect of health planning has not been well recognised. However, the experience of health planning in other countries and of the SARS crisis in China may

serve to awaken the planners and researchers on this and to warn them that health planning is not a purely technical field.

Some of the key findings in relation to macro including political influences are as follows:

(1) Chinese decision-making is still dominated by the 'first hand'. Personal impacts on health planning and information system development are significant, especially when 'first hand' seeks 'political achievement'; (2) the People's Congress provides some scope for formal accountability in health planning and management. While the people's voice sometimes runs counter to government purpose, the People's Congress could be used as a political lever to empower the RHP; (3) government function on health governance was not be set up appropriately. Huge and complex bureaucratic government, benefit and power-driven department fragmentation, as well as increased local protectionism during decentralisation embarrassed health plan formulation and implementation.

Contemporary health planning from a sociological aspect points to the following important influences: (1) centralisation will continuously exist in long period of time, although Chinese leaders do not stop find the 'middle way'; (2) 'urban-rural-split' social structure is difficult to exceed when RHP intends to integrate regional health resources; (3) idealist and technical bureaucratic health allocation plan are often overturned by local cultural, social psychological and traditional forces; (4) new culture and globalisation brought new challenges to quick development areas; and (5) it is hard for the medical association to be an effective party for regulating medical practice.

A number of suggestions for future practice emerge from these findings and analysis: (1) promoting democratic and scientific decision-making to the position of 'first hand', would be a fundamental prerequisite for rational health planning and an effective HIS; (2) strengthening information to and communication with the people's congress would help to mobilise their support for the goals and implementation of improved health planning; (3) improving information production and dissemination may help to promote government restructuring and departmental cooperation; and (4) introducing information about sociological influences will strengthen information support to planning.

## CHAPTER TEN

# **FUTURE DEVELOPMENT OF REGIONAL PLANNING AND IMPLICATIONS ON HEALTH INFORMATION SYSTEMS**

If the value bases of health planning are not made coherent and explicit, information system cannot be set to assist in accomplishing a better health care system (Mooney, 2003). Building on the research findings presented in previous chapters, and having regard to current international trends in health planning, this chapter sketches some of the likely developments in RHP and health services administration in China over the next 5-10 years. The implications of these developments and trends for provincial HIS are discussed.

### **DEVELOPMENT OF REGIONAL HEALTH PLANNING IN CHINA**

#### **HEALTH PLANNING FOR REGIONAL DEVELOPMENT**

The vision of the health planners will become wider. As discussed in Chapter Two, health planning and management have evolved considerably in recent years along with social, political and economic development. Nonetheless, the effects of longstanding arrangements and systems on health planning practice will continue for a long time. Current constraints on health planning, for instance administrative fragmentation, will not be resolved easily. Meanwhile, newly introduced constraints, such as the separation of health administration from health insurance, have further weakened the power of the health planners. Most current RHPs examined in the context of this study were conceived within the narrow silo of health bureau administration. Planners were not authorised to include all of the different funding streams contributing to the health care of the regional

population in planning to redirect 'regional' resource allocation. Their efforts were restricted to rearranging certain sub-classes of public assets and funding streams.

One of the leading principles of China's SME transition in last two decades has been 'to find a trade-off between social and economic development' (CCCPC, 2002). However, social and economic objectives are not always antagonistic. The SARS crisis in 2003 alarmed decision-makers; they recognised afresh that the implications of health development go beyond simple medical and health considerations. Health planning is now understood much more widely as an important determinant of sustainable socio-economic development (MOH, 2003b).

This appreciation of a wider social responsibility will encourage health planners to consider health resource allocation in the context of regional development. This new vision brings new challenges to planners and HIS.

### **HEALTH PLANNING IN SME AND THE GLOBALISED ENVIRONMENT**

RHP will need to adapt further to the new macro environment of market transition and membership of the WTO. Health planning is intricately related to the SME environment in which it takes place (MOH, 2003b). 'Market forces play a fundamental role in resource allocation', 'public ownership plays a dominant role but other forms of ownership develop side by side'. These key principles have been confirmed again at the 16th National Congress of the Chinese Communist Party (CCCPC, 2002). Health planners may have to develop new tools. Government is withdrawing from participating directly in health care and increasingly leaves the immediate investment and consumption choices to market forces. Current government policies for negotiating the transition include: the reform of property rights, distinguishing between for-profit and not-for-profit health providers; encouraging social, individual and foreign investment (Li and Zhu, 2003); and reshaping government dealings with health service providers as an arm length relationship. It is intended that resource mobilisation and productive efficiency will be encouraged through competitive market mechanisms. RHP, which is directed also at

equity and allocative efficiency, should have regard to the emerging market conditions; should achieve its objectives by shaping the ways in which the emerging markets work.

## **STRENGTHENING REGIONAL PUBLIC HEALTH AND BASIC MEDICAL SERVICES**

As discussed in Chapter Two, China made a significant achievement in the reform of government functioning, during the recovery from the chaos of the Great Leap Forward and the Cultural Revolution. Further restructuring in 1998 directed to managing the SME more effectively was explicitly directed at establishing efficient and uncorrupted government (CCCPC, 2002).

China has always been proud of its achievements in 'equitable' health service delivery under the planned economy. However, it is also recognised that the previous model did not satisfy increasing and increasingly diverse needs. Equity under low efficiency is not a good model for social development. The SME based on the principle of 'economic construction at the centre' has led to dramatic improvements in productive efficiency in many sectors. However, unregulated health service delivery is widely recognised as being at risk of market failure on several grounds. In this circumstance, the proper role of government is to correct and prevent market failure: by providing or purchasing health programs as public goods and promoting universal access to basic medical services.

The proper functions of government have been identified as 'policy regulation, market supervision, social management, and public services provision' (CCCPC, 2002). Unfortunately, government has been absent when certain public goods were needed. Government responsibility for public health and essential healthcare has been affirmed (Hou and An, 2003), especially population-based public health services (immunisation, STD and HIV/AIDS control, TB control, etc.), rural health care, and health services for vulnerable populations (women and children, unemployed, financial dependents and those living in remote areas) (MOH, 2003b). Government is also seen to have a role in market entry control with respect to institutions, workforce categories and technologies

(equipment). Medical and pharmaceutical services will continue to be supervised and evaluated on a continuing basis as well (Hou and An, 2003). All these efforts are seen as part of achieving the policy goal of 'establishing a well-off society by 2010' and achieving the targets of the Millennium Declaration (United Nations, 2000).

To successfully provide more public services and encourage more accessible primary care depends not only on more government investment, but also on appropriate strategies for regional resource allocation. Public health resources could be based on (1) a population based input (budget) funding approach, such as the RAWP of UK (1976) (Shaw and Smith, 2001), which allocated resources to regional and district health authorities on the basis of population and needs; (2) regulatory approach, such as the certificate of need legislation introduced in the US (in 1974); or (3) a combined approach of both regulating and directive funding.

Current regulatory approaches to health resource allocation in China focus on input controls (facility development control and labour force entry controls). However there are other kinds of levers which can be used to shape the flow of money and services including utilisation controls (1973) and capped purchasing through prospective payment (1986) in the US and GP fundholding in UK. A broader range of regulatory tools including utilisation control and the capping of recurrent expenditure are likely to be used increasingly in China in the future.

### **FOCUS ON IMPROVEMENT OF VERTICAL AND HORIZONTAL EQUITIES**

Political debate about how to balance productive efficiency and social equity is a commonplace among politicians and scholars around the world. The designers of China's transition have been focused on national economic recovery using multiple measures of stimulating economic development. 'Economic construction' has been set up as the core national policy for two decades. The policy of 'prioritising efficiency while considering equity' was confirmed again at the 16th National Conference (CCCPC, 2002). The strategy is to maximize the economic pie and then consider how to fairly share the pie.

However, the productive efficiency first policy has been criticised for inducing wider variation with respect to socio-economic development and health status. China has recognised imbalances between social and economic development, urban and rural development, human development and environment conservation, domestic and international development, as well as widening gap between regions (MOH, 2003b). Hu Angang, a famous Chinese economist, has suggested ‘to prioritise productive efficiency when developing the economy and to prioritise social equity when allocating resources and providing public services’ (Hu, 2002). Other scholars have suggested that social security programs should be based on the principle of equity (Guo, 2002a), efficiency should not be achieved at the cost of equity (Yang, 2003a), and that tradeoffs between productive efficiency and social equity should be considered (Zhao, 2004).

Therefore, to reduce differences in access to and the quality of services in a given region should be an essential concern of RHP. Planners have to fairly allocate resources to both urban and rural population in order to achieve horizontal equity, to emphasise women’s and children’s health care, and to address the needs of vulnerable social groups (which has been recognised as a new issue emerging with SOE reform) for vertical equity (Zheng and Li, 2003).

## **FROM OUTSPREAD TO PRODUCTIVE AND ALLOCATIVE EFFICIENCIES**

Regional planning has changed since the first generation of RHPs in the 1980s. The World Bank RHP project (Health III) focused on improving infrastructures for health provision (Liang and Duan, 1999) in three pilot prefectures. The newer generation of RHP has u-turned to ‘development based on existing inventory’ seeking to maximize productive and allocative efficiency.

RHP seeks to achieve allocative efficiency with respect to access to and use of services. Allocation should be based on needs and seek to maximise health outcomes within limited resources (Hou and An, 2003). However, the implementation of RHP is complicated by the parallel development of market forces in health care, which, it is

believed, will contribute to greater productive efficiency and improvements in quality. In circumstances where hospital costs are largely met through out of pocket costs and there is a significant degree of income inequality the freeing up of market forces also lead to patterns of investment and marketing which are directed largely to engaging the more affluent sectors of the market. In this degree the policy (market forces), which is directed at achieving productive efficiency, is running counter to the policy (RHP) which is directed towards allocative efficiency.

Government is withdrawing from comprehensive medical service provision in the competitive market but will remain involved in the provision (or purchasing) of preventive services and basic medical services for vulnerable groups. Because it does not have the resources to run a fully publicly funded health system, government resources are being focused on public health and the safety net. However, the consequence of the government's withdrawal from the competitive market for comprehensive services is that its power to redress the imbalances of the market place through public expenditure is weakened.

### **ALLOCATE HEALTH FUNDS BASED ON POPULATION NEEDS**

Population based (or needs based) funding can be used to promote allocative efficiency in the context of a comprehensive health service. Even in a market system population and needs based formulae can be used to derive benchmarks to guide the reallocation, regulation and funding of services.

Health planning can engage with the health financing system in two ways. The first one is 'how health expenditure is committed' and the second one is 'how funds are mobilised and how they flow to the point of consumption'. Currently, as discussed in Chapter Five, individual health expenditure makes up the lion's share of THE (from 20% of 1978 to 59% of 2002). Individuals have decisive power to select the services they use, especially where a competitive medical market has taken shape. Planning, under the planned economy, was largely about approving and funding capital developments with the

understanding that operating costs would also be funded. With the development of the medical marketplace, these kinds of supply side controls are less powerful. Regional planners must therefore look to the demand side of the market as well as the supply side for the levers which will help to control expenditure and the flow of funds. This may involve subsidising services to vulnerable groups through safety net provisions. It could also involve encouraging community involvement in health planning through making information more widely available and encouraging local representative organs to be more involved in communicating local needs to the planners (MOH, 2003b).

The reform of health funding shapes and conditions the appropriate forms of health planning. The allocation of resources to hospitals in Australia, for instance, has shifted from cost-based model to one based on population needs and/or health outputs (Eagar et al., 2001, pp.71-92). Cost-based funding (historical funding) does not encourage improvement of health service output and outcome, does not respond to the changing needs of regional populations, and can lead to over supply.

In China, health services are paid largely based on FFS. The government contribution (in THE) is declining (from 32% of 1978 to 15% of 2002), with a corresponding reduction in the financial leverage of resource allocation, especially on competitive medical services. Government funding to public providers has traditionally been based on the number of staff and/or the scale of the facility (numbers of hospital beds) which motivates providers to build their asset base and press for increases in the approved numbers staff contributing to the widening gap in regional health resource distribution between rural and urban areas. Revenues are also determined by price setting policies with particularly large margins allowed for newer drugs and new technologies. These 'indirect' subsidies motivate provider's behaviour towards over-prescription and over-investment in high-tech equipment, especially in urban tertiary hospitals.

Many attempted countermeasures have been implemented in order to keep this malignant dilation of urban health expenditure within limits. For instance, Shanghai has implemented a project payment method for CHSs based on outputs and productivity. The

MOH has sought to contain pharmaceutical prices through a bidding process and has required the separation of medical services billing and accounting from pharmaceutical sales and accounting at the hospital level. There have been some increases in the price of medical services and some steps towards administrative control of investment in high-technology equipment. The principle of 'to control overall inventory, to adjust structure, to activate existing stockpile and to optimise increment' is targeted on cost containment and increasing productivity. In this policy, the term 'structure' has an overarching meaning including patterns of expenditure and the flow of funds. The critical issue is how to 'adjust structure'.

Need-based health planning would contribute to 'adjusting structure'. A population-based health funding formula modified for differences in need, as in the UK (RAWP) and in NSW in Australia (Eagar et al., 2001, pp.71-92), would enable the setting of targets for resource allocation which (if achieved) would lead to more equitable access and improved health gain.

### **PAY ATTENTION TO PROCESS AND OUTPUT**

During the current period of transition, regional health planners and policy managers have expressed increasing interest in applying market mechanisms in health planning and management. Typical examples involving the use of market related mechanisms in health resource allocation are casemix-based funding (Eagar et al., 2001; Chisholm, 2004), recognising both quantity and resource intensity of different services. This approach includes incentives on providers to improve productive efficiency, and ensures equitable funding as between providers.

Although broadly successful in securing major shifts in expenditure over a period of decade, the casemix funding was vulnerable to the criticism that it was based on average rather than marginal cost, limited to acute hospital care (Eagar et al., 2001; Mooney, 2002) and did not contribute to allocative efficiency and population-based equity (although it does provide tools which funders may be able to use to promote population equity). The

difficulties and complications of casemix systems discouraged Chinese policy makers in the early 1990s but the issue is being re-examined in the present period.

The increasing attention to the management of process and output in regional planning (rather than focusing solely on the distribution of assets) also reflects the increasing influence of Western management theories and practices. Health managers both in for-profit and non-for-profit institutions appreciate that improved productive efficiency and quality of care are critical for their survival in the marketplace. Many approaches have been introduced and implemented in different regions, such as clinical operation reengineering, episode management, clinical protocol, total quality management and continuous quality improvement.

Process and output considerations have been recognised as important criteria in the evaluation of RHPs. This may involve increased attention to political and sociological perspectives as well as economic and epidemiological perspectives (Hou and An, 2003).

### **HEALTH PLANNING MAKES IT HAPPEN**

As RHP evolves the slogans, abstract principles and sweeping (but unreal) instructions which have been part of the implementation environment during the early period will give way to more practical strategies, methods and accountabilities.

However, the generation of practical RHP will depend on substantial support from the provincial level. Most regional health plans were formulated as relatively stereotyped reproductions of Central RHP Guideline and Provincial RHP Standards. One of the major limitations on lower level RHP has been the imposition of inappropriate provincial resource allocation standards. Although need-based resource allocation methods provided by the central authorities (Rao and Chen, 1999b, 1999a; Wu and Wang, 1999), most provincial standards repeat the central RHP guideline statements, while promulgating what are often quite arbitrary asset distribution standards for the prefecture level. Such provincial standards have been criticised as reflecting a 'local planned economy' (Chang, 1999). Most RHP have not been able to access sufficient information and methodological

expertise to implement need-based resource planning. Under central pressure to ‘quicken the process of standards formulation’, provinces have continued to use a more autocratic than empirical approach. Provinces have promulgated different standards for different prefectures (Henan Planning Commission, Finance Bureau and Health Bureau, 2000; Shannxi Finance Bureau, Planning Commission and Health Bureau, 2001; Tianjin Planning Commission, Finance Bureau and Health Bureau, 2002) and geographic areas (Jiangsu Planning Commission, Finance Bureau and Health Bureau, 2001).

To improve provincial support for RHP, these methods of provincial direction should be reviewed. The request of prefectural planners is that the ‘province should provide a method of fishing instead of the fish’. Provincial planners should provide practical tools and methodologies for achieving allocative efficiency, including the needs-based approach. Improved provincial HIS will be necessary to provide the necessary information products.

A stronger emphasis on the management of the planning and implementation processes will be another precondition for successful RHP. RHP is an incremental and complex process, involving complex stakeholder relationships and a dynamic policy environment (see also macro policy changes in Appendix 3). Planners have to formulate strategies and timetables in accordance with the principles of project management including clear objectives for each stage, monitoring the process of implementation, learning from practice, and adjusting activities accordingly. ‘This giant social engineering project should be decomposed as a series of practicable projects’ (Hou and An, 2003).

## **REGIONALISED HEALTH PLANNING AND MANAGEMENT**

More devolved responsibilities in the management of RHP will involve empowering the regional health planner to focus more on regional health need, building cooperation among all the regional stakeholders and integrating with other aspects of regional development. This would differ from the current ‘top-down’ approach, guided by central

government, standardised by provincial government, and formulated (in somewhat stereotyped ways) by prefecture government.

Bureaucratic fragmentation is recognised as the biggest system barrier facing RHP (Chen, Jiang and Hu, 1999; Du and Fei, 1999; Hou, 1999; Liu, 1999a; Liu, Wang and Yu, 1999; She, 1999; Song and Ren, 1999; Yang, 1999b; Yin, 1999; Zeng and Lv, 1999; Zhou, 1999). Regionalised and integrated health resource allocation and management is a goal of the policy makers (Hou and An, 2003). However, as discussed in Chapter Seven, integrated regional administration will involve negotiating historical tensions between central and local powers. It will be a long-term trade-off process of relationship adjustment, from extremely centralised to stepwise decentralisation.

## **MULTIDISCIPLINARY AND MULTI POLICY TOOLS**

Planning needs to be evidence-based (Lin and Gibson, 2003, pp.44-55) but the goals of RHP will not be achieved through one particular planning tool. They will depend upon the integrated deployment of a range of policy tools including government regulation, legislation, financing, pricing and information (Hou and An, 2003). The combination of government, market forces and morality will determine the direction of RHP.

## **IMPLICATIONS FOR PROVINCIAL HEALTH INFORMATION SYSTEMS**

The planning and management of information systems should be aligned with objectives of regional health development. Successful management of information systems will be crucial if planners and managers are to realise the objectives of rational health resource allocation and priority setting and strategic management. The SME transition places new demands on PHICs building on but moving beyond the traditional health resource statistics system. Rapid changes in information technology will require that provincial HIS managers, like health managers more generally, participate more actively in mainstream thinking in IT, RHP and HIS.

## **TO IDENTIFY INFORMATION NEEDS OF THE RHP**

To identify need is the first task in the life cycle of information system development. Infrastructure and capacity building for provincial HIS will depend on clarity with respect to information needs. In order to develop provincial HIS appropriately, strategic evaluation and analysis of the needs of the information customers is a critical step. Based on such evaluation and analysis, provincial HIS development plans may be drafted which would include financial, infrastructure, workforce and information technology plans.

Strategic planning is critical for investment and development, for further project planning, and for providing relevant information production (Hovenga and Lloyd, 2002). As discussed in Chapter Four, PHICs need an overall upgrade with respect to infrastructure, workforce and analysis capacity and functioning. Strategic investment and intelligent development of provincial HIS needs a clear understanding of needs and expectations with respect to information products and value added to users, investor and donors.

## **TO BUILD TEAMS AND COOPERATE WITH EXTERNAL RESOURCES**

China has spent two decades moving from ‘resource statistics’ to real ‘statistical information’; new blood has been added which is contributing to improved quality with respect to information products. ‘Statistics *and* information’ conveys the current direction, inheriting the past and ushering in the future. Health information will no longer be restricted to statistics about institutional and professional assets, but will mobilise all kinds of information products relevant to regional health development.

Quality products depend upon a competent producer team. Based on information needs of regional health planning, workforces of health management, health economics, sociology, political science, leadership, organisational behaviour, system design and analysis have to be enriched at provincial HIS. The team building should be featured as integrations of qualitative and quantitative approaches, social sciences and physical sciences (such as IT), and experts on both theory and practice.

Regional health planning requires information that cuts across traditional fragmented silos and isolated information islands. RHP requires information that smoothly flows from one platform to others. Provincial HIS is an active subsystem of regional, national and global information networks. Sharing resources and information with others is a necessary feature of contemporary information systems.

The findings of this thesis point towards three collaborations that provincial HIS will need to build:

- with government departments and public institutions, in order to share information with all of the major collectors, processors and users;
- with all of the main market place players, in order to provide evidence for need-based regional resource allocation; and
- with academics, think tanks, and research resources, in order to share system resources, to achieve cost-efficiency and effectiveness in system management.

#### **TO ACTIVELY INTERACT WITH RHP FORMULATORS AND GUIDERS**

Previously, PHICs inactively responded to information demands of planners, as result of its limited capacity, designated function and organisational position. Overloaded and irrelevant data also contribute to poor communications between the information custodians and the planners who are eager for quick success and instant benefit. There may be some scope for improving the network infrastructure through which planners and information providers can communicate. However, there are limits to the effectiveness of this kind of 'technical fix'.

Better interaction is needed (Hovenga and Lloyd, 2002). Improved RHP will require provincial HISs to be in frequent and active communication with RHP formulators and guiders, involving personal relationships as well as network linkages. The interaction should not be limited to the planning stages, but continue through all phases of the planning cycle.

## **TO DEVELOP PLANNING TOOLS FOR PREFECTURAL PLANNERS**

Regionalised and needs-based health planning in a system that increasingly involves market relationships (and therefore choices) cannot be achieved through the old style autocratic standards based approach. Provincial guiders and information providers need to see their role as providing support to the prefecture level planners. To provide new methods for fishing rather than simply giving fish, the orientation of the information producers should be changed. Instruments or practical guidelines, instead of 'requirement of submitting data', should be the major form and these might include methods of social diagnosis and community participation, stakeholder analysis, use of recurrent expenditure estimates and servicing and utilisation rates, indicators of achievable outcomes, strategic planning methods and project management, monitoring and evaluation, etc.

## **INFORMATION PRODUCTS TO SUPPORT REGIONAL PLANNING**

To make sensible decisions in an environment as complex as modern China in transition would be close to impossible without appropriate information. New standards for information products will need to be met to properly support the work of the RHP planners.

## **COMPREHENSIVE INFORMATION PRODUCTS**

The formulation of appropriate regional plans and their implementation will need a broadly based understanding of a range of complicated planning parameters and determinants and their relationships. The provision of such information must also recognise the speed of change including the transition from a planned economy to a market economy. A key feature of the transition process is the changing pattern of stakeholders' influence and interests and the information planners must anticipate these changes. Health planners need information to understand the dynamics of interest group relationships and stakeholder interests in the contexts of organisational, political and historical change. Both planners and stakeholders need access to information about a

wide range of issues, both quantitative and qualitative information, and provided in different formats and over different platforms.

## **DEVELOPED INFORMATION PRODUCTS**

As discussed in Chapters Five, Six and Seven, some critical data have not been available, poor validity and accuracy, and is insufficiently analysed at provincial and prefecture levels. This includes qualitative information for supply and demand sides, and information for service process, output, outcome and financing. In order to identify indicative targets for achieving allocative efficiency, health planners need more detailed background data, such as health needs and health status across geographic areas, between rural and urban populations, and among vulnerable groups. Meanwhile, the quality of the data that are collected needs to be further improved.

The availability of useful information could be much improved simply by further processing of existing collections. As demonstrated in Chapter Six, there is considerable scope for strengthening the analytic capacity at the provincial level. Information delivery and presentation should also be improved. Needs-based health planning, which must involve a population health approach, relies on geographic and socio-demographic information about health needs and achievable health outcomes. Information about parameters such as age and gender structure, fertility rates, socio-economic status, population density, standardised mortality rates, servicing and utilisation patterns and recurrent expenditure rates, should be provided (Eagar et al., 2001, pp.119-37).

There is increasing scope for adopting the principles of knowledge management at the provincial HIS level also. Knowledge bases should be established and managed. However, priority must go to the foundations for information development and knowledge management, namely capacity improvement in data collection and analysis and overall system management.

## **RELEVANT INFORMATION PRODUCTS**

Information products are relevant when they present clear pictures of the regional socio-economic environment, population dynamics, stakeholder relationship and related policies. Their relevance also depends on their quality as well as quantity and reach of the data. Demand-side information, including recurrent expenditure patterns and servicing and utilisation rates, should be further emphasised if demand side levers are to be deployed in implementing regional plans. Information about inputs should be complemented by process, output and outcome information.

Information products should also be relevant to the different stages of regional health planning. Information for problem identification, environment understanding, stakeholder analysis, alternative evaluation and formula design should be provided in the formulation stage; information about process monitoring should be provided at the implementation stage. In the evaluation stage the priority will be the provision of evaluation information, following the success or otherwise of the planning interventions. The capacity of planners to learn from their experience is dependent on their being provided with such information.

Relevance should also be judged in terms of whether the information produced corresponds to health policy priorities. For instance, if the focus of health policy is on productive efficiency and redirecting the flow of recurrent expenditure then output data, including casemix measures would definitely be relevant information. There is a great deal of developmental work required on systems for measuring casemix in acute care and other programs in China and this work should be seen as a national priority rather than a provincial responsibility at this stage.

## **TIMELY AND TRANSPARENT INFORMATION PRODUCTS**

Confidence in decision-making depends in part on the timeliness of information. Timely information provision is a critical requirement of decision-makers in monitoring RHP implementation and adjusting the appropriate levers accordingly.

Transparent information helps stakeholders to understand each other and reach agreement on planning objectives and methods. An informed community can also contribute to planning in the early stages in needs identification and priority setting and later through public auditing and accountability. Making raw data available will enable local level planners to conduct further and more specific analysis of their own needs. Providing ad hoc information analysis service to prefectural planners needs to be recognised as a new function for provincial HIS.

Timely feedback to collectors and the communities about whom the data are collected is a system requirement for maximising planning support, performance improvement and HIS development.

### **STANDARDISED INFORMATION PROCESSES**

Regional health planners need integrated information provided by all relevant information suppliers. Besides the departmental agreements on information sharing, standardisation is one of critical technical measures for ensuring information exchange and integration (Eagar, 1996).

If planners are to have easy access to relevant, reliable and timely information the barriers to data movement and integration of information from different sources need to be minimised. A critical part of this is the adoption of system wide (and nation-wide and international) standards for defining, processing and sharing data.

### **UNDERSTANDABLE INFORMATION PRODUCTS**

Planners require that the information provided to them should be easily accessible and understandable. Well-presented information will improve the interactions between the information provider and users, and will contribute to wider participation in planning and to better communication between stakeholders.

## CHAPTER ELEVEN

# **PROSPECTS FOR HEALTH INFORMATION SYSTEM DEVELOPMENT**

This Chapter examines prospects and directions for health information system development in China, based on the findings presented in earlier chapters, including in particular, the likely directions in health planning discussed in the previous chapter. Some new data are also presented reflecting the opinions and attitudes of key informants regarding the priorities for HIS development over the next 5-10 years. This chapter provides the foundations for the conclusions in the final chapter regarding priorities for HIS development and strategies for implementation.

### **SYSTEM DEVELOPMENT – MISSION AND MASTER PLAN**

#### **MISSION OF HEALTH INFORMATION SYSTEM**

The findings presented suggest that many of the deficiencies in contemporary health information systems are the consequence of inappropriate system design. This may be partly because of the lack of clear statements of mission and purpose regarding the work of government departments (such as the MOH) and institution (such as the CHSI).

The work of many official organisations internationally is guided by formal statements of mission, vision and objectives which provide a guiding framework for more detailed system design. For instance, an objective of the WHO, as set out in its Constitution, ‘is the attainment by all peoples of the highest possible level of health’ (WHO, 2004). The vision of the Australian Department of Health and Ageing is ‘for better health and healthier ageing for all Australians through a world class health system’ (DHA, 2003). The mission of Australian Bureau of Statistics is to ‘assist and encourage informed

decision-making, research and discussion within governments and the community, by providing a high quality, objective and responsive national statistical service' (ABS, 2004). The mission of the Australian Institute of Health and Welfare is 'to inform community discussion and decision making through national leadership in developing and providing health and welfare statistics and information, in order to improve health and well-being of Australians' (AIHW, 2003c).

There are no comparable statements (publicly available) regarding the mission, vision and purposes of Chinese government departments and institutions. Even in Guangdong province, which is recognised as one of the best for health information system development, there is no public statement of the mission and responsibility of the provincial health information system (based on review of website of Guangdong Health Bureau, <http://www.gdhealth.net.cn/>).

System design in China starts with the responsibilities of the institution within its bureaucratic hierarchy. For instance, the MOH is simply identified as 'a component of the State Council and in charge of health administration', and fifteen 'major responsibilities' follow (State Council, 1998)<sup>89</sup>. The CHSI is defined as 'a fully budgeted government institution, approved by the Central planning committee', and thirteen responsibilities are listed (CHSI, 2002)<sup>90</sup>.

As a consequence, health officials and information system managers understand 'who they are' and 'what they should do' but they lack formal guidance with respect to 'where to go' and 'why'. Clearly formulated mission statements and objectives for health departments and information centres would help to guide their development, provide clearer criteria for evaluation and enable greater efficiency (Liu and Jiang, 2002).

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<sup>89</sup> For instance: 'responsibility two: to design regional health planning policy, to coordinate national health resource allocation, to set up community health service plan and standard, and to set up technical protocols and health standards'.

<sup>90</sup> For instance: 'responsibility one: to draft national policy and plan for health statistics works, to formulate national principle, policy, plan and standard of health informationalisation'.

## **HEALTH INFORMATION SYSTEM DEVELOPMENT PLANS**

Some health information requirements are specified in health plan documentation. In the Tenth Five-Year Plan for Health Development (MOH, 2000), it is required that ‘a comprehensive health information system and archive system should be further established and improved, in order to meet needs of government function re-structuring and health science and technology development’. Based on this statement, health departments are developing two information systems: one for health planners (public health decision-making) and another for medical professionals (clinical decision-making).

Further guidance regarding HIS development comes from the e-government initiative. ‘Three networks and one database’ (which refers to (i) the government’s automated office network, (ii) the point to point government resource network, (iii) government websites and (iv) government databases) comprise the basic infrastructure of the e-government program led by the MII.

The third plan which provides guidance for the development of HIS is the National Health Information Network program. The MOH intends to establish an efficient, fast and smooth National Health Information Network as part of capacity improvement with respect to macro health management, scientific decision-making, response and direction in cases of crisis. This program is based on the principle of ‘overall planning, step by step implementation, infectious disease reporting with priority given to networking and information resource sharing’ (MOH, 2002c).

Nevertheless, there is still a great deal of uncertainty with respect to health information system development, especially in relation to regional health planning.

## **SYSTEM DEVELOPMENT STRATEGIES**

CHSI has identified six objectives for health information system development (2000-2005): (1) to reform health statistics regulation and survey system, (collecting more raw data, standardising data definitions and databases, introducing ICD 10 coding, etc); (2) to

expand information volume, (in particular, producing, publishing and releasing more information reports); (3) to improve quality (accuracy and timeliness) of information through training programs and information technology and to improve information reporting through strengthened team work; (4) to strengthen the surveillance function, i.e. to improve the management and quality of the NDSP and to extend the scope of the system from infectious disease monitoring to comprehensive disease surveillance; (5) to improve medical science and technology databases, i.e. to improve medical library services, medical journals and promote evidence-based medicine, and (6) to promote wider utilisation of information (MOH, 2003c).

The five-year plan is a departmental plan, which focuses largely on ‘internal’ health information (i.e. collected within the health sector) and technical approaches. Otherwise, the list is essentially product-oriented. It does not focus on strategic planning itself.

During the interview study, informants were asked ‘what is the top priority for system development in the next five to ten years’ (see Appendix 2). The opinions of respondents on regarding priorities for system development in the near future are summarised under the following headings.

### **HUMAN RESOUCCE DEVELOPMENT AS A PRIORITY FOR SYSTEM INFRASTRUCTURE CAPACITY BUILDING**

To build capacity and improve infrastructure is recognised as one of the most important strategies for the sustainable development of provincial health information systems. Human resource development was identified in this study as the most important strategy. An HIS expert suggests allocating 50% of information system budget for human resource management (Jin, 2002).

*We have to do very basic things in the near future. If I design a new project for HIS, I will set up three priorities. Firstly, we have to construct a computer network, to recruit qualified staff and to establish good regulations. This is the foundation of system development. Secondly, we have to improve information analysis and utilisation. In addition, the third priority is to promote information communication*

*and feedback. However, based on my experience, human resource development is the priority of priorities. (Health project manager, central)*

*Human resource development is the most important. We know what the system should do. However, we need more resources. If there are insufficient staff in our HIC, how can we conduct activities? (HIS manager, Jilin)*

*Smart persons are hard to retain working on health information systems for a long period. There are many exciting chances outside the health sector. Therefore, we need to design a human resource development plan in order to stabilise them. (HIS manager, city of Guangdong)*

*We need more computers, because it is an information age. However, we need more staff. I think there is nothing that can be done when a provincial health information centre is run (and staffed) by one part-time staff member. I think we should have at least five staff. (HIS manager, Xinjiang)*

Informants also suggest paying more attention on the quality of human resources. They recognise that a quality strategy is more rational than simply increasing the number of information staff. Meanwhile, they pointed out that the criteria for judging human resources quality relates to information demand. In other words, quality of information staff should match the requirements for health planning.

*We need a keen-witted and capable information team. The team should be an efficient team. HIC is not a retired club. (HIS manager, Beijing)*

*What we have is what they need. Our leaders want help on policy analysis. Therefore, we have to have policy analysers in information system. (HIS manager, city of Guangdong)*

*Information system does not mean computer system. Wise persons are more wanted than advanced computers. Human brain directs electronic brain. (HIS manager, Guangdong)*

*HIS staff should be capable as technical advisors, to provide valid, essential and timely data to planners clearly and effectively. In addition, the health information system should facilitate the collection, analysis, reporting, presentation and use of data at all levels (Health official, Jiangsu)*

Information users should also be regarded within the same scope as information system capacity building. A HIS manager at central level provided his unique opinion on evidence-based public health planning. He stated ‘the health planner is a part of the health information system’. Therefore, he continued ‘we should strengthen the capacity

of planners to identify data needs for solving problems and to interpret and use data appropriately. This would be my favoured user-enhancing approach’.

## **A RATIONAL FRAMEWORK OF FUNCTIONS TO RESPOND TO INFORMATION DEMANDS**

The findings suggest that there is an increased understanding of the ‘new’ role of information systems in supporting health planning. Informants suggest that the functions of current information systems are not suited to meet current and future information demands. The system functions should be re-designed on a need-based approach. The HIS functions that should be strengthened include: information analysis, provision of relevant information products, population health focused information production, and participation in health reform.

*Health information system reform is needed. For instance, new working groups could be organised for specific health topics or programs. (Health official, city of Guangdong)*

*The current system is weak in information analysis and presentation. ‘Much in but little out’. Most information products do not satisfy the demands of the health planners. We need to strengthen the functions of analysis and presentation. (HIS manager, Jiangsu)*

*Regional planning needs more population and community information. However, the current system cannot provide sufficient information on that. We can shift system resources from routine reports to community and population information. (RHP researcher, Beijing)*

*To publish statistical summaries is not enough for health planning. The statistics tables should appear as appendices to the information reports. The report itself should present the critical findings and the policy analysis. (Health project manager, central)*

*China has more than ten years’ history of regional health planning and optimising resource allocation. Why do HISs always provide supply-side information only? In my opinion, the ideology of HIS has not changed. While the planner considers how to regionalise resource allocation and strengthen market management, HIS still concentrates on the inventory of health administrated institutions. Why do HISs not provide more information about the market, about private practice, village health*

*care and community services? [...] HIS has to change its function and direction along with health reform and macro transition. (RHP researcher, Beijing)*

## **RESTRUCTURING INFORMATION FLOWS FROM FUNCTIONAL HIERARCHIES TO NETWORK COMMUNICATIONS**

PHICs have traditionally been structured as units within a hierarchical bureaucracy. Information flows follow the 'chain of command'. Communications are formal and paper based. Supervision is based upon direct observation of workers, and accountability is based on supervisory responsibilities (Nolan and Croson, 1995, p.12).

In the interview study, both health planners and HIS managers recognised the bureaucratic and institution-based pattern of HIC development plan as inappropriate. The national health information development strategy should include provision for development at the central and regional levels, in keeping with the trend towards the decentralisation of health planning (Tchokobou et al., 2003). Information flows should not be restricted to vertical 'bottom-up' flows but should provide for closer horizontal integration between production and utilisation at every level.

*Previously, our information users were our superior governments. Our responsibility was to submit data to the higher level. I know that is necessary when all decisions are being made by the top leaders. However, the situation is changing. Local governments have more power and responsibility for regional planning. Instead of providing information to the upper levels of government, the provincial information systems have to serve provincial decision-makers. (Planning official, Guangdong)*

*Who are our users? Previously we believed that they are our tops. Right now, we think they are also by our sides and in our communities. Changing user depends on changing patterns of decision-making. (Statistics official, Guangdong)*

*We need a strong coordinator of health information systems at the regional level. Isolated and fragmented information systems should be integrated through an information steering committee. If the provincial health information centre is too weak to be the coordinator, I suggest establishing an inter-departmental coordinator or a steering committee in region. (Health official, central)*

*The previous information system has a bottom window for data collection and a top window for data submitting. Future information system should create horizontal*

*windows for sharing information and coordinating system activities. All windows should be designed as two-way interfaces. (RHP researcher, Beijing)*

*We have had centralised health information regulation. We also need regionalised health information agreement. (HIS manager, city of Guangdong)*

Laws facilitating access to information held in the public sector can play an important role in increasing information flow and facilitating the accountability of government and wider policy participation. As part of enhancing regional health information systems, some informants suggested strengthening the legislative processes which guide the development and operations of information systems. For instance, Australian information organisation and activities are regulated by a series laws and regulation, such as the Australian Health Information Agreement 1993, AIHW Act 1987, Statistics (Agreements with States) Act 1956, Australian Bureau of Statistics Act 1975, Census and Statistics 1905, etc.

## **DEVELOPING REGIONAL HEALTH INFORMATION SYSTEMS ACCORDING TO LOCAL CIRCUMSTANCES AND CONTEXTUAL CONSIDERATIONS**

As discussed previously (Chapters Four and Eight), there are significant variations in HIS infrastructure, capacity and environment among and within the provinces. A central HIS official commented that ‘it is meaningless to talk in generalities about provincial HIS development. The diversity among provinces is so significant’. Both national and provincial health planners and information system managers acknowledge that they should be providing assistance to disadvantaged prefectures and that local system design and implementation should be based on contextual considerations of local conditions and macro environment.

*We hope we can provide help to our prefectures. However, we are not able to handle the task [...] we have no money, no staff, and no computer and are even without administrative support. I have presented my opinion to the health director and central HIC. It would be appreciated if we could gain support from all parties, i.e. central HIC, provincial bureau and prefecture government. [...] We cannot conduct*

*household surveys or data analysis. Could central HIC provide special support to us? (HIS manager, Xinjiang)*

*We feel relaxed about some advantaged prefectures and worry about others. The capacity for information utilisation among prefectures is extremely different. What we can do is to organise a conference at an advantaged prefecture and to demonstrate their experiences to disadvantaged prefectures. I know that a demo is not a ready-made product. Peoples in disadvantaged prefectures complain that 'it's good but cannot be copied'. [...] I know they need help, but I cannot do more. There are many restrictions, including administrative barriers, financial barriers and staff shortage. I am busy too, you know. (HIS manager, Guangdong)*

The great disparity among provinces does not correlate precisely with their economic status. Poorly functioning HISs are found in higher-income provinces, while well functioning HISs do exist in some developing provinces. Findings of this study suggest that the performance of the PHICs does not directly correlate with IT investment. The determinants of local system performance include the ideology of government management (especially health policy management in environment of economic system in transition), HIS involvement in health planning, and investment in HIS capacity building (as discussed in Chapter Nine).

All provinces are concerned about some common issues, such as departmental coordination, demand-side information provision, and external information utilisation. In addition, the strategic plans for provincial HIS development should be more specific based on local circumstance. The patterns of information demand are different among the provinces. Planners in developed areas may be looking to 'strengthen informed decision-making, establish regional health information networks, improve analysis and utilisation of demand-side information and promote transparency and secure communication' (cited from Guangdong's interview); while planners in developing areas (for example, Shanxi) focus on restructuring, capacity building and stakeholder cooperation.

There is limited space for 'self-development' of HISs in West of China and other less developed provinces (such as Shanxi, Jilin, Henan and Xinjiang) because of extreme resource shortage and lack of overall management capacity. The disadvantaged provinces urgently require assistance from the central level and more advantaged areas. Such

assistance, encompassing data collection (especially demand-side data collection), data analysis and evidence-based health planning, should be timely and effective. Meanwhile, although external IT assistance is expected to play short-term (or may be long-term) efforts, local financial and managerial system may not support potential help.

*In Shannxi province, an expensive computerised hospital information system was developed. However, the project failed as the hospital could not afford the necessary tele-communications costs. (HIS manager, central)*

## **COORDINATION, COLLABORATION, COMMUNICATION AND CONCENTRATION**

One question which underlies many of these proposals is how to establish the trust and cooperation among all the interested parties that will be necessary to develop better provincial health information systems for improving the management of health resource allocation (Liu and Jiang, 2002). Provincial health information managers suggest the establishment of a legal framework and departmental agreements for cooperation.

*We need a legal document that authorises the PHIC to exercise responsibility for regional information coordination. Otherwise, the PHIC does not have a chance of working with others. (HIS manager, city of Guangdong)*

*Regional health planners have to work with PHIC and other information agents. In order to overcome bureaucratic fragmentation, a regional information manager is necessary. The manager should have strong capability for departmental coordination. From my personal opinion, the PHIC is not the appropriate manager, because of its lower position, narrow vision and weak capacity. The provincial statistics bureau may be a good coordinator, if the bureau's focus were expanded to include social information systems (HIS manager, Guangdong)*

*The current bureaucratic framework is hard to break. However, a departmental agreement may be a useful tool for cooperation. Such an agreement would be weak in regulating government behaviours. However, it is better than nothing. (HIS manager, Jiangsu)*

*We work with other information systems relying on personal relationships. We have to invite them to dancing, drinking and playing, when we want to work with them. If we ask them to work with us in 'official language' in a formal meeting room, negative results will wait for you. If discussing with drunken officials, everything is ok. That is the common way in China if someone wants to do something. However, this is a high*

*risk way. The under-the-table cooperation is built on an unstable base. In my opinion, we cannot stop this pattern of cooperation, but we can strengthen formal cooperation simultaneously. (HIS manager, city of Shanxi)*

Some interviewees suggested strengthening partnership relationships among regional information bodies. Informal information coalitions have achieved some positive outcomes in regional planning.

*A nongovernmental RHP group exists. Group members come from prefectures that have experienced RHP over many years. The group's meetings are organised once a year. A voluntary prefecture hosts the meeting. I like this form of cooperation. (Director of research institute, central)*

*Five provinces of northwest China have a mega-regional cooperation network on socio-economic development. We should use this network for health development. (HIS manager, Xinjiang)*

Concentration on relevant information provision was suggested as a strategy for improving the performance of provincial HIS by a number of informants.

*We do have limited system resources. However, we do not have limited health data. We almost drown in a 'sea of data'. I believed that the better strategy is not 'more data', but 'more concentration'. (Statistics official, Guangdong)*

*Next steps? We have to prioritise our activities and concentrate on the most important task. We intend to publish the National Health Development Report. This Report requires a huge amount of money. I have discussed it with another relevant department for applying for project funding for this Report. Approximately, we need US\$200,000 for the Report. We intend to develop this Report as one of our formal publications. I think this Report will be the most important output of HIS. (HIS director, central)*

## **DATABASE DEVELOPMENT**

### **IMPORTANCE OF DATABASES FOR REGIONAL HEALTH PLANNING**

PHIC directors were asked to rate the importance of different databases among health and health-related information databases. Table 11-1 demonstrate the percentage of PHICs that agree that the identified database is 'important' or 'extremely important' for RHP.

As showed in Table 11-1, the majority of PHICs (over 80%) agree on the importance of information about health workforce, regional population, socio-economic development, traditional resource statistics, health service outcomes and rural health service. These databases and/or information sources are considered as priorities for database development for regional health planning.

Databases or data sources	Percent of PHICs who agreed databases are 'important' or 'extremely important' for the RHP (%)
Health institution report	82
Capital resource report	76
Health workforce report	91
Medical equipment report	83
Volume of services report	86
Recurrent resource report	53
Inpatient discharge (front-page) report	78
Community/clinic health services report	76
Village health services report	45
Cause of death report	65
Nominated disease report	72
Health inspection report	65
Household interview survey	74
Institution ad hoc survey	81
Community health survey	68
Rural health survey	81
Performance survey	74
Outcome survey	81
Demographic data	91
Socio-economic data	85
Medical insurance data	53
Medical service data of other department	55

**Table 11-1 Opinion of PHICs on importance of databases for the RHP**

The results shows that of the highest proportion of PHICs (91%) identified the most important databases for the RHP as those that answer the question of 'who serves who': the health workforce information and the demographic information.

The health workforce database (HS-2, see Appendix 4, data collected in raw form, rather than summarised form) is important for several reasons. (1) Human resource policies have shifted from a 'quantitative' to a 'qualitative' approach. Health bureaux will control entry to practice and seek to improve the quality of the health workforce using practitioner accreditation and the Physician Law. (2) Human resource regulation is more important than other resources because the medical industry is dominated by

professionals, especially senior professionals. Therefore, workforce information is important evidence for regional planners to monitor and adjust regional health resource allocation. (3) Workforce database is also relevant for consumers. There are plans to release the information to the public to enable consumers to freely select their doctor. (4) A focus on human resources is a reflection of the 'people-centred' philosophy of oriental management.

Socio-economic information is recognised by most PHICs (85%) as one of the important information sources for RHP. This consideration partly relates to government promises that 'government health financial budget will increase along with economic development'. Increasing awareness of the impact of social determinants on health programs explains the PHIC's high ranking of the importance of social information.

Most of PHICs (82-86%) believe that the three traditional health reports (institution, equipment and hospital business) are important for the RHP. As discussed (in Chapter Five) these databases are collections of input (resource) data based on institutional annual reporting. Furthermore, 81% of PHICs agree that ad hoc institutional survey is also important for more detailed and accurate input resources data.

81% of PHICs agree that ad hoc surveys of rural health service is important for the RHP while 45% of them believed the rural health reporting data are important. This result reflects the very underdeveloped status of rural health reporting in most provinces and prefectures.

Eighty one percent of PHICs believe that outcome information is important for RHP. This suggests that that institutional and system performance is increasingly recognised as important by health planners.

The PHICs are less persuaded of the importance of information about medical records (front-page), household interview, cause of death, medical insurance and medical services provided by out side of health department for regional planning. Only 72-78% of PHICs agreed that the medical record abstract, community health service reports and

preventive health service information are important for the RHP. The NHSS is recognised as important information by 74% of provinces. Only 65% of PHICs agreed that cause of death information is valuable for RHP. The apparent discounting of utilisation data and deaths data as indicators of need is surprising. It may reflect the quality of the data at the present time.

Only 53% PHICs agree that the medical insurance information and recurrent financial information is important. This may reflect the continuing influence of older paradigms of planning. In the context of the market transition, health planners need to have better data on health care financing, if they are to use financial levers as tools for shaping resource distribution. The same percentage of PHICs (53%) agrees that information about other sectors (military and industrial health resource and provision) is important for the RHP.

### **IMPORTANT SOURCES OF INFORMATION FOR THE RHP**

PHICs believe that field survey is a more appropriate approach than the reporting approach when collecting community and rural health data. As discussed in Chapter Five, urban and rural primary care information are not traditional components of the reporting system. Primary care data reported through the hierarchical structure is likely to be inaccurate, because the collectors (community doctors and village doctors) are not able to submit quality data. When the reporting system fails to respond to information needs, thematic surveys have been performed to supplement reporting systems.

In the circumstance of rapid change in health care in China, health planners need immediate and up-to-date information for their new policies and regulations. Therefore, they require information systems that can respond quickly to their new information demands. The ad hoc survey is recognised as an appropriate approach for overcoming the delays in analysis and presentation of reporting information. Eighty one percent of PHICs agree that institutional surveys provide an important tool for supplementing institutional reporting.

There is a cost associated with using survey to fill the information gaps. A significant amount of money has been spent on rural health surveys in the context of various health projects and programs. Another common way of collecting and exchanging rural health information in China is the “site conference” where local health bureau conduct a conference in a selected county and experiences of the county are presented and discussed and similar experiences in other counties exchanged among participants also.

PHICs appear to believe that internal information (collected by health department) is more important than external information (especially medical insurance information). This opinion reflects the familiarity of PHICs with internal data and the limitations on inter-departmental communication. In addition, political factors and organisational isolation affect the attitudes of PHICs to external information.

Although the NHSS is designed as a tool for understanding health status, need, demand, utilisation, behaviour and opinions of population, only two thirds (74%) of PHICs believe the household interview is important or extremely important for the RHP. The opinions of the other one third of provincial HICs can be explained in the following terms: (1) the RHP in practice does not use demand-side information; and (2) PHICs lack capacity in population-based data analysis; and (3) the national survey does not provide a sufficiently representative sample to be used meaningfully at the provincial and prefectural level.

## **ROLE OF INFORMATION TECHNOLOGY**

Since the 1990s, the MII and MOH promote government informationalisation and medical IT development (Li, 2002b). Health officials are more frequently using intranet and Internet to exchange and release administrative transactions and documents. Hospital presidents and doctors are interested in computerised hospital information system for real time monitoring of their financial status (MIS) and for computerising various facets of clinical practice (CIS and PACS). Medical IT companies hovering around the hospitals see unlimited market opportunities. Health informatics in China is developing rapidly and attracting huge investments.

*In the next five years, a major task for us is to quicken the process of health informationalisation. [...] This is a requirement from high levels. [...] Although health informationalisation is a priority of health information development, it cannot solve all problems, and it is hard to be developed in a rational way. Health informationalisation is a 'first hand project'. Without support of the first hand, we can do nothing. Health informationalisation is also a 'fundamental project'. Without sufficient capacity at baseline, the information system is a castle in the air. [...] What we plan to do is what we can do. (HIS manager, city of Guangdong)*

*Computers and networks are wonderful and fashionable technologies. To adopt computerisation and establish networks represents the modernisation of health management. (Health official, city of Shanxi)*

*When I organise a meeting in the health bureau, almost all participants bring their notebook computers for taking notes. See, this is our achievement: health management modernisation and informationalisation. (Health director, city of Jilin)*

However, as stated by Davenport (Davenport, 2000), infatuation with hospital informatics, e-medicine, e-health, e-health government and e-hospital are symptoms of IT-madness in the age of information. Technology driven HIS development has consumed huge amounts of health sector resources in developing and developed countries. However, expenditure on technology led initiatives has often not gained the expected service and performance improvement. Many managers and planners have complained that the computerised system did not provide more useful information than the previous system.

Current patterns of HIS development, driven in part by the policy of informationalisation, has ignored the other side of person-machine relationship – what people need and how to enable them to use the technologies to access the information they need.

*Our president studied health administration and has just come back from Australia. He has fresh ideas about hospital management. He told me that an information system in broad perspective might be unnecessarily computerised. The key is a rational design of system mission, mechanism and framework. Even without computers, an appropriate information design is the critical step of successful health management (Hospital IS manager, prefecture of Jiangsu)*

It is not as simple as imagining that government can improve its planning and management functions through informationalisation. Informationalisation is a high cost

venture of government, especially for those in Western China, and its benefits on health planning may not be realised until after a long period. The UK, US and Australia and other developed countries have invested in information systems (infrastructure and network) since the 1970s and before. Countless government and social resources have been spent. However, benefits have not been gained as expected until the last decade (Hovenga and Lloyd, 2002). In the circumstance of 'economy development-centred' policy environment, short-term achievement perspective and overall shortage of resources, useful and efficient informationalisation will be very difficult.

It was commented that compared with other sectors, government and society do not invest sufficiently in health informationalisation (Hovenga and Lloyd, 2002). Based on national policy of 'realising modernisation through informationalisation', the majority of IT investments are injected into fields of high financial profits (such as telecommunication, e-bank, e-taxation, e-insurance, e-hotel, and Internet-related productions) (Li, 2002b). In addition, medical IT in China is still a 'high risk' business because of weak legislation and poor standardisation, as suggested by information professionals of Guangdong and Jiangsu in this study.

Finally, the current efforts towards health informatics are being implemented in the context of fragmented government administration. Technical intervention, such as informationalisation, cannot solve problems which are due to such fragmentation.

## SWOT ANALYSIS

SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) has been used for strategic planning of health information systems (Nilsson and Ljunggren, 2003, pp.23-5). During the interview study, key informants provided many comments about strengths, weaknesses, opportunities for and threats to provincial HIS development in the next five to ten years (see Appendix 2). Their comments are summarised in Table 11-2.

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● Established statistics organisations</li> <li>● Longitudinal health resources data collection</li> <li>● Improved health statistical survey regulation</li> <li>● Improved national health service survey</li> <li>● Improved health management think tanks</li> <li>● Improved health indicators, e.g. THE</li> <li>● Improved standardisation, e.g. ICD10, hospital IS regulation</li> <li>● Improved e-government</li> <li>● Increased e-hospital, e.g. CISs and PACS</li> <li>● Improved transparent health information</li> <li>● Experiences of advantaged provinces, e.g. Guangdong and Shanghai</li> </ul>	<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>● Strong pressure from health planners</li> <li>● Improved consciousness of informed health planning</li> <li>● Government driven informationalisation</li> <li>● Social awareness and accountability for informed decision-making</li> <li>● Improvement of social security programs, such as medical insurance</li> <li>● Ongoing draft of China's FOI</li> <li>● Impacts of globalisation and information economy</li> <li>● Lesson and introduction of experiences of other countries</li> </ul>
<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>● Poor HIS infrastructure</li> <li>● Unsatisfactory quality and structure of human resources</li> <li>● Underdeveloped system of human resources recruitment and training</li> <li>● Lack of outstanding health information manager and teams</li> <li>● Lack of investment and budget</li> <li>● Resistance of reform from organisations and individuals</li> <li>● Lack of capacity, experience and motivation for collecting, processing and utilising demand-side information</li> <li>● Reliability and accuracy issues of existing data</li> <li>● Uncompleted data collection structure</li> <li>● Information isolated island</li> <li>● Lack of channels of information dissemination and feedback</li> <li>● User's insufficient involvement</li> <li>● Disjointed development plan between health reform and HIS development</li> <li>● Lack of agreements on information releasing, accessing, exchanging and utilising</li> <li>● Lack of enforcement mechanisms for health information communication</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>● Long-term existence of fragmentation</li> <li>● Unbalanced development among provinces</li> <li>● Continuing tension between productive efficiency and social equity</li> <li>● Conflict between current political system and people-centred (need-based) health planning</li> <li>● Insufficient intervention and involvement of national statistics system in HIS development</li> <li>● Over expectation of RHP</li> <li>● Lack of public trust and confidence on government health information</li> </ul>

**Table 11-2 SWOT analysis of PHICs (data derived from interview study)**

### SUMMARY

Responsibility for central and provincial health information management has had a clearly defined position and responsibility in the bureaucratic hierarchy. However, at neither the central nor provincial levels the health information centres had a clearly defined mission, vision statement or strategic objectives. Without a clear mission and objectives, health information system will face difficulties in terms of direction, motivation, evaluation and continuous performance improvement. Project plans for

health information systems exist. However, none of the plans focus on system issues. Regional health information plans have not been found. There is a need for improved macro level health information system design (Lei, 2001); it is especially urgent for PHICs, which are progressively being re-structured as semi-independent institutions.

From the interview study, five key issues for provincial information system development emerged. Firstly, human resource management and capacity building are recognised as the most important strategy for sustainable system development. Besides requiring more HIS staff, interviewees also noted that the quality of the workforce and the capacity of users are more important than just increasing the numbers of HIS staff. Secondly, there is a need for reform, including redesign of provincial health information systems. Needs-based functional design should be conducted. Thirdly, horizontal information flow and two-way interfaces should be established, in order to enhance regional information sharing and utilisation. Fourthly, the design of regional health information systems should reflect local conditions and needs. Systems that are successful in one place are not necessarily successful in others (Hovenga and Lloyd, 2002). Therefore, individuation of health information systems is another challenge to the unique system model. Fifthly, information system managers should manage information activities in cooperative ways, encourage interdepartmental agreements and nongovernmental partnerships and prioritise information activities.

Some controversial opinions also emerged regarding the role of health informatics in regional health information system. Effective health information systems for regional health planning need not necessarily involve the latest high technology. There is not a significant relationship between massive investments on IT and effective health planning. Most failed information systems can be attributed to ignoring social and organisational consideration (Hovenga and Lloyd, 2002). Therefore, system design (instead of IT investment) is the key step for ensuring system success.

In final part of this Chapter, a summary of strengths, weaknesses, opportunities for and threats to HIS development, based on the interview study, is presented.

## CHAPTER TWELVE

### **CONCLUSIONS AND RECOMMENDATIONS**

This Chapter summarises the main findings, draws conclusions from the evaluation of HIS in China, and outlines recommendations for HIS development over the next five to ten years. The logic of the recommendations is based on the following dependences: health reform is critical for the success of the SME transition, RHP is critical for the success of the health reform program, and appropriate HIS development is critical for successful RHP.

#### **CRITICAL CHAINS IN MACRO SYSTEM TRANSITION AND HEALTH SECTOR REFORM**

China is undergoing a historical new transition, transforming what has been a highly centralised planned economy to a socialist market economy. The processes of opening up and reform are difficult; some of the goals have not been reached; and more effort is needed. The SME transition should not be regarded simply as reaching an economic target, nor simply understood as a political ideology. It should be a broadly based achievement across social, economic, political, cultural and health aspects.

Health reform is critical for social stability and solidarity in the course of the SME transition. The macro system transition requires corresponding changes in the health sector. Health reform and development have been identified as national strategies for reaching overall wellbeing. Since the middle of the 1990s, following the global tide of health sector reform, China's health reform has interacted closely with macro changes in social, economic and political aspects. Health reformers have aimed for creative, efficient and effective health management and health service schemes in order to overcome the drawbacks and residues of the planned economy.

Needs-based and evidence-based regional health planning is critical for China's health reform and regional socio-economic development. With the process of decentralisation, local government has gained greater financial power plus the responsibility to formulate and implement regional health plans for meeting diverse and pressing health needs and improving social equity. Government health planning and regulation are required to compensate for and manage the risks of market failure, particularly with respect to equity and allocative efficiency and for ensuring public health services and basic medical care and protection for vulnerable groups. At the same time the government has to build the conditions under which market forces will promote quality and efficiency in the distribution and use of health care resources in accordance with national economic policy.

Health information system development is critical for government health planning. Changing health planning and management requires corresponding changes in health information systems. Better performing health information systems will result in better health planning and well informed health planning will result in better outcomes of health services and better health of the population.

## **OVERALL FINDINGS AND CONCLUSIONS**

The Chinese health information system is founded in the national statistics legislation and structured within a bureaucratic framework. In the context of ongoing government restructuring and functional re-orientation, the PHICs are gradually leaving the core of the bureaucracy and evolving as relatively independent government institutions. The stakeholders with an interest in improved health information have expanded from government leaders to health planners, service managers and consumers. However, most provincial health information systems have been somewhat unresponsive to these new users and their needs. As explored in Chapter Four, health information systems (which have focused largely on descriptive statistics about assets and resources) have been slow to widen their range of collections and improve their capacity for information analysis and presentation. System design and operation are restricted by the limited training and experience of local information managers. System design and performance are both

affected by their hierarchical context and the ‘first-hand’ decision method. PHICs have limited cooperation with other health institutions, government departments and academic bodies. There is significant diversity across the provinces in terms of the PHIC’s human resources, financial resources, infrastructure and capacity. Most PHICs undertake health data collection and upwards reporting and health informationalisation, following directions set at the central level. Few PHICs participate in national health planning or in planning for HIS development.

Information relevant to RHP is held in various places. However, the phenomenon of departmental ‘information islands’ is an obstacle to information sharing and utilisation. In Chapter Five, we have discussed existing information sources and availability. RHP formulators can acquire demographic information from a variety of government departments and institutions. However, household registration data are an unsuitable source of information because they are subject to certain distortions; massive population migration affects the continuing accuracy of the population census and the political priority assigned to the national family planning policy contributes to political limitations on the availability of fertility data. The new urban medical insurance programs collect isolated islands of data in the municipal and prefectural social security bureaux but neither central nor provincial health planners are able to acquire anything more than summary statistics, certainly not raw medical insurance data. Mortality and morbidity data have been collected for a long time; however, multiple sources (death register, hospital record, census and surveillance) provide non-comparable epidemiologic information. The NHSS provides useful information regarding population needs and utilisation but its high cost, strict technical requirements, and reliance on ‘non-professional diagnosis’ limit its usefulness. Because it is only designed to be representative at the national level, it is not representative at the prefectural level unless the provincial and prefectural governments have funded supplementary collections locally. Healthcare activity data are reported and aggregated through ‘professional channels’ but reports which take the form of summary tables of statistics leave little space for further analysis. Finally, key information (in particular financial data) is withheld or

doctored by service managers for political and benefit reasons. Meanwhile, information regarding primary health care utilisation in urban and rural areas is almost non-existent.

We have examined the intrinsic qualities (reliability, accuracy, validity) of available data. Although China has a tradition of collecting resource statistics, health resource data lack content validity when report items only provide a quantitative health inventory, without regard to the quality or capacity of those resources. The NHSS compensates for weaknesses in the hospital morbidity data but under-trained household interviewers bring systematic errors into the database. Nearly half the provinces estimate THE on a local basis by source of finance; however, expenditure patterns are not yet available. Because of the unsatisfactory mortality and morbidity data, regional planners cannot use BOD estimates despite their being widely recognised as useful evidence for prioritising regional health resources allocation. In databases for regional planning, qualitative data are rarely used. Most PHICs are lacking in the skills of qualitative study nor are they alert to the need for further analysis of macro factors (political system, social transition, cultural tradition, community and peoples' attitude) for regional planning. The knowledge and skills of primary collectors, the commitment and motivation scheme of the data collection system and the data transmission channels affect intrinsic quality. Meanwhile, the findings reported in Chapter Six suggest that outdated data collection and reporting systems, extreme shortages of resources, and political interventions also affect the quality of data. It appears that there are very few sources of data which are free from the influence of benefit driven forces, especially health financial data.

Health information is only of value if it is used; in this case, used effectively by health planners. It is for this reason that the evaluation of health information systems should incorporate user perspectives. For example, regional planners are looking for demographic and utilisation information which provides detail about and reflects the experience of rural communities, the floating population and the urban poor. However, the quality of socio-economic information depends on the development of social statistics; upon having a legislative base for information transparency, and upon the application of social study methods. Too often (see Chapter Seven) the quality of health information

does not get the attention it needs except as a reaction to external pressure (for example the WHO 2000 World Health Report) or an internal disaster such as SARS. Although a vast amount of data is collected, much of it has not been transformed into relevant and timely information for health planning, mainly because of the shortage of skilled HIS human resources. Slow progress on standardisation is another reason for poor health information production.

Information about system and institutional performance has not been widely available, also because of poor data quality and limited expertise. The absence of information sharing guidelines and FOI legislation is a barrier to health information presentation and communication. Health planners cannot obtain sufficient health expenditure data for RHP formulation. Process and outcome information regarding health services is still insufficient. Demand-side information provided through NHSS is not regarded as very useful by local planners, because of it is generally not representative at the prefectural level and because it is so difficult to map survey based morbidity data to medical diagnosis morbidity. Data collected through the NHSS is not sufficient for RHP formulators who are wishing to redress inequalities in access to and use of services among different subpopulation groups. The information provided through the health information system is largely restricted to quantitative description, and does not throw much light on mechanisms, reasons and context.

Weaknesses at the management level within provincial health information centres, as discussed in Chapter Eight, contribute to some of the weaknesses in information services and products. It appears that very few PHICs have formulated an explicit mission and/or vision statements, objectives, or long-term development strategy. Few PHICs are thinking about reorienting their functions around the needs of a broader set of users, beyond simply their hierarchical superiors. Provincial health information systems are fairly unresponsive to their users and there are few opportunities for active user-system interactions. National and local information authorities (statistics bureaux and information industry bureaux) are not well equipped to provide support to regional social programs and PHIC managers are not oriented towards building cooperation with internal

and external partners for sharing information and system resources. Regional information systems have not been conceived as supporting informed community participation in health planning or health policy formulation. PHICs simply do not have the necessary resources. System managers lack the skills and mechanisms to recruit, maintain and motivate the human resources which are needed. While the informationalisation program has encouraged the acquisition of new technologies, it has not addressed the need to improve the effectiveness and efficiency of information support for regional planning. There is a pressing need for health information system reform. The information system has to be re-conceptualised as a decision support system rather than simply a 'data collection and transmission system' or a data warehouse or simply in terms of computers and networks.

Political and sociological factors have emerged from this research as major external determinants of RHP and PHIC performance (see Chapter Nine). Despite the progress of political reform, the centralised 'first-hand' decision model is still the mainstay of decision-making although significant steps are being taken towards more participatory and rational decision-making. As discussed in Chapter Nine, the legislative and supervision powers of the people's congress are being strengthened and health plans have faced audit and scrutiny in people's congress, particularly in relation to improving allocative efficiency and social equity. Whatever the rationality of the original RHP policy, people-centred health plans will be improved under this pressure and improvements in health information system should closely follow.

Dysfunctional government structures present a further barrier. Complicated hierarchies and fragmented administrations make regional planning much more difficult than it need be (particularly with respect to implementation) as well as retarding information system performance. Tensions between centralisation and decentralisation and between central policies and local interests place regional planners in a dilemma. Arguments between conservative and radical planners reflect the uncertainties associated with health reform. The historical urban-rural dual social structure makes it more difficult to achieve equity and allocative efficiency. Changing social class configurations and newly emerging

vulnerable groups challenge some of the conventional assumptions of government planning. Local cultural diversity and the role of the Chinese medical profession should be considered when formulating local health plan.

Health managers and HIS experts are aware of these challenges. They provided their opinions on HIS further development. (1) To strengthen regulation and cooperation: they propose legislation, governmental agreements, departmental partnerships and non-government coalitions to support wide information cooperation. (2) To improve HIS capacity they suggest prioritising human resource development. (3) To enrich HIS products they urge that information systems focus on health resources, healthcare activities, health financing and health outcome. (4) To promote IT applications they suggest using IT to build bridges between previously isolated information islands.

### **IMPLICATIONS FOR CENTRAL DECISION-MAKERS**

Regional health planning and provincial health information services will not be well developed in the absence of over-arching strategic plans with implementation followed through by central and provincial governments. Central authorities will also need to strengthen health planning to achieve an effective, equitable and efficient health care system. Improvement of health information systems at the national level is also critical to support the development of an integrated national system including successful provincial health information systems. The findings of this study suggest that central government should give particular attention to: strengthening departmental coordination and cooperation; strengthening the consultative and advisory inputs to health planning; integrating informationalisation and capacity building; and introducing legislation for information system development.

## **STRENGTHENING INTERDEPARTMENTAL COORDINATION AND COOPERATION**

Central coordination should be strengthened. Many of the weaknesses which have emerged in health planning and information systems management could be attributed, at least in part, to fragmented government administration. Fragmented health planning and health information management at the local level are a consequence of ministerial fragmentation at the central level (see Chapters Two and Nine). Conversely, departmental cooperation at the central level is a critical prerequisite for health planning and information system development. The NDRC has been assigned the responsibility of central coordination of economic and social development nationally. With the transfer of what have been government functions to the market, the NDRC should be endowed with stronger powers to promote social (including health) program coordination. Strengthening the NDRC would appear to be a necessary step towards overcoming the present structural fragmentation.

Further work on inter-departmental agreements is needed. There has been a series of jointly issued central policies (such as the RHP Guidelines issued by NDRC, MPH and MOH) but these have not been well implemented. Bureaucratic documents agreed through a process of high level bargaining and compromise will not be implemented unless they have the commitment of all parties. Strong and effective inter-departmental cooperation calls for agreements which are built upon mutual understanding and commitment to a common vision and a shared goal amongst the stakeholders. Such agreements would provide frameworks for cooperation on regional health planning and information management. In the agreements, responsibilities among related departments could be clarified and allocated based upon a common vision and purpose (such as improving allocative efficiency and sharing information system resources). Responsibilities for health planning and health information management should be documented in a formal agreement, following wide discussion among all stakeholders. An agreement on regional health planning should include important stakeholders, e.g.

NBS, MOLSS, NDRC and MOH, et al. A clear and transparent agreement of this sort could support a significant improvement in cooperation. The NDRC is probably the most appropriate body to broker a central agreement on RHP and HIS development.

Another important area needing better coordination at central level is between the MOLSS and the MOH. The separation between medical insurance and health service administration results in contradictions between health policies and barriers to accessing and using health financing information. A multilateral interdepartmental agreement (MOLSS, MOH, NBS, MOII, etc) should be established for inter-agency cooperation for rational health financing management.

Central and local responsibilities should be clarified, through a central-local agreement on the delivery of healthcare and health information. RHP will not be implemented effectively unless local governments have appropriate delegated authorities and powers to design and implement health plans.

## **STRENGTHENING CONSULTATIVE AND ADVISORY INPUTS TO HEALTH PLANNING**

Regional health planning requires a broad information base and inputs from a wide range of different perspectives. However, the findings reported in Chapter Nine suggest that local consultation has not been a strong feature of regional health planning in China so far. Among the key stakeholders are the people's congress at the relevant levels, local community organisations (including for example street committees), academic groups and health practitioners and managers. It would seem desirable to incorporate into the protocols for regional health planning the appointment of health planning consultative and advisory committees through which a wider network of informants and stakeholders might engage with the planning process. These structures would need to be clearly authorised in order to ensure sufficient support from think tanks, stakeholders and local communities.

## **BALANCING INFORMATIONALISATION AND MORE FUNDAMENTAL CAPACITY BUILDING**

Wider use of health informatics in healthcare has the potential to bring knowledge and information to decision-makers at various levels in a cost-effective and timely manner. In developing China, informationalisation is seen as a strategy for encouraging industrial and economic development. A commitment to e-government has been made as part of this with expectations of more efficient and transparent government as a consequence.

However, while informationalisation may be necessary, it is not a sufficient condition for improved government planning. As documented in Chapter Four, health information infrastructure varies widely among regions and departments. In some developing areas, health information system infrastructure is extremely weak with correspondingly poor performance. Provincial health information centres in these regions certainly need increased investment in hardware (which has been the main focus of the informationalisation program) but there are many other factors limiting their performance including a low level of human resources, lack of standardisation, gaps in data collections and more.

Policy makers and health information managers need to strike a balance between 'hardware' construction (computer, network, and electronic transactions) and 'software' / 'wetware' development (system planning, development and evaluation, human resource development, involvement in planning, partnership development, information standards and knowledge management) (Jerva, 2001). Improved policy coordination between MII (informationalisation) and NBS (government statistics system) is critical for rational HIS investment and healthy HIS development at the provincial level. Setting up an interdepartmental agreement (between NBS, MOII, MOH and others) may be an appropriate way to advance such coordination.

## **PROMOTING LEGISLATION ON INFORMATION TRANSPARENCY AND SECURITY**

The findings reported in Chapters Five and Six suggest that health planning is often limited because planners do not have access to information which is held by other units, departments or at different levels or in different sectors of government. The current Statistics Law is not sufficient for regulating information sharing. A significant amount of relevant information is communicated only through internal circulars including documents labelled 'top secret'. Information transparency and information security are two important principles of information system management (Islam, 2003). Clearer rules are needed to regulate the practice of government officials with respect to information provision and to promote transparency of decision-making and the effective use of government information resources. New legislative provisions, along the general lines of freedom of information laws, should be considered with a view to regulating the sharing of information within government as well as between government and public. Such legislation might include a code of practice governing access to information and mechanisms to ensure that officials are accountable for following such guidelines for information sharing. In addition to new provisions regarding within-government information sharing a case may also be made for extending current FOI provisions regarding public access to information. Current FOI provisions do not apply to government departments and agencies at the central level. Likewise, the implementation of appropriate privacy laws should be considered to ensure information security and privacy protection.

## **IMPLICATIONS FOR CHSI AND OTHER HEALTH INFORMATION SUPPLIERS**

This study has focused on provincial health information systems. However, provincial health information centres are part of a national system which depends in many respects on the efforts of the national health information centre. The work of provincial HISs

relies strongly on central health information leadership, planning, administration and coordination. There are important implications arising from the findings of this study for the CHSI and other information suppliers at the central level.

## **STRATEGIC PLANNING FOR INFORMATION DEVELOPMENT**

The findings presented in Chapters Four, Eight and Eleven point to the need for health information system development to be guided by shared strategic plans that recognise the changing patterns of need and that address all of the element of infrastructure including human resources, standardisation, networking etc. Such plans need to engage all of the relevant stakeholders, not just the information providers at central and local levels but the main information users also including the health planners at the provincial and prefectural levels. In Australia the National Health Information Development Plan of 1995 brought together all of the main stakeholders including the technical experts and the different levels of government in a commitment to the creation of a more effective health information system. This national strategic approach was continued in 2002 with the Health Information Development Priorities Paper. Both of these were authored by the National Health Information Management Group which reports to Commonwealth and State Health Ministers and were based on extensive consultation with various stakeholders.

It is not enough to have a system wide plan. The need for forward looking strategic planning applies at the corporate level also and particularly for organisations such as CHSI which have leadership responsibilities across the whole system. It appears that HICs at both national and provincial level need to develop corporate plans which articulate clearly the system inputs (especially in relation to workforce), relationships (system wide planning, stakeholder participation, etc), system activities (standardisation, analyses, presentation, etc), system outputs (quality of health information products) and system outcomes (for example, improved regional health planning).

If CHSI were to develop a corporate plan analogous to that of AIHW (AIHW, 2004a, pp.333-53) it might articulate a 'mission' cast in terms of improving the health of the Chinese people through improved statistics and information. It might articulate a set of values including commitments like: ensuring information availability, keeping a high level of expertise, providing objective and impartial products, and improving system responsiveness. A corporate plan might set the directions for a range of goals including building and maintaining a national health statistics and information network; providing objective and authoritative health information to decision-makers; developing statistics and information standards for ensuring quality and communication of health information; providing consultation services and comprehensive information reports to the public; and promoting health information utilisation. A corporate plan might commit CHSI managers to providing relevant, accurate, comprehensive, timely, understandable and predictable information products to health planners and health managers at all levels and across a wide range of stakeholders. The plan might commit the CHSI to developing the organisational networks and partnerships needed to enhance the functioning of the system as a whole. These might include: building intra and inter-departmental and central-local relationships; developing a national health information coalition through legislation, departmental agreements and collaborative attitudes. The plan would foreshadow the initiatives needed to build the system on a rational framework, through innovative leadership and excellence in staffing.

CHSI has responsibility for supporting PHICs also and this should include helping them to design corporate plans at the provincial level. HICs at the central and local level should formally publish their plans in hard copy and on their websites in order to demonstrate the value of an improved system by providing a clearer image of what it might achieve and to gain stakeholder acknowledgement and cooperation.

## **PROMOTING INFORMATION SHARING THROUGH INTRA- AND INTER-DEPARTMENTAL AGREEMENTS**

Fragmented government administration results in barriers to information flow and dispersed information islands (or silos, see Chapters Five and Eight). Poor departmental communication and cooperation leads to duplication of data collection, poor comparability between datasets and difficulty in information sharing. Networking and coordinating government information management will contribute to more effective data collection, analysis and distribution. The key national information agencies (CHSI and NBS) should explore the possibility of intra and inter-departmental agreements to regulate and promote the sharing of health information.

The establishment of formal agreements of this sort would also help national and local information producers to contribute more effectively to rational regional planning. The findings of this study suggest that the statistics department hierarchy has not been closely involved in regional health planning. However, as the top authority with respect to information management, the NBS has the responsibility to provide leadership in the field of social statistics and information, to provide more information products for social programs, and to ensure that the health planning process is properly resourced. The statistics sector has particular responsibilities in terms of standards such as the detailed specification of minimum health datasets and consistent data definitions. The national bodies also have the responsibility of collecting and communicating information about the health planning process and supporting benchmarking with respect to the information support to health planning.

Health planners need to establish and strengthen their partnerships with health institutions, universities and professional associations (Glouberman and Millar, 2003). Agreements and commitments between government information suppliers and research and academic organisations may also help to mobilise specialist expertise in the process of health planning. The first step is to improve networking and then to encourage higher levels of coordination, cooperation and collaboration.

## **BUILDING SYSTEM CAPACITY**

Steering health reform and development in a period of great uncertainty, decision-makers require strong information support. Health information producers need to integrate information from various sources to produce relevant, timely and innovative information products. In order to meet these extraordinary demands, health information systems (which have traditionally focused on resource statistics) need to improve infrastructure, adopt sound methodologies, and acquire new competencies, including new technical and management skills (ABS, 2002; AIHW, 2003a).

Human resources are a critical system resource. The findings of this study suggest that the quantity and quality of health information personnel lag well behind the needs of the planners (and other end users). In order to advance health information systems in China, there is an urgent need for human resource development through recruiting and training programs. Organisations such as CHSI need additional staff, in particular, in the areas of epidemiology, health management and policy analysis. Teamwork should be built up within and between departments and outside partners. Continuous quality and performance improvement should be conducted in relation to all information product lines (as presented in Chapter Three).

HIS capacity building is not only about computerisation; it is about working with other stakeholders to find solutions to the problems of health care delivery and financing (Maeda, 2003). Under the proposed agreement between MOII, NBS and MOH (as suggested below), CHSI would have a responsibility to help provincial HICs to identify, design, select and evaluate the appropriate information technology applications to make databases accessible and compatible in order to share and integrate data and disseminate information products that will meet the needs of policy makers and planners and managers who are working towards efficient, effective and equitable health care (Guimaraes and McKeen, 1989; Southard, Hong and Siau, 2000; Littlejohns et al., 2003).

## **STRENGTHENING PROVINCIAL HEALTH INFORMATION SYSTEMS**

Provincial HICs and the local HISs which they support are key components of the national health information system. Stronger provincial systems would improve the range and quality of data and information available to CHSI for formulating national health planning as well as supporting local policy makers and planners. Quite apart from its leadership responsibilities, the performance of CHSI relies in part on the capacity and performance of provincial HISs.

Central and provincial HIS cooperation could be further strengthened through CHSI efforts. It would be useful if CHSI were to systematically assess all provincial health information system and design assistance plans for weak provinces. The relationship between CHSI and PHICs could be based on central-local health information agreements.

CHSI has an important role to play in encouraging experience sharing on an inter-provincial basis as well as between central and local levels. CHSI experience is very relevant to provincial personnel. For instance, the proposed national health report (to be provided at the central level, see below) could be a demonstration for provincial health reports. Provincial experience could also be used as a reference for central activity. For instance, the experience of Shenzhen and Shanghai in FOI could inform planning for national legislation. Inter-provincial cooperation (organised by CHSI) also enables provinces to learn from one another.

## **IMPROVED INFORMATION PRODUCTS**

With additional resources CHSI would be able to improve its key information products. A publication similar to *Australia's Health* (AIHW, 2004a), perhaps named the *National Health Report* (focusing on health status, BOD, determinants of health etc) would contribute to wider understanding of health care issues and improved policy making. A parallel document, named something like the *National Health Care Report* (and focusing on health financing, activity, system performance, etc) would also contribute to

policymaking, planning and accountability. Province-specific (and even prefecture-specific) THE reports and BOD reports should be possible within five to ten years.

Reports of CHSI projects with partners (research institutions, professional societies, universities and international agencies) need to be published in a timely fashion, on the MOH website and as policy discussion papers. The annual working report of CHSI needs to be widely disseminated for purposes of improving performance, sharing experience, and consolidating partnerships. Further work is needed to find out how best to make health databases including the NHSS database (based on interview survey) publicly accessible. One possibility would be to use a package such as HealthWiz to make it easier for politicians, planners, journalists and consumers to access.

### **STRENGTHENING STANDARDISATION**

National standards are critical for information system development. The findings reported in earlier chapters indicate that many of the quality issues in health information reflect gaps and weaknesses in standardisation. For example, morbidity statistics based on hospital reports are less accurate and less reliable than they could be because of poor control of the collection process.

National datasets (such as the hospital inpatient morbidity collection) should be clearly defined in standards of data structure, definitions, the collection process and quality control. A health data dictionary such as that used in Australia (AIHW, 2004a) should be produced. The CHSI has a key role to play in evaluating, adapting as necessary and promoting international definitions, classifications and models.

Such standards need to be properly authorised if they are to be widely accepted and implemented. Successful standardisation depends on central leadership, local participation and cooperation among stakeholders. CHSI needs to involve local information custodians and primary data collectors in the process of developing and adopting health information standards. However, this is clearly a function which must be coordinated at the central level (Choi, 1995). While CHSI has particular expertise in

relation to the health sector, the NBS and the MOII should also be involved in advancing the standardisation process.

## **IMPLICATIONS FOR PROVINCIAL STAKEHOLDERS (GOVERNMENT, HEALTH BUREAUX AND INFORMATION CENTRES)**

### **PLANNING**

More than half PHICs have been reformed as semi-independent government information institutions. However, it appears that very few PHICs have formulated strategic plans. Health reform during the SME transition depends on quality information which depends on strategic planning for information development. PHIC development needs to be based on a clear vision and mission statement, achievable objectives and appropriate strategies, in short a corporate plan. The mission and objectives should be based on the information needs of policy makers, planners and managers. For example, regional health planners who are looking to improve quality and efficiency of health care will need information products which reflect upon these dimensions and also on the determinants and appropriate policy levers.

The development of health information systems at the provincial level requires a clear strategic vision to be adopted and projected by the PHICs. However, corporate planning for the PHIC needs to be complemented by a more system oriented health information development plan which projects a vision and objectives for the system as a whole, province-wide, and which sketches the commitments which will be required of various stakeholders as well as the PHIC.

In order to strengthen leadership and coordination, it would make sense to establish at the provincial level a steering committee for HIS reform. This committee would commission working groups (involving relevant provincial agencies) with various responsibilities. There would need to be some guidance from CHSI in relation to national guidelines and standards and technical issues; the degree of CHSI involvement would depend on the

level of HIS development in each province. It would be desirable to have some involvement also of the provincial people's assembly as part of strengthening the accountability of the various bureaucratic units.

### **PROMOTING USER INVOLVEMENT AND HORIZONTAL INTEGRATION**

Users should be fully involved in the processes of HIS design and evaluation (Lycett and Giaglis, 2000). User input will help the HICs to provide relevant and timely information. The findings of this study suggest that user involvement could be further strengthened.

The findings of this study suggest that much regional information flow takes place in vertical silos structured around the needs and responsibilities of particular sectors. Regional health planning requires interfaced and interconnected information systems (Leonard, Tan and Pink, 1998). It would seem that there is a need for new channels which will support horizontal across-government information flows. New interfaces between departmental information systems would need to assure compatibility of definitions and integrity of data as well as intercommunication of data sets.

Horizontal information flow should not be restricted to the exchange of aggregated tables of statistics. (As discussed in Chapter Six) summarised tables of statistics have serious limitations in terms of information sharing, in particular with respect to further analysis. Priority should be given to strengthening information warehousing and retrieval functions over the next five to ten years. Electronic databases (raw data) and information tools (software for searching databases and presenting the results of analyses) should be accessible by users and horizontal partners. Identifying technical solutions is not enough. The findings of this study suggest that information sharing is commonly obstructed by narrow bureaucratic politics and power plays. Strategies to overcome these kinds of obstructions could include interdepartmental agreements, greater involvement of people's congress committees and FOI-type legislation regulating interdepartmental information access as well as public information access.

## **ESTABLISHING AGREEMENTS AND LEGISLATION FOR REGIONAL INFORMATION SHARING**

The findings of this study (Chapters Four and Eight) suggest that there is considerable scope for improved cooperation between provincial health information centres and various provincial level partners (bureaucratic, technical and academic).

Two strategies, already discussed in relation to central cooperation, are inter-departmental and inter-sectoral agreements on health information development and management and whole-of-government structures for strengthening regional cooperation and partnership.

The processes of information sharing, production and dissemination also require a clear regulatory framework, established through legislation. In particular, such a framework should deal with access to government information resources (extending the principle of FOI to other government agencies as well as to the public) and information security (regulated by privacy law). The creation of a legal framework for on-line access to data and information is needed, to enable and facilitate the free access to quality data with proper protection of confidentiality (Csiki, Marcu and Ungurean, 2004). Like other public goods, government information resources should be free of charge for all producers and most users of health system.

Maintaining a strong whole-of-government perspective would be greatly enhanced by the involvement of local people's congress, not just in passing relevant legislation but also in maintaining an active overview of data quality and information sharing.

## **PRIORITISING INFORMATION PRODUCTION AND IMPROVING INFORMATION QUALITY**

As discussed in Chapters Five and Six, the quality of data and information for RHP is problematic. Many duplicated and irrelevant data are collected but decision-makers are

frustrated by the lack of useful information (WHO, 2003a). Large volumes of data are collected but insufficiently analysed and not used in decision-making (Chapter Seven).

Information is a scarce resource and there is a need to concentrate on developing and producing relevant, timely and quality information to support decision-making. As part of the corporate planning PHICs should prioritise data collections and information products on the basis of users' needs and rational health indicator development (such as the Canadian model (Glouberman and Millar, 2003)).

Improving health information support to regional health planning will require health information managers (1) to identify regional health planners as important users of their products, (2) to recognise the purposes of RHP (in particular, improved allocative efficiency) and the challenges these present for HIS development, and (3) to identify and select the appropriate system components, indicators, information sources and presentation formats from the vast range of existing alternatives to best support the regional planners. For example, improved demand-side information provision is a priority for regional planning if planners are to address the challenges of allocative efficiency and strengthen outcome management (Matthews, 2000; Renhard, 2003). There is also scope for further analyses of existing demographic, mortality and morbidity information to better support regional planning.

Users' trust in health information products and the systems which produce them depend on users' judgement of the quality (credibility) of those products (Trewin, 2001). Quality depends on audit of standards and continuous quality improvement (Beynon-Davies and Lloyd-Williams, 1999). The findings of this study (see Chapters Six and Seven) suggest that many local health information centres have yet to implement formal systems for quality improvement.

PHICs need to sharpen their focus on information quality and continuous improvement. They should nurture a quality culture across all steps of information processing, from primary data collection to information utilisation. Active and informed feedback from users and dialogue between information providers and users should be encouraged.

## **EXPERTISE AND COMPETENCIES THAT SHOULD BE DEVELOPED**

Provincial health information centres face the challenge of transforming themselves from their traditional role of data collector and custodian to the role of information and knowledge manager (Malone, 2001; Chatwin, 2002; Donato and Walker, 2003). This challenge calls for a long-term strategy including investment in capacity building. The findings of this study suggest that information competencies are quite limited in many provincial HICs, especially those in developing areas. In particular it appears that the skills of data interpretation, reporting, presentation and dissemination need to be developed, so that data become information and knowledge for decision-makers (Shams and Farishta, 2001). Epidemiological and statistical methods; data, information and knowledge management; health policy analysis; health care financing, performance measurement and qualitative study methods are all recommended areas for development.

## **NEED FOR MORE RESEARCH**

In this thesis, data from a nationwide PHIC questionnaire survey, in-depth key informant interviews and extensive document analysis have been used to generate a broad description of the Chinese health information system and to evaluate its performance at the provincial level in relation to the task of providing information support to regional health planners. The experience and opinions of government officials, HIC managers, health service managers and academic experts at central and local levels have been documented and analysed. In this final chapter, some of the implications of the study for different stakeholders (including policy makers, planners and information providers at central and local levels) have been identified.

There is still a pressing need for further ongoing research. China is a very diverse country, with wide variation in political, socio-economic, and cultural and management aspects. The ways in which PHICs are set up and operate also reflect this diversity with significantly unique features in different provinces. In-depth province-specific HIS study is needed.

China is midway in a complex process of transition. The socialist market economy has not been perfectly established. Social, political and economic structures are changing incrementally. The impacts of new macro changes on the supply of and need for information systems should be carefully observed and analysed.

Complicated relationships between government, market and moral forces contribute to the difficulties of predicting the outcomes of PHIC reform. Ongoing interdisciplinary studies will be needed to follow the impact on HISs and PHICs of the reform of government decision-making and the evolving configurations of stakeholder relationships.

Health sector reform is entering a particularly critical phase and the outcomes of current health reform initiatives cannot be clearly predicted. How will health reform influence HIS development? Will medical insurance arrangements be used as to shape recurrent health allocations as part of regional planning and what information support would such a strategy require? Follow-up research on the interplay of health reform and HIS reform will be necessary.

The Chinese health information system is developing in a dynamic technical environment. Undoubtedly there will be technical innovations, presently undreamed of. With such innovations will come new research challenges such as how to evaluate and compare different ways of doing things.

### **LAST WORDS AND NEXT STEPS**

Health information systems that support health reform and development also contribute to sustainable socio-economic development (Schirnding, 2002). Improvements in regional health planning and management depend on integrated and consolidated information systems. The necessary improvements in health information systems will require long-term vision and prudent judgement. There are multiple stakeholders who should be participating in and contributing to the development of regional health information systems. Provincial HIS development will be critical for ensuring that high quality and relevant information is utilised for better regional planning for people's health.

As China moves to establish a socialist market economy, the task of health planning increasingly involves the regulation of markets as well as government purchasing and investment. The information upon which market regulation is based must be accurate and relevant and the decision making transparent. One criterion for success in current moves to improve provincial HISs will be the increasing trust of stakeholders in government, market and public.

Some implications for HIS reform have been discussed in this chapter and some directions for consideration have been sketched. However, the Chinese health system is changing rapidly and health information systems are also experiencing rapid change and improvement. Ongoing evaluation and advanced studies are definitely needed.

## APPENDICES

### Appendix 1 Questionnaire

#### **Questionnaire: Understanding of Provincial Health Statistics and Information System and Its Functions on Regional Health Planning**

Dear Sir or Madam:

There is significant agreement for important roles of health information system on reform and development of health system in our country. In order to analyse functions of the health information system supporting regional health planning, La Trobe University of Australia, Centre of Health Statistics and Information of Ministry of Health, and Department of Health Policy and Management in Peking University jointly conduct a questionnaire survey. Please fill this questionnaire within one month. Questionnaire would be mailed or faxed back to Centre for Health Statistics and Information, or Department of Health Policy and Management.

Thanks for your cooperation.

Contact with:

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## Part I: Organisation, Leadership and Relationship

In this section, we are interested in finding out about nature, structure and inter-department relationship of provincial health statistics and information office.

1.1 Name of provincial health statistics and information institute: *(Please choice an appropriate answer, and tick the box in front of this answer. If there is not an appropriate answer, please select 'others,' then provide brief description)*

\_\_\_\_\_ *(Name of province)*

- Division of health statistics in provincial health bureau
- Division of Planning and Financing in provincial health bureau
- Centre for health statistics in provincial health bureau
- Others: \_\_\_\_\_

1.2 Nature of the institute: *(Please choice an appropriate answer, and tick the box in front of this answer. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- Civil servant system
- Government institute
- Others: \_\_\_\_\_

1.3 Professional education background of Directors: *(This question is applied director AND deputy directors in the institute. More than one appropriate answer could be selected. Please choice all appropriate answers, and tick the boxes in front of those answers. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- Medical sciences
- Accounting
- Public health
- Health management
- Computer sciences
- Others: \_\_\_\_\_

1.4 Position of Director in provincial health bureau: *(Please choice an appropriate answer, and tick the box in front of this answer. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- Member of 'decision-making' group' in provincial health bureau
- Division head only
- Others: \_\_\_\_\_

1.5 Most frequent/important cooperate divisions in provincial health bureau: *(More than one appropriate answer could be selected. Please choice all appropriate answers, and tick the boxes in front of those answers. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- General Office (Health Law)
- Division of Personal Affaire
- Division of Planning and Financing
- Division of primary health care and MCH
- Division of Medical Administration
- Division of Disease Control

- Division of Health Inspection
- Division of Medical Education and Technology
- Division of International Cooperation
- Division of Medical Equipment
- Others: \_\_\_\_\_

1.6 Most frequent/important cooperate institutes of provincial health bureau: *(More than one appropriate answer could be selected. Please choice all appropriate answers, and tick the boxes in front of those answers. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- Provincial Institute of Hospital Management
- Provincial Institute of Public Health Management
- Provincial Institute of Health Economics
- Provincial Centre of Health Personnel Exchange
- Provincial Foreign Loan Office in PHB
- Others: \_\_\_\_\_

1.7 Most frequent/important cooperate bureaux within province: *(More than one appropriate answer could be selected. Please choice all appropriate answers, and tick the boxes in front of those answers. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- Provincial Development Planning Commission
- Provincial Statistics Bureau
- Provincial Financing Bureau
- Provincial Labour and Social Security Bureau
- Others: \_\_\_\_\_

1.8 Most frequent/important cooperate universities and research Institutes: *(More than one appropriate answer could be selected. Please choice all appropriate answers, and tick the boxes in front of those answers. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- Universities within provinces
- Universities within China
- Universities in other countries
- Provincial Training Centre for Health Management
- Others: \_\_\_\_\_

1.9 Most frequent/important cooperate societies or associations: *(More than one appropriate answer could be selected. Please choice all appropriate answers, and tick the boxes in front of those answers. If there is not an appropriate answer, please select 'others,' then provide brief description)*

- Medical association
- Preventive medical association
- Society of health statistics
- Society of hospital management
- Society of health economic
- Others: \_\_\_\_\_

## Part II: Human and Financial Resources

In this section, we are interested in finding out about workforce and financial status of provincial health statistics and information office.

### 2.1 Human resources (*Please fill numbers of staff*)

- 2.1.1 Number of staff on plans \_\_\_\_\_
- 2.1.2 Number of staff actually \_\_\_\_\_
- Number of full time staff \_\_\_\_\_
- Number of part time staff \_\_\_\_\_

### 2.2 Professional education background of staff: (*Please fill numbers of staff, which including full time and part time staff. If staff has accepted more than one professional education, the most recent education is accepted.*)

- 2.2.1 Medical sciences \_\_\_\_\_
- 2.2.2 Accounting \_\_\_\_\_
- 2.2.3 Public health \_\_\_\_\_
- 2.2.4 Health management \_\_\_\_\_
- 2.2.5 Computer science \_\_\_\_\_
- 2.2.6 Others \_\_\_\_\_

### 2.3 Financial Resources (*Please fill financial data of 2001*)

- 2.3.1 Government regular budget last year \_\_\_\_\_ 10 thousand yuan
- 2.3.2 Government special fund last year \_\_\_\_\_ 10 thousand yuan
- 2.3.3 Revenue of consulting and routine Service \_\_\_\_\_ 10 thousand yuan
- 2.3.4 Other revenues \_\_\_\_\_ 10 thousand yuan

## Part III: Responsibilities and Functions

In this section, we are interested in finding out about responsibilities and functions of provincial health statistics and information office in health planning and management.

*(Please identify which functions/responsibilities/activities of your office. Click Yes or No if you ensure that function is current implemented (or not implemented). If you not sure, please click 'Unknown'.)*

### 3.1 Macro Decision and Regulation Building

- | <i>Y</i>                 | <i>N</i>                 | <i>Unknown</i>           |  |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To involve in national health planning                                 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To involve in provincial health planning                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To involve in national health information planning                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To conduct provincial health information planning                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To involve in national health information standardisation and policies |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To conduct provincial health information standardisation and policies  |

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To involve in national health information legislation and data reporting
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To involve in provincial health information legislation & data reporting
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To involve in and implement national health information law inspection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To organise and conduct provincial health information law inspection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Others_____

### 3.2 Data collection and maintaining

<i>Y</i>	<i>N</i>	<i>Unknown</i>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To involve in national statistics reporting (uploading)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To involve in national health service survey
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To conduct special survey for health reform and development policies
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To manage and coordinate health statistics within PHB
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To release provincial health information (annual health statistics report)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To maintain and provide provincial health data
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To review and audit health data form and survey plan within PHB
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To review health data reports of other division within PHB
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Others_____

### 3.3 Professional Standards and Network Building

<i>Y</i>	<i>N</i>	<i>Unknown</i>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To involve in national health statistics Standards and Coding
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To organise and coordinate regional health information network
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To manage health related website, and to popularize online health
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To design provincial health website and health information databases
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To develop, operate, manage and maintain PHB computer network
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To organise and coordinate provincial computerised health network
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Others_____

### 3.4 Research, Consulting, Training and Exchange

<i>Y</i>	<i>N</i>	<i>Unknown</i>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To conduct studies on statistics and statistical analysis
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To provide statistics consultation
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To implement statistics monitoring
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To organise training program on computer and network application
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To cooperate with PSB on health information professionals accreditation
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To conduct inter-department health information exchange
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To conduct inter-provincial health information exchange
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To participate international health information exchange
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To coordinate with provincial health statistics society
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To conduct other health information project within PHB
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Others_____

## Part IV: Databases and Survey

In this section, we are interested in finding out about data and information available in provincial health statistics and information office, or accessible from other departments. Otherwise, we try to find out roles and efforts of health information on regional health planning.

### 4.1 Routine database – minimum dataset

*Please read following instruction carefully before you give answers.*

*Routine databases are listed in following table. Please provide your opinion on those datasets for their quality on different aspects. Likert scale is designed for your evaluation marking. '1' represents extremely good and '5' as extremely bad. The numbers between 1 and 5 represent degree of 'good' or 'bad'. If you cannot provide your evaluation on specific dataset or evaluation criteria, please use '6' as 'unknown'. Please mark scale in matrix. Brief definition of evaluation criteria is listed as follow:*

- *Objective/valid: Unbiased, can be check to make sure that is correct by verifying multiple sources.*
- *Accurate: Detailed, reflect full-scale of events or facts.*
- *Relevant: Relevant to purpose they are to serve, processed according to pre-designed plans.*
- *Sensitive: Reflect significant changes of health status or quality of service.*
- *Comprehensive: Reflect major features by using parameters.*
- *Development: Data have been analysed amply.*
- *Timeliness: Decision maker has current and relevant facts to ensure appropriate responses to specific situation.*
- *Economic viability: usefulness and benefits of information exceed cost incurred in collecting and processing the information.*
- *Simple: Easy to interpret.*
- *Volume: Volume of information do not cause cognitive overload.*
- *Comparable: Standardised, enhance planner on interdepartmental and intradepartmental sharing and exchange.*
- *Projectable: Provide chance for time series analysis, and forecast future changes.*

Type of survey	Objective/valid	Accurate	Relevant	Sensitive	Comprehensive	Development	Timely	Economic viability	Simple	Volume	Comparable	Predictable
Household interview survey												
Health institution survey												
Community health survey												
Rural health survey												
Health care performance												
Health service outputs												
Others												

#### 4.2 Special Surveys

*Special Surveys are listed in following table. Please provide your opinion on those investigations for their quality on different aspects. Likert scale is designed for your evaluation marking. '1' represents extremely good and '5' as extremely bad. The numbers between 1 and 5 represent degree of 'good' or 'bad'. If you can not provide your evaluation on specific survey or evaluation criteria, please use '6' as 'unknown'. Please mark scale in matrix. Brief definition of evaluation criteria is same as question 4.1.*

Type of datasets	Objective/valid	Accurate	Relevant	Sensitive	Comprehensive	Development	Timely	Economic viability	Simple	Volume	Comparable	Predictable
Health institutions												
Health workforce												
Health equipment												
Hospital operation												
Hospital inpatient care												
Community health care												
Rural health care												
Reasons of death and injury												
Disease prevention and control												
Health inspection												
Others												

#### 4.3 Health related information of other departments

*Health related information provided by other departments is listed in following table. Please provide your opinion on those information sources for their quality on different aspects. Likert scale is*

designed for your evaluation marking. '1' represents extremely good and '5' as extremely bad. The numbers between 1 and 5 represent degree of 'good' or 'bad'. If you cannot provide your evaluation on specific source or evaluation criteria, please use '6' as 'unknown'. Please mark scale in matrix. Brief definition of evaluation criteria is same as question 4.1.

Type of data source	Objective/valid	Accurate	Relevant	Sensitive	Comprehensive	Development	Timely	Economic viability	Simple	Volume	Comparable	Predictable
Population and demography												
Economic development												
Capital investment												
Recurrent expenses												
Medical insurance												
Health services provided by outside of health department												
Other												

#### 4.4 Health information and Regional Health Planning

Please provide your opinions roles of current datasets on regional health planning. Likert scale is designed for your evaluation marking. '1' represents extremely good and '5' as extremely bad. The numbers between 1 and 5 represent degree of 'good' or 'bad'. If you cannot provide your evaluation on specific source or evaluation criteria, please use '6' as 'unknown'.

Routine datasets	Your opinion	Special surveys	Your opinion	Interdepartmental datasets	Your opinion
Health institutions		Household interview survey		Population and demography	
Health workforce		Health institution survey		Economic development	
Health equipment		Community health care survey		Capital investment	
Hospital operation		Rural health care survey		Recurrent expenses	
Hospital inpatient care		Health care performance		Medical insurance	
Community health service		Health service outputs		Healthcare outside of health department	
Rural health service					
Reasons of death and injury					
Disease control and prevention					
Health inspection report					

## Appendix 2 Interview Guide

*Dear Sir or Madam:*

*There is significant agreement for important roles of health information system on reform and development of health system in our country. In order to analyse functions of the health information system supporting regional health planning, La Trobe University of Australia, Centre of Health Statistics and Information of Ministry of Health, and Department of Health Policy and Management in Peking University conduct a qualitative study. You have been selected as an informant for in-depth discussion. You have been contacted before this interview, and question list has been mailed or faxed to you. Researcher will give you more detail introduction on this study before interview.*

*Thanks for your cooperation.*

*Latrobe University*

*Peking University*

*Ministry of Health*

### Interviewee: HIS managers at national level (QL1)

1. As a manager of National Health Information system, what are your major responsibilities?
2. What is the structure of your staff and organisation? What are their major responsibilities?
3. Who are your supervisors, both administrative and professional? How do you report to your supervisors?
4. What are the resources, including funds, workforce, and equipments, in your department?
5. As your opinion, what are the major features of health information development in China, since 1980s China's open policy?
6. As your opinion, what are the framework, characteristics and functions of current health information of China? What is the relationship with other information systems?
7. What kind of health data, message, or information can be gained? What is the major source of Health data, message or information? What are standards for data collection? How about quality of those health data, message or information? What are major factors affecting quality of data? What are methods you selected for quality improvement? Is current information source enough for health management and policy-making, seeing Regional Health Planning?
8. Do you think what other health related information should be collected interdepartmentally? Do you think those data could be easily obtained? If not, why (department policy or conflict, cost of information, or technical reason)?
9. How did you analyse those data? Was there a uniform analysis outline? Did you analyse data on demand-based? Do you think the data have been analysed in comprehensive way and sufficiently? Was there many data collected but hard to valuable support on health planning? Why?
10. How did you decide to provide what kind of information for regional health planning? Which departments, institutions or population are targets of your information provision? What are common formats of information provision (information report, data forms, oral presentations, web publication)? What is frequency of information report (annual, seasonal, monthly, occasionally)? What are your opinion on standards and quality of information? What information released by national/provincial agencies and used by regional health planner in prefecture level?

11. How did you involve in regional health planning? How the health information provided in your department support and/or influence decision makers of regional health planning? How do you think to improve health information system for more effective support on regional health planning?
12. How do you think about objectives and methodologies of regional health planning? What are appropriate ways to push regional health planning in your province? What are appropriate ways to develop rational regional health planning?
13. During pilots of regional health planning, did you collect information in order to follow up implementation? If yes, what kind of information you collected? Did planner modify his/her plan according to your information? What additional information should be collected for monitoring?
14. How do you think about health information system provides information to patients and population? Moreover, why do you think so? When setting up information provision principle, which information receiver (health manager, services provider, insurer and patient/population) should be the priority? Moreover, why do you think so?
15. Could you share with me about your foresee on Chinese health information system for health planning in next 5 or 10 years? What is the first priority of system development?
16. As your opinion, what are the major strengths, weaknesses, opportunities and threats of Chinese health information system for its function on supporting regional health planning? And Why?

Interviewee: SDPC, MOF, PDPC, PFB officials (QL2)

1. As a manager of national/provincial health planning and financing, what are your major responsibilities?
2. For your opinion, what are the major features of information system development in China, since 1980s China's open policy? On more specific aspect, how about health information system?
3. How do you think about objectives and methodologies of regional health planning? What are appropriate ways to push regional health planning in your province? What are appropriate ways to develop rational regional health planning?
4. For regional health planning, what kind of data, message, or information should be gained? What is the major source of health data, message or information available? How about quality of those health data, message or information? In addition, is current information source enough for regional health planning? As your opinion, what is other relevant information should be added in list of data collection?
5. Do you think those data have been analysed in comprehensive way and sufficiently? Was there many data collected but hard to valuable support on health planning? Why?
6. What kind of information has been released in national and provincial agencies and used by regional health planning in prefecture level? How they obtained that information?
7. As your opinion, how about the standard and quality of provided information? Why?
8. During pilots of regional health planning, did you collect information in order to follow up implementation? If yes, what kind of information you collected? Did planner modify his/her plan according to your information? What additional information should be collected for monitoring?
9. Could you share with me about your foresee on Chinese health information system for health planning in next 5 or 10 years? What is the first priority of system development?

10. As your opinion, what are the major strengths, weaknesses, opportunities and threats of Chinese health information system for its function on supporting regional health planning? And Why?

Interviewee: NBS, PSB officials (QL3)

1. As a manager of national/provincial statistics, what are your major responsibilities?
2. What is the structure of your staff and organisation? What are their major responsibilities?
3. Who are your supervisors, both administrative and professional? How do you report to your supervisors?
4. What are the resources, including funds, workforce, and equipments, in your department?
5. As your opinion, what are the major features of information system development in China, since 1980s China's open policy? More specifically, how about health information system development?
6. As your opinion, what are the framework, characteristics and functions of current information system of China? What is feature of health information system? What information systems related with health information system? Moreover, what are their relationships?
7. What kind of data, message, or information can be gained for health planning, especially for regional health planning? What is the major source of health data, message or information? Are current information sources enough for regional health planning? As your opinion, what information should be added in data collection list for regional health planning?
8. Do you think those data have been analysed in comprehensive way and sufficiently? Was there many data collected but hard to valuable support on health planning? Why?
9. What kind of information has been released in national and provincial agencies and used by regional health planning in prefecture level? How they obtained information?
10. Did national or regional statistics standard apply in health information collection? What are those standards? What is your opinion about the standard or quality of provided information? Why?
11. During pilots of regional health planning, did you collect information in order to follow up implementation? If yes, what kind of information you collected? Did planner modify his/her plan according to your information? What additional information should be collected for monitoring?
12. How do you think about health information system provides information to patients and population? Moreover, why do you think so? When setting up information provision principle, which information receiver (health manager, services provider, insurer and patient/population) should be the priority? Moreover, why do you think so?
13. Could you share with me about your foresee on Chinese health information system for health planning in next 5 or 10 years? What is the first priority of system development?
14. As your opinion, what are the major strengths, weaknesses, opportunities and threats of Chinese health information system for its function on supporting regional health planning? And Why?

Interviewee: Prefecture Regional Health Planning officials (QL4)

1. As an official of prefecture regional health planning, what are your major responsibilities?
2. For your opinion, what are the major features of health information system development in China, since 1980s China's open policy?

3. For regional health planning, what kinds of data, message, or information were gained? What is the major source of health data, message or information available? What standards of statistics applied during data collection? How about quality of those health data, message or information? What are major reasons affecting quality of data? What methods of you occupied for quality improvement? Are current information sources enough for regional health planning?
4. What other health related information was collected interdepartmentally? Do you those data could be easy obtained? If not, why (department policy or conflict, cost of information, or technical reason)?
5. How did you analyse those data? Was there a uniform analysis outline? Did you analyse data on demand-based? Do you think the data have been analysed in comprehensive way and sufficiently? Was there many data collected but hard to valuable support on health planning? Why?
6. What are common formats of information obtained (information report, data forms, oral presentations, web publication)? What is frequency of information obtained (annual, seasonal, monthly, occasionally)? What are your opinion on standards and quality of information? What information released by national/provincial agencies and used in your regional health planning?
7. How do you think to improve health information system for more effective support on regional health planning?
8. How do you think about objectives and methodologies of regional health planning? What are appropriate ways to push regional health planning in your province? What are appropriate ways to develop rational regional health planning?
9. During pilots of regional health planning, did you collect information in order to follow up implementation? If yes, what kind of information you collected? Did you modify your plan according to information? What additional information should be collected for monitoring?
10. Could you share with me about your foresee on Chinese health information system for health planning in next 5 or 10 years? What is the first priority of system development?
11. As your opinion, what are the major strengths, weaknesses, opportunities and threats of Chinese health information system for its function on supporting regional health planning? And Why?

Interviewee: Provincial hospital presidents (QL5)

1. As a manager of this hospital, what are your major responsibilities?
2. For your opinion, what are the major features of health information system development in China, since 1980s China's open policy? More specifically, how about development of hospital information system?
3. For regional health planning, what kinds of data, message, or information were gained and provided? What is the major source of health data, message or information available? What standards of statistics applied during data collection? How about quality of those health data, message or information? What are major reasons affecting quality of data? What methods of you occupied for quality improvement? Are current information sources enough for regional health planning?
4. What other health related information was collected interdepartmentally? Do you those data could be easy obtained? If not, why (department policy or conflict, cost of information, or technical reason)?

5. How did you analyse those data? How do you conduct the analysis? Was there a uniform analysis outline? Did you analyse data on demand-based? Do you think the data have been analysed in comprehensive way and sufficiently? Was there many data collected but hard to valuable support on health planning? Why?
6. What are common formats of information obtained and provided (information report, data forms, oral presentations, web publication)? What is frequency of information obtained and reported (annual, seasonal, monthly, occasionally)? What are your opinion on standards and quality of information provision? What information released by national/provincial agencies and used in regional health planning?
7. How do you think to improve health information system for more effective support on regional health planning?
8. How do you think about objectives and methodologies of regional health planning? What are appropriate ways to push regional health planning in your province? What are appropriate ways to develop rational regional health planning?
9. During pilots of regional health planning, did you collect information in order to follow up implementation? If yes, what kind of information you collected? Did planner modify his/her plan according to information? What additional information should be collected for monitoring?
10. Could you share with me about your foresee on Chinese health information system for health planning in next 5 or 10 years? What is the first priority of system development?
11. As your opinion, what are the major strengths, weaknesses, opportunities and threats of Chinese health information system for its function on supporting regional health planning? And Why?

### Appendix 3 Major Policies of Economic System Transition Since 1978

Year	Political Documents	Key Points and Significances
1978	Emancipate the mind, seek truth from facts and unite as One in Looking to the Future – Xiaoping Deng’s speech at closing session of the Central Working Conference which made preparations for the Third Plenary Session of the Eleventh Central Committee of the CPC	To positively assess the Debate about whether practice is the sole criterion for testing truth; to animadvert ‘two whatevers’ (Mao’s ideology); to abolish class struggle policy; and to shift priority to construction of socialist modernisation. This speech is recognised as manifesto of China’s transition.
1981	Resolutions on historical issues of the Communist Party after founding of China – The Sixth Plenary Session of the Fourteenth Central Committee of the CPC	To animadvert the Cultural Revolution and Mao’s theory of Continuous Revolution under Proletariat Dictatorship; and to conclude historical position of Zedong Mao.
1982	To fully initiate new phase of socialist modernisation – Hu Yaobang’s report at the Twelfth Central Committee of the CPC	To allege the socialist with Chinese characteristics; market forces was identified as supplementary measure of planned economy; and to set up two steps for modernisation.
1984	Decisions on economic system reform – the Third Plenary Session of the Twelfth Central Committee of the CPC	To allege the planned commodity economy with base of public ownership; and to initiate price reform policy
1987	To march on the way of socialist with Chinese characteristics – Zhao Ziyang’s report at the Thirteenth Central Committee of the CPC	To allege the theory of Socialist at Primary Stage and ‘one centre two principles’; to set up principle of ‘government regulate market and market lead enterprises’; to set up three steps for modernisation; and to request political system reform.
1992	Excerpts from Deng Xiaoping’s talks given in Wuchang, Shenzhen, Zhuhai and Shanghai.	To allege the proportion of planning to market forces is not the essential benchmark between socialism and capitalism; to request more radical reform; and to allege the development is the absolute principle.
1992	To quicken open, reform and modernisation, and to achieve more victory of socialism with Chinese characteristics – Jiang Zemin’s report at Fourteenth Central Committee of the CPC	To conform the target of economic system reform is to establish Socialist Market Economic System.
1993	CCCPC Decision on several issues of establishing socialist market economic system – the Third Plenary Session of the Fourteenth CPCC	To clarify blueprint and policies of economic system reform, and the framework of SME.
1997	To hold banner of Deng Xiaoping’s theory, and to persist the socialism with Chinese characteristics to twenty first century – Jiang Zemin’s report at Fifteenth Central Committee of the CPC	To conclude historical position of Xiaoping Deng; to emphasize rule of law; to allege the public ownership could be realised in multi forms and non-public ownership is important component of the SME
2002	To build a well-off society in an all-round way and create a new situation in building socialism with Chinese characteristics – Jiang Zemin’s report at Sixteenth Central Committee of the CPC	To summarise Zemin Jiang’s era; and conform continuation of reform policies.
2003	Decision on several issues of improving socialist market economic system – the Third Plenary Session of the Sixteenth Central Committee of the CPC	To clarify targets, tasks, principles and policies of improvement of SME for the third strategic step.

## Appendix 4 Datasets of National Health Statistics Reporting System (translated)

*(Note: Source: MOH (2002) National Health Statistical Survey Regulation, Beijing, People Health Publisher, pp 1-5. The titles are named as 'survey', 'card' or 'report'. However, all of them could be regarded as 'statistics reporting forms', which are collected through vertical hierarchy of health statistics reporting system. In addition, reporting forms with asterisk (\*) are contents of comprehensive health statistics (CHS), while others are professional health statistics (PHS), as discussed in Chapter Five)*

### Health resource statistics

- HS1\* Health Institution Survey
- HS2\* Health Workforce Survey
- HS3\* Health Equipment Survey
- HS6\* Community Health Survey
- HS7\* Village Health Survey
- HS9 Health Institution Construction Survey

### Medical statistics

- HS4\* Medical Institution Operation Survey
- HS5\* Hospital Separation Survey
- HS5-1 Outcome-specific Separation and LOS
- HS5-2 Age-specific Separation and LOS
- HS5-3 Disease-specific Separation Charges
- HS10 Blood Collection and Supply Institution Survey

### Health inspection statistics

- HS11 Preventive Health Inspection Report Card
- HS12 Food Health Inspection Report Card
- HS13 Food Health Inspection Institution Report Card
- HS14 Food Hygiene Event Report Card
- HS15 Public Place Health Inspection Report Card
- HS16 Cosmetic Health Inspection Report Card
- HS17 Drinking Water Health Inspection Report Card
- HS18 Public Place Health Inspection Institution Report Card
- HS19 Cosmetic Health Inspection Institution Report Card
- HS20 Drinking Water Health Inspection Institution Report Card
- HS21 Environmental Hygiene Event Report Card
- HS22 Occupational Health Inspection Report Card
- HS23 Occupational Health Inspection Institution Report Card
- HS24 Occupational Hygiene Event Report Card
- HS25 Occupational Disease Report Card
- HS26 Silicosis Report Card
- HS27 Pesticide Poisoning Report Card
- HS28 School Health Inspection Report Card
- HS29 Radiation Health Inspection Report Card

- HS30 Preventive Radiation Health Inspection Report Card
- HS31 Radiation Health Inspection Institution Report Card
- HS32 Radiation Event Report Card
- HS55 Local Health Regulation, Rule and Standard Registration Card
- HS56 Health Administration Lawsuit Report Card
- HS57 Health Administration Reconsideration Report Card

Disease control statistics

- HS8-1\* Causes of Resident's Death Survey
- HS8-2\* Causes of Infant Death Survey
- HS33-1 Type I and II Infectious Diseases Survey
- HS33-2 Type III Infectious Diseases Survey
- HS33-3 Age & Sex-specific Morbidity and Mortality for Type I & II Infectious Diseases
- HS33-4 Age & Sex-specific Morbidity and Mortality for Type III Infectious Diseases
- HS34 Sex-transmitted Diseases Survey
- HS35 Tuberculosis Survey
- HS36 Lepra Survey
- HS37-1 Polio Case Report
- HS37-2 Polio Follow-up Survey
- HS38-1 Measles Suspect Case Report
- HS38-2 Measles Break Out Report
- HS39-1 Routine Immunisation Survey
- HS39-2 Essential Immunisation Survey
- HS39-3 Expanded Immunisation Survey
- HS40-1 Neonatal Tetanus Suspect Case Report
- HS40-2 Neonatal Tetanus Suspect Case Survey
- HS41-1 Student Common Diseases Report Card
- HS41-2 Student Common Diseases Survey
- HS42-1 School Health Event Report Card
- HS42-2 School Health Event Survey
- HS43 Health Education Survey
- HS49 HIV Monitoring Survey
- HS49-1 HIV Positive Report
- HS49-2 AIDS Patient Report
- HS49-3 HIV/AIDS Death Report
- HS50-1 Schistosomiasis Endemic Survey
- HS50-2 Schistosomiasis Prevention and Treatment Report
- HS50-3 Oncomelania Control Report
- HS51-1 Malaria Endemic Survey
- HS51-2 Malaria Prevention and Treatment Survey
- HS51-3 Malaria Surveillance Report
- HS52 Echinococcosis Prevention and Treatment Survey
- HS53 Filariasis Prevention and Treatment Survey
- HS54-1 Chronic Keshan Disease Prevention and Treatment Survey
- HS54-2 Dagujie Prevention and Treatment Survey

HS54-3 Iodine-deficiency Prevention and Treatment Survey  
HS54-4 Fluorosis (water) Prevention and Treatment Survey  
HS54-5 Fluorosis (coal) Prevention and Treatment Survey  
HS54-6 Arsenic Disease Prevention and Treatment Survey  
HS54-7 Arsenic Disease Prevention and Treatment Survey  
HS54-8 Endemic Disease Education Report  
Aiwei-1 Rural Safety Drinking Water Survey  
Aiwei-2 Rural Toilet Survey

MCH statistics

HS44 Pre-marriage Health Examination Survey  
HS45 Family Planning Operation Survey  
HS46 Reproductive Health Survey  
HS47 Child Health (under 7) Survey  
HS48 Woman Common Diseases Survey

**Appendix 5 Standard Medical Record Abstract (front-page) (Translated)**

\_\_\_\_\_ Name of hospital  
Hospital Inpatient Medical Record Abstract

Type of payments: \_\_\_\_\_

Record code: \_\_\_\_\_

Patient name: \_\_\_\_\_ Gender: \_\_\_\_\_ Birthday: \_\_\_\_\_ year \_\_\_\_\_ month \_\_\_\_\_ day

Age: \_\_\_\_\_ Marriage status: single/married/divorce/bereft of spouse

Occupation: \_\_\_\_\_ Birthplace: \_\_\_\_\_ province \_\_\_\_\_ county Nationality: \_\_\_\_\_

Personal identification number: \_\_\_\_\_

Working address: \_\_\_\_\_ telephone: \_\_\_\_\_ zip code: \_\_\_\_\_

Household address: \_\_\_\_\_ zip code: \_\_\_\_\_

Contact person name: \_\_\_\_\_ relation: \_\_\_\_\_ address: \_\_\_\_\_ telephone: \_\_\_\_\_

Admission date: \_\_\_\_\_ year \_\_\_\_\_ month \_\_\_\_\_ day

Admission department: \_\_\_\_\_ ward: \_\_\_\_\_ referral department: \_\_\_\_\_

Discharge date: \_\_\_\_\_ year \_\_\_\_\_ month \_\_\_\_\_ day

Discharge department: \_\_\_\_\_ ward: \_\_\_\_\_ length of stay: \_\_\_\_\_

Diagnosis in outpatient/emergency department: \_\_\_\_\_

Status of admission: critical/urgent/ordinary

Diagnosis in inpatient department: \_\_\_\_\_

Date of final diagnosis: \_\_\_\_\_ year \_\_\_\_\_ month \_\_\_\_\_ day

Diagnosis in discharge:

	Patient condition when discharge					ICD10
	Cured	Improved	Unchanged	Died	Others	
Principal diagnosis						
Other diagnosis						

Condition of hospital infection: \_\_\_\_\_

Pathological diagnosis: \_\_\_\_\_

Reason of injury or toxicosis: \_\_\_\_\_

Drug allergy: \_\_\_\_\_

Lab test: HbsAg \_\_\_\_\_ HCV-Ab \_\_\_\_\_ HIV-Ab \_\_\_\_\_

Diagnostic consistency: outpatient/inpatient \_\_\_\_\_ before after operation \_\_\_\_\_

clinic/pathology \_\_\_\_\_

Intensive care: \_\_\_\_\_

Signature of department director: \_\_\_\_ chief physician: \_\_\_\_ physician in charge: \_\_\_\_  
 resident physician: \_\_\_\_ physician in advanced study: \_\_\_\_ graduate intern \_\_\_\_  
 undergraduate intern \_\_\_\_  
 Signature of coding staff: \_\_\_\_  
 Quality of medical record: \_\_\_\_  
 Signature of physician in charge of quality control: \_\_\_\_ nurse: \_\_\_\_  
 Date: \_\_\_\_ year \_\_\_\_ month \_\_\_\_ day

(Rear page)

Code of operation	Date of operation	Name of operation	Operator	Assistant		Anaesthesia	Incision	Anaesthetist
				1	2			

Bill statement (yuan): total \_\_\_\_ bed \_\_\_\_ nursing \_\_\_\_ Western medicines \_\_\_\_ Chinese medicines \_\_\_\_ Chinese herbs \_\_\_\_ radiology \_\_\_\_ lab test \_\_\_\_ oxygen \_\_\_\_ transfusion \_\_\_\_ procedure \_\_\_\_ operation \_\_\_\_ midwife service \_\_\_\_ physical examine \_\_\_\_ anaesthesia \_\_\_\_ infant nursing \_\_\_\_ carer \_\_\_\_ others \_\_\_\_

Autopsy: \_\_\_\_ Infrequent case: \_\_\_\_  
 Follow up: \_\_\_\_ duration \_\_\_\_ year \_\_\_\_ month \_\_\_\_ day  
 Case for teaching: \_\_\_\_  
 Transfusion reaction: \_\_\_\_  
 Transfusion: RBC \_\_\_\_ hematoblast \_\_\_\_ plasma \_\_\_\_ whole blood \_\_\_\_ others \_\_\_\_

## Appendix 6 Generation, Submission, and Presentation of Medical Record Abstract

### Data

Items of standardised medical record abstract in China *	Aggregated data submission **	Raw data submission ***	Statistics data publication ****
1 name of hospital (standardised code of health institution)	√	√	
2 method of payment (social basic medical insurance, commercial health insurance, out of pocket, government health insurance, others)		√	
3 code of medical record (designed by hospital)		√	
4 time of admission		√	
5 name of patient			
6 gender of patient (male, female)		√	
7 birthday of patient (year, month, date)			
8 age of patient	√	√	
9 marriage status (single, married, divorce, bereft of spouse)		√	
10 occupation		√	
11 birth place			
12 nationality			
13 citizenship			
14 personal identification number			
15 employer and address			
16 working telephone number			
17 post code of working address			
18 address of household registration			
19 post code of address of household registration			
20 name of contact person			
21 relationship with patient			
22 address of contact person			
23 telephone number of contact person			
24 date of admission (year, month, day)		√	
25 department of admission		√	
26 ward of admission			
27 referral department			
28 date of discharge (year, month, day)		√	
29 department of discharge		√	
30 ward of discharge			
31 days of stay	√		√
32 diagnosis of outpatient or emergency department			
33 condition when admission (critical, emergency, ordinate)		√	
34 diagnosis of admission (ICD 10)		√	
35 date of final diagnosis (year, month, day)		√	
36 principle diagnosis (ICD 10)	√	√	√
37 outcome of principle diagnosis when discharge (cured, improved, uncured, death, others)	√	√	
38 secondary diagnosis (ICD 10)		√	
39 outcome of secondary diagnosis when discharge (cured, improved, unchanged, death, others)		√	
40 name of hospital infection		√	

41 diagnosis of pathology			
42 external reason of injury		√	
43 history of drug allergy			
44 test of HbsAg (no test, negative, positive)			
45 test of HCV-Ab (no test negative, positive)			
46 test of HIV-Ab (no test, negative, positive)			
47 diagnosis result matching: outpatient department vs. discharge (no diagnosis, consistent, inconsistent, unsure)			
48 diagnosis result matching: before and after surgery operation (no diagnosis, consistent, inconsistent, unsure)			
49 diagnosis result matching: clinical vs. pathology (no diagnosis, consistent, inconsistent, unsure)			
50 diagnosis result matching: radiology vs. pathology (no diagnosis, consistent, inconsistent, unsure)			
51 frequency of intensive care			
52 successful times of intensive care			
53 signature of department director			
54 signature of chief physician			
55 signature of physician in charge			
56 signature of resident physician			
57 signature of physician in advanced study			
58 signature of graduate intern			
59 signature of undergraduate intern			
60 signature of coding staff			
61 quality of medical record (class A, class B, class C)			
62 signature of physician in charge of quality of medical record			
63 signature of nurse in charge of quality of medical record			
64 date			
65 code of operation/procedure (ICD 9 – CM3)		√	
66 date of operation/procedure			
67 name of operation/procedure			
68 name of responsible physician on operation/procedure (surgery physician, first assistant, second assistant)			
69 method of anesthesia			
70 incision			
71 signature of anaesthetist			
72 fee for bed	√	√	√
73 fee for nursing		√	
74 fee for Western medicines	√	√	√
75 fee for traditional Chinese patent medicine	√	√	√
76 fee for traditional Chinese herbs	√	√	√
77 fee for radiology			
78 fee for chemical laboratory test			
79 fee for oxygen therapy			
80 fee for blood transfusion			
81 fee for diagnosis and treatment	√	√	√
82 fee for surgery operation	√	√	√
83 fee for delivery (midwife service)			
84 fee for examination	√	√	√
85 fee for anesthesia			
86 fee for newborn nursing			
87 fee for accompany care			
88 fee for others		√	
89 autopsy (yes, no)			
90 first case of surgery operation, treatment, examination or			

diagnosis (yes, no)			
91 follow up case (yes, no)			
92 duration of follow up (week, month, year)			
93 teaching case (yes, no)			
94 blood type (A, B, AB, O, others)		√	
95 Rh (negative, positive)			
96 transfusion reaction (yes, no)			
97 blood transfusion: RBC (unit)		√	
98 blood transfusion: blood platelet (pack)		√	
99 blood transfusion: blood plasma (ml)		√	
100 blood transfusion: whole blood (ml)		√	
101 blood transfusion: others (ml)		√	

\*: All hospital keeps the raw data in medical record office, based on MOH (2001) Announcement on Amending Front-Page of Hospital Medical Record.

\*\* : All public general hospital under health department should submit aggregated data to CHSI through HS-4 (Medical Institution Operation Survey) and HS-5-1, 5-2 and 5-3 (outcome, age and disease specific separation aggregated tables).

\*\*\*: Select public general hospitals under health department (128 hospitals) should submit raw data (electronic database) to CHSI through HS-5 (Hospital Separation Survey).

\*\*\*\*: Statistics tables are published in MOH's health digest and yearbook.

### Appendix 7 Hospital Outcome, Age and Disease Specific Data (HS 5-1, 5-2 and 5-3)

(MOH requests each public medical institution (hospital) fills these tables based on counting results of medical records. Provincial and central HICs add up all submitted tables and then published in the health digest and yearbook. )

Health Statistical Report Table 5-1

Name of disease (ICD 10*)	Outcome-specified Number of Separation					Total bed-days
	Total	Cured	Improved	Uncured	Died	
XX system disease**						
X disease						
[.....]						
XX system disease						
X disease						
[.....]						

Health Statistical Report Table 5-2

Name of disease (ICD 10*)	Age-specified Number of Separation						Total bed-days
	Total	< 5	5-14	15-44	45-59	60 & above	
XX system disease**							
X disease							
[.....]							
XX system disease							
X disease							
[.....]							

Health Statistical Report Table 5-3

Name of disease (ICD 10)*	# of separation	Total bed-days	ALOS	Billing summary (average per separation, yuan)				
				Total	Bed	Drug	Surgery Operation	Examination and treatment
Disease 1**								
Disease 2								
[.....]								
Disease 30								

\*: Simplified disease classification based on ICD 10, including subtotal of system (such as circulatory system) and some specific disease (such as hypertension).

\*\* : 30 selected diseases assigned by MOH. Within the disease, two of them treated by department of infectious diseases, 12 of them treated by department of internal medicine, 11 of them treated by department of surgery, two of them treated by department of paediatrics, two of them treated by department of gynaecology, and one of them treated by department of ophthalmology.

## Appendix 8 Medical Institution Operation Survey (HS-4)

*(Translation based on CHSI-MOH. 2002. Chinese Health Statistics Survey Regulation. This is an annual health statistics reporting. All medical institutions (hospital, community health centre, township health centre, outpatient department, MCH stations and specific disease institutions) are requested to submit this form county/city health bureau. Flowing in the vertical statistics reporting system, the form will be aggregated and uploaded. PHICs are requested to provide their aggregated forms to the CHSI by the end of February.)*

Name and code of hospital

1.1 – 1.6 Featured specialities of the hospital

2.1 Level of institution

2.2 Grade of institution

3.0 Total hospital beds

3.1 Hospital bed in preventive care department

3.2 Hospital bed in GP department

3.3 Hospital bed in internal medicine department

3.4 Hospital bed in surgery department

3.5 Hospital bed in paediatric department

3.6 Hospital bed in gynaecologic and obstetric department

3.7 Hospital bed in ophthalmological department

3.8 Hospital bed in otolaryngological department

3.9 Hospital bed in stomatological department

3.10 Hospital bed in dermatological department

3.11 Hospital bed in plastic surgery department

3.12 Hospital bed in psychiatric department

3.13 Hospital bed in infectious disease department

3.14 Hospital bed in tuberculosis department

3.15 Hospital bed in endemic disease department

3.16 Hospital bed in cancer department

3.17 Hospital bed in rehabilitation department

3.18 Hospital bed in sport medicine department

3.19 Hospital bed in occupational health department

3.20 Hospital bed in traditional Chinese medicine department

3.20.1 Hospital bed in TCM internal department

3.20.2 Hospital bed in TCM surgery department

3.20.3 Hospital bed in TCM gynaecological and obstetric department

3.20.4 Hospital bed in TCM paediatric department

3.20.5 Hospital bed in TCM dermatological department

3.20.6 Hospital bed in TCM ophthalmological department

- 3.20.7 Hospital bed in TCM cancer department
- 3.20.8 Hospital bed in TCM injury and trauma department
- 3.20.9 Hospital bed in TCM anorectal department
- 3.20.10 Hospital bed in TCM acupuncture department
- 3.20.11 Hospital bed in TCM massage department
- 3.21 Hospital bed in minority medicine department
- 3.22 Hospital bed in Chinese-Western integrated medicine department
- 3.23 Hospital bed in other departments
  
- 4.1 Total volume (episode) of services
  - 4.1.1 Service volume in outpatient departments
    - 4.1.1.1 Volume in internal medical department
    - 4.1.1.2 Volume in surgery department
    - 4.1.1.3 Volume in gynaecological and obstetric department
    - 4.1.1.4 Volume in paediatric department
    - 4.1.1.5 Volume in TCM department
  - 4.1.2 Service volume in emergency department
    - 4.1.2.1 Number of patient died in emergency department
  - 4.1.3 Service volume in family health care
- 4.2 Volume of observation department
  - 4.2.1 Number of patient died in observation department
- 4.3 Volume of physical examination
- 4.4 Number of admission
- 4.5 Number of discharge
  - 4.5.1 Number of cured
  - 4.5.2 Number of improved
  - 4.5.3 Number of unchanged
  - 4.5.4 Number of death
  - 4.5.5 Number of other outcomes
- 4.6 Volume of surgery operation
- 4.7 Volume of intensive care in inpatient department
  - 4.7.1 Number of successful intensive care
- 4.8 Total occupied bed-day
- 4.9 Total used bed-day
- 4.10 Total bed-day of discharge patient
- 4.11 Total home care bed
- 4.12 Number of staff
- 4.13 Number of physician
  
- 5.1 Total business revenue
  - 5.1.1 Medical service revenue
    - 5.1.1.1 Outpatient medical service revenue
      - 5.1.1.1.1 Registration revenue
      - 5.1.1.1.2 Diagnosis revenue

- 5.1.1.1.3 Examination revenue
- 5.1.1.1.4 Treatment revenue
- 5.1.1.1.5 Surgery revenue
- 5.1.1.1.6 Lab test revenue
- 5.1.1.2 Inpatient medical service revenue
  - 5.1.1.2.1 Bed revenue
  - 5.1.1.2.2 Diagnosis revenue
  - 5.1.1.2.3 Examination revenue
  - 5.1.1.2.4 Treatment revenue
  - 5.1.1.2.5 Surgery revenue
  - 5.1.1.2.6 Lab test revenue
- 5.1.2 Drug revenue
  - 5.1.2.1 Outpatient drug revenue
    - 5.1.2.1.1 Outpatient Western drug revenue
    - 5.1.2.1.2 Outpatient Chinese drug revenue
  - 5.1.2.2. Inpatient drug revenue
    - 5.1.2.2.1 Inpatient Western drug revenue
    - 5.1.2.2.2 Inpatient Chinese drug revenue
- 5.1.3 Other revenue
- 5.2 Total business expenditure
  - 5.2.1 Medical service expenditure
  - 5.2.2 Drug service expenditure
    - 5.2.2.1 Drug expenditure
      - 5.2.2.1.1 Western drug expenditure
      - 5.2.2.1.2 Chinese drug expenditure
  - 5.2.3 Other expenditure
- 5.3 Accumulated patient arrearage
  - 5.3.1 Annual patient arrearage

### Appendix 9 Finance Data Collected through National Health Reporting System

	Data items	Primary data submitter
Health Institution Survey (HS-1)	<ul style="list-style-type: none"> <li>- Total asset value,               <ul style="list-style-type: none"> <li>- Current assets value, investment value, fixed assets value, immaterial assets value</li> </ul> </li> <li>- Debts and net assets value</li> <li>- Debts value, net assets value (development fund, fixed fund, special fund)</li> <li>- Annual revenue and expenditure               <ul style="list-style-type: none"> <li>- Total revenue (government subsidies (special government subsidies), super government subsidies, operational revenue, for profit revenue)</li> <li>- Total expenditure (operational expenditure, special fund expenditure, workforce expenditure)</li> </ul> </li> </ul>	All health institutions or practitioners, excepts clinics, CHS, VHS, Health news agency and publisher, military internal health institution, Hong Kong, Macao, and Taiwan health institution
Community Health Survey (HS-6)	<ul style="list-style-type: none"> <li>- Total revenue               <ul style="list-style-type: none"> <li>- Super government subsidies, operational revenue</li> </ul> </li> <li>- Total expenditure               <ul style="list-style-type: none"> <li>- Workforce expenditure, drug expenditure</li> </ul> </li> </ul>	Clinics and CHS
Village Health Survey (HS-7)	<ul style="list-style-type: none"> <li>- Total revenue               <ul style="list-style-type: none"> <li>- Super government subsidies, village or collective subsidies, operational revenue</li> </ul> </li> <li>- Total expenditure               <ul style="list-style-type: none"> <li>- Workforce expenditure, drug expenditure</li> </ul> </li> </ul>	VHS
Medical Institution Operation Survey (HS-4)	<ul style="list-style-type: none"> <li>- Operational revenue               <ul style="list-style-type: none"> <li>- Medical activity revenue                   <ul style="list-style-type: none"> <li>- Outpatient revenue (registration revenue, consultation revenue, diagnostic revenue, treatment revenue, surgery operation revenue, lab test revenue)</li> <li>- Inpatient revenue (bed service revenue, consultation revenue, diagnostic revenue, treatment revenue, surgery operation revenue, lab test revenue)</li> </ul> </li> <li>- Drug revenue (outpatient drug revenue (Western medicines, Chinese medicines), inpatient drug revenue (Western medicines, Chinese medicines))</li> </ul> </li> <li>- Other revenue</li> <li>- Operational expenditure               <ul style="list-style-type: none"> <li>- Medical activity expenditure</li> <li>- Drug service expenditure (Western medicines, Chinese medicines)</li> <li>- Other expenditure</li> </ul> </li> </ul> <p>Accumulated and annual patient's arrears</p>	Hospital, CHC, THC, Clinic, MCH station, specific disease institution
HS-5 Hospital discharged patient survey	<ul style="list-style-type: none"> <li>- Total charge of discharged patient               <ul style="list-style-type: none"> <li>- Bed fee, nursing fee, Western medicines fee, Chinese medicines fee, lab test fee, treatment fee, surgery operation fee, diagnostic fee, other fee</li> </ul> </li> </ul>	Selected public general hospitals administrated by health department

Note: all finance data were required submitting to the CHSI by the end of next February.

Source: MOH (2002) Chinese Health Statistics Survey Regulation, People's Health Publisher, Beijing, pp 35-7, 72, 78, 83-85, 102-3.

## **Appendix 10 Household Interview Survey – National Health Services Survey 2003 (translated)**

*(Note: Adopted from CHSI-MOH. 2003. Household Interview Survey Questionnaire, retrieved in <http://www.moh.gov.cn/tjxxzx/dcyvj/gjwsfwdc/1200209280005.htm> in 14/11/03. The Household Interview Survey Questionnaire was designed for logical interview process. The questionnaire contains three parts: (1) household general information, (2) family member information, and (3) healthcare utilisation. For clearly describing the framework of the survey, researcher rearranged the questionnaire into five components: (1) socio-economic features, (2) family background, (3) needs and utilisations of medical services, (4) health behaviours, and (5) reproductive health, and (6) immunisation.)*

### **1 Socio-demographic features (for each family member in dwelling)**

- Name
- Relation with head of dwelling
- Name of major respondent
- Gender
- Birthday (year, month)
- Nationality (Han or others)
- Marriage status (single, married, divorce, bereft of spouse)
- Educational status (illiterate, primary school, secondary school, high school/technical school, diploma (two years), diploma (three years), university)
- Occupational status (department or official manager, government business manager, private business manager, professional, ordinary government or enterprises staff, private self-employed, commercial service staff, industrial worker with non-rural household registration, urban migrate worker with rural household registration, rural migrate worker with rural household registration, rural labour (farmer, forester, herder, fisher), student, retired, unemployed or semi-unemployed in rural or urban)
- Current social (non-commercial) health insurance (Urban Basic Medical Insurance, Medical Insurance for Serious Disease, Government Health Insurance Scheme, Labour Health Insurance Scheme, Cooperative Medical System, Other social health insurance)
- Annual premium if joining CMS (yuan)
- Current commercial medical insurance (yes, no)
- Annual premium of purchasing commercial medical insurance (yuan)

### **2 Family Background (for each dwelling)**

- Number of family members
- Number of people living in the dwelling (at least 6 month within a year)
- Constructive areas of living (square meters)
- Number of TV set (WB or colour)
- Type of drinking water

- Type of toilet
- Distance to the nearest medical service
- Minutes to the nearest medical service
- Use ambulance within 12 month, if yes, how many times
- If dialling emergency service, how many minutes medical staff arrived
- Average monthly (urban resident) or annual (rural resident) income, including government subsidies
- Monthly (urban resident) or annual (rural resident) consumption expenses: (food, clothes and commodity, transportation and communication, house and utilities, education and entertainment, medical and drug, others)
- Did the family be identified as poverty or relief family? Amount of government or collective subsidies.
- Opinions on reason of family poverty (lack of labour, bad nature condition or disaster, disease or injury, man-made reason, others)
- Opinions on 'New CMS' (medical insurance in rural area. Governments provide at least 20 yuan per head, and individual pays premium at least 10 yuan)

### **3 Needs and utilisations of Medical Services (for each family member in dwelling)**

- Feel unwell (disease) within two weeks
  - Type of feeling (chest pain, stomach-ache, Diarrhea, headache, injury, fever, cough, heart-throb, others)
  - How serious of the feeling
  - Name of disease or injury
  - Continuum of disease (occurred within two weeks, acute condition before two weeks, chronic condition before two weeks)
  - Days of unwell (disease or injury)
  - Days of sick leave (for current student or employed)
  - Days of keeping the bed
  - If did not seek medical service, reasons (take care by myself, have no money to pay doctor, have no time to visit doctor, inconvenience transportation, bad quality of medical services, unavailable of effective treatment, others) and expense for self-care (yuan)
  - If did seek medical services, how many times to visit doctor, type of medical service provider (clinics, township health centre or community health centre, county hospital, prefectural hospital, provincial hospital, traditional Chinese hospital, military hospital, others), why select this provider (near by, lower price, good quality, designated provider, has acquaintance, trustable doctor, good attitude, others), type of doctor (traditional Chinese medicine, Western medicine, integrated medicine), purchasing drug in pharmacy, total expense and compensation, transportation and other costs.
  - Opinions on medical services (advise relative health knowledge, time spent on transportation, time spent on waiting room, respect patient, privacy protection, clear explanation, ask opinion when prescribing drug or treatment, environment and facility, convenience when verifying bills, convenience when complain), the most unsatisfied service (bad attitude, bad technical aspect, bad environment and facility, over-supply unnecessary services, unreasonable billing, high medical service cost, do not allow pay on credit, complicated transactions, long waiting time, inconvenienced transportation, others)

- Chronic disease within six months
  - Name of chronic diseases (list no more than three diseases)
  - Medical provider who diagnosed and treated the disease (clinics, township health centre or community health centre, county hospital, prefectural hospital, provincial hospital, traditional Chinese hospital, military hospital, others)
  - Tuberculosis: symptoms of cough and haemoptysis, sputum test, X-ray exam, TB treatment provider, DOS, months of treatment
- Hospitalisation within 12 months
  - Times of hospital admission within 12 months
  - Times of unmet need of hospital inpatient service, and reasons (no time, unnecessary, financial difficulty, bad hospital service, bed unavailable, others)
  - Name and code of condition or disease for hospital admission (disease, injury, rehabilitation, family planning, delivery, others)
  - If hospitalised, date of (year and month), inpatient service provider (township or community health centre, county hospital, prefectural hospital, provincial hospital, traditional Chinese medicine hospital, military hospital, others), days of waiting for bed available, type of doctor (traditional Chinese medicine, Western medicine, integrated medicine), surgery operation (yes or no), waiting days for surgery operation after admission, length of stay, who request you discharge (doctor suggested discharge because disease cured, doctor suggested discharge but disease did not cured, patient want to discharge, others), reason of patient want to discharge (disease did not cure for a long time, financial difficulty, limitation of hospital, bad service attitude, others), total expense and compensation, transportation and other costs, present gift or 'red package' to doctor (yes or no), number of patient sharing a ward.
  - Opinions on inpatient services (respect patient, privacy protection, clear explanation, ask opinion when prescribing drug or treatment, environment and facility, convenience of family and friend visit, convenience when verifying bills, convenience when complain), the most unsatisfied service (bad attitude, bad technical aspect, bad environment and facility, over-supply unnecessary services, unreasonable billing, high medical service cost, do not allow pay on credit, complicated transactions, long waiting time, inconvenienced transportation, others)
- Disabilities within 30 days
  - Extent of difficulty for brushing tooth, washing face, do up hair and wearing cloth within 30 days (none, lightly, middling, seriously, extremely),
  - Extent of difficulty for working and house-working within 30 days (same scale as above),
  - Extent of pain and uncomfortable within 30 days (same scale as above),
  - Extent of difficulty for concentration and memory within 30 days (same scale as above),
  - Extent of difficulty for recognising an acquaintance far from 20 meters (same scale as above),
  - Extent of cachexia because have not well rest within 30 days (same scale as above),
  - Extent of sadness, annoyance, emotional depress and blahs within 20 days (same scale as above)
  - Self-reported health status (excellent, good, commonly, bed, extremely bed)

#### **4 Health behaviours – Smoking, drinking and exercise (for each family member in dwelling)**

- Age of starting smoking, average cigarettes per day, trend of smoking (increase or decrease), attempting of quit smoking, reason of quit smoking, regulation of free-smoking in you office and public location, smoking at home.
- Years of drinking
- Commonly activity of exercise (walking, jogging, taiji boxing, dancing, appliance, balls, games), times each week, minutes each time.
- Knowledge about health: major source of health knowledge (doctor, TV program, broadcast program, newspaper and magazine, school, family member, colleagues and friend, poster, others), knowledge about channel of HIV infection (blood channel, mother-infant channel, sexual contact, handshaking or other routine contact, air channel, others), knowledge about 'National rural health promotion movement' (known, unknown)

#### **5 Reproductive health (for women 15 to 49 years old)**

- Years of marriage, gynaecological screening within 12 month (for breast carcinoma and uterine cancer)
- Birthday, gender, death day (if applicable) of children.
- For the last live-birth delivery, times and provider of prenatal examination, identified as 'high risk' pregnancy', be promoted for hospital delivery, weeks of delivery, condition of delivery (spontaneous delivery, dystocia, Caesarean birth), location of delivery (county hospital, MCH institution, township or district health centre, community health station, clinic, home, on the way to provider, others), reason of home-delivery (unnecessary, emergent delivery, financial difficulty, transportation difficulty, others), assistant of home-delivery (doctor at town and higher level, village doctor, full-time midwife, part-time midwife, family member, others), pay for hospital or midwife (yuan), weight of birth (grams),
- Times of doctor (midwife) visit for postnatal care, time of starting breastfeeding (half hour after birth, within 24 hours of birth, after 24 hours of birth, never), month of pure breastfeeding, month after birth for adding supplementaries

#### **6 Immunisation (for children born after 1st January 1998)**

- Immunisation of BCG, diphtheria, chincough and tetanus, poliomyelitis, measles, and B hepatitis (check immunisation record booklet or ask parent)

## **Appendix 11 Socio-economic information provided by statistics bureau (Statistics Yearbook)**

*(Adopted from Statistics Yearbook 2000)*

1. 'Division of Administrative Areas and Natural Resources' covers data on divisions of administrative areas, natural conditions and the exploitation and utilisation of the natural resources. The Department of Integrated Statistics of the NBS compiled information from relevant ministries and agencies. The data sources include MOCA, MOA, SOA, CMB, NBF, MOWC and MOLR.

2. 'General Survey', covers summarise data on the national economy and data on the socio-economic development.

3. 'National Accounts' includes mainly four components, namely, GDP, input-output table, flow of fund table and balance of payment. The data on GDP are calculated by the Department of National Economic Accounting of NBS with various approaches in the light of the features of various sectors, various expenditure structures and the data sources, and adjusted based on census data. The input-output table, compiled by the same department of NBS, reflects the sources of the input into, and the utilisation of the output from production by various industries of the national economy. The flow of fund table constitutes a matrix of institutional sectors by transactions. The current flow of fund table is composed of the physical (real) transaction compiled by the National Accounts Department of the NBS and financial transactions compiled by the Survey and Statistics Department of the People's Bank of China. The Balance of Payment Department of the SAOFE compiled the balance of payment table.

4. 'Population' shows the basic condition of national and provincial population, such as the national population, urban and rural population over the years, and data of the advance tabulation of the population census, such as population growth rate by regions, nationality composition, dependency ratio, family household size and the educational level of population, etc. Tables in this chapter are prepared and provided by the Department of Population, Social and Science Statistics of NBS.

5. 'Employment and Wages' shows the basic conditions of China's labour economy, such as the economically active population, employed persons and staff and workers, persons employed in the urban and rural private enterprises and self-employed persons in industry and commerce, registered unemployed persons in urban areas, total and average wages of the staff and workers and the changes in index, etc. Employment and wage data of fully employed workers and staff are collected and tabulated by the Department of Population, Social and Science Statistics, NBS. Data on the career services and the exchanges of labour force are provided by the MOLSS. Data on the number of

persons employed in the urban and rural private enterprises and self-employed are provided by the SAOIC.

6. 'Investment in Fixed Assets' covers mainly the energy production and consumption and their composition, the elasticity ratio of energy production and consumption, the overall balance of energy and the balance by the variety of energy, the consumption of energy by sector and by main variety, efficiency of energy conversion and the consumption of energy for residential use. The data of this chapter were provided from 'industrial statistics' and urban and rural surveys.

7. 'Production and Consumption of Energy' provides information of energy production and consumption and their composition, the elasticity ratio of energy production and consumption, the overall balance of energy and the balance by the variety of energy, the consumption of energy by sector and by main variety, efficiency of energy conversion and the consumption of energy for residential use. The data was compiled by the Department of Industry and Transport Statistics, NBS on the basis of data from surveys and from input-output tables.

8. 'Government Finance' information is provided by Department of Finance and shows the government revenue and expenditure. The data are based on the final state financial accounts, the final accounts of extra-budgetary revenue and expenditure and the concerned financial reports. The final state financial accounts are composed of the final accounts at the level of central government and the total final accounts at the level of local governments. The total final accounts at the level of local governments are composed of the total final accounts of the governments of provincial government. The total final accounts at the provincial level are composed of the final accounts at the provincial level and the total final accounts at the level of governments of prefectures and counties (cities). The final accounts at the central level, at the provincial level and at the county (city) level are respectively composed of the final accounts of the administrative and institutional units, the final financial accounts of enterprises, final financial accounts of capital construction, annual reports on treasury and annual reports on tax revenue, pooled together by the responsible departments at the same level.

9. 'Price Indices' shows the changing trend and the change rates in production, circulation, consumption and investment, etc., including mainly consumer price indices of residents, retail price indices, price indices of agricultural means of production, purchasing price indices of farm products, producers price indices of industrial products, and price indices of investment in fixed assets. The statistics of price indices is organised by the Urban Socio-economic Survey Organisation, NBS. The urban socio-economic survey organisations of the provinces, autonomous regions and municipalities directly under the central government as well as the urban socio-economic survey organisations of the selected cities and counties collect statistical data from the grassroots units in accordance with the scheme of price survey stipulated by the NBS, tabulate them and report them to the higher agencies.

10. 'People's Livelihood' includes employment, income and expenditure of residents, housing, possession of durable consumer goods, culture, education, health care and household facilities. The data on livelihood of the urban residents come from the data collected by the sample household survey, which organised by the Urban Socio-economic Survey Team (USEST), NBS. The main content of the survey includes the population in the household and its composition, the cash income and expenditure

of the household, the quantity of major commodities purchased and the expenditure for them, the employment of the household members, the housing condition and the ownership of the durable consumer goods. USESTs of the provincial level as well as the selected cities/counties collect the data in accordance with the survey scheme stipulated by NBS and report them to the higher organisation<sup>91</sup>. The data on the livelihood of the rural residents come mainly from the data collected by the sample survey on the rural households, which is organised by the Rural Socio-economic Survey Team (RSEST), NBS. The main content of the survey includes the basic condition of the rural households, the per capita total income and net income, the expenditure for the residential consumption, the consumption of major consumer goods and the quantity of durable consumer goods owned<sup>92</sup>.

11. 'General Survey of Cities' contains information of social and economic development as well as the scale, growth rate, economic efficiency, overall level and other basic conditions of China's cities. Detailed information includes the distribution of the cities, main indicators on socio-economic development of open coastal cities and cities in special economic zones (SEZ), indicators of provincial capitals and important cities separately listed in the national plan, and urban residential buildings and public facilities. Most of the data were collected and reported by provincial statistics bureaux, while data on areas, building and public facilities are provided by the Ministry of Construction.

12. 'Agriculture' shows the basic conditions of agricultural production and rural economy, including mainly rural labour force, cultivated land, quantity of agricultural machinery, output of farming, forestry, animal husbandry and fishery, output of major products, facilities of water conservancy and efforts to eliminate water-logging and combat alkalinity, productive fixed assets owned by the rural households, and basic conditions of the state-owned farms. Most of data provided by RSEST and statistics routine reports. Part of data provided by MOA, MOWC and MOCA.

13. 'Industry' provides information of industrial sectors. Detailed information includes: (1) The number of industrial enterprises, the gross industrial output value (GIOV) and its indexes of all state-owned industrial enterprises (SOIE) and the non-state enterprises (NSE); (2) Economic and efficiency

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<sup>91</sup> The survey on the urban households is conducted in such a way that the selected households by sampling method should keep accounts for successive three years and be interviewed by the enumerators. By a rotation sampling scheme, one third of the old sample households should be replaced by the new sample households every year. The respondent households are selected by the two-stage stratified systematic random sampling scheme. In total, 25,000 households in 226 cities and countries are selected by NBS in the above-mentioned way. Additional samples are selected by local statistical offices by the same sample design, making the total sample size to reach 40,000 households.

<sup>92</sup> The sample survey on the rural households is conducted by first selecting sample villages and then selecting households in the selected villages in each province, will all rural households in the province as the population. A combination of multi-stage, stratified, systematic sampling approaches is used to identify a total of 68,000 households are selected from 7,100 villages throughout the whole country. In order to ensure the accuracy of the data of the survey on the rural households, two accounts are designed for the respondent households by RSEST, the cash account and the account on goods in kind. Nearly 10 thousand assistant enumerators have been invited to help the households to keep good accounts and check and tabulate the data of the survey.

indicators of all SOIE, and of NSE, classified by region and by industrial division; (3) Economic and efficiency indicators of the SOIE and enterprises where the state holds the majority of shares, classified by region and by industrial division; (4) Indicators of foreign-funded industrial enterprises by region and by branch of industry; (5) Indicators of large and medium scale industrial enterprises by region and by branch of industry; (6) Output of key industrial products; (7) Production capacity of main products by key industrial enterprises; and (8) Proportion of economic indicators by branch of industry in national total. All data are prepared and provided by the Department of Industrial and Transport Statistics, NBS.

14. 'Construction' covers mainly the situation of production and management of the enterprises of construction, including the number of employed persons, gross output value and value added of construction, floor space of the buildings, machinery and equipment, assets and liabilities, total revenue of enterprises, profits and taxes, labour productivity, percentage of high quality projects, per capita machinery, consumption of construction materials, etc. They also cover the situation of prospecting and designing institutions and the personnel as well as the main indicators of the rural construction teams. Data are provided by the Department of Statistics of Investment in Fixed Assets, NBS, as well as MOC and MOA.

15. 'Transport, Post and Telecommunication Services' reflect conditions of transportation, post and telecommunications. Data of transport cover the length of routes, ownership, technological quality, freight traffic and passenger, etc. Data of post and telecommunications cover situation of post and telecommunications offices and postal routes, the telephone and telegraph lines, ownership of the telecommunication facilities, principal postal and telecommunications services rendered, main financial indicators, etc. Many government departments involves in data provision, such as the MOR, MOCOM, CAAC, MOPS, CNPNGCG, CPCG and provincial statistical bureaus. Data on posts and telecommunications come from the MOII.

16. 'Domestic Trade' reflects the development of China's domestic market and the sales of the commodities in wholesale and retail sale trades as well as catering trade. Data are collected and processed by the Department of Trade and External Economic Relations of the NBS, while urban and rural fair trade information are provided respectively by the SAOIC.

17. 'Foreign Trades and Economic Cooperation' shows the summary data of China's foreign trade, utilisation of foreign capital, contracted projects and labour cooperation with the foreign countries or territories over the years, stressing on the recent situation of foreign trade and economic cooperation. Data were provided by SAOEC, GCA, MOFTEC and SAOIC.

18. 'Tourism' provides information on total number of international tourists received, Chinese residents going abroad, domestic tourists, tourists participating in organised tours, and income from international and domestic tourism. Data provided by the MOPS and State Tourism Administration.

19. 'Banking and Insurance' contains information about the development of China's banking, securities and insurance, including the following the number of the institutions and personnel in the banking system; the financial activities of banking institutions; the changes of the interest rates of the

deposits and loans; the direct financing; and the business of insurance. Data provided by the PBOC, CSRC and CIRC.

20. 'Education, Science and Technology' provides data of China's education and the basic conditions of the activities of China's science and technology. The data on education cover the situations on higher, secondary, primary education, kindergarten, special, adult education of various levels and categories, and expenditure on education. The main indicators cover the number of schools, students enrolled, new students enrolled, graduates and staff, sources and outlay of education fund, education expenditure from the state budget. Education information was mainly provided by the Department of Planning and Development, MOE. The data on development of science and technology cover mainly the scale, composition, distribution and development of the scientific and technological activities, including the statistical data of the provincial level as well as the departments concerned under the SC on science and technology, such as the MOST, MOE, CSTIND, NBS, Department of Organisation of the CCCPC, CAST, NBOSM, CMA SATSQ and SBIP.

21. 'Culture, Sports and Public Health'. Data on culture cover the situations on institutions, personnel and business activities of arts, libraries, mass culture, cultural relics, broadcasting, films, televisions, news and publication. Culture data provided by the MOCU, SBOCR, SAOBFT and SANP. Data on sports cover mass sports and athletics sports, including mainly the number of staff and workers in sports departments, number of athletes, coaches and referees, number of stadiums and gymnasiums, achievements in athletic sport events, number of persons who have come up to the National Physical Training Program Standards and the international exchanges of sport delegations. Data on sports are mainly from the SSA. Data on public health include mainly the number of institutions, personnel, hospital beds, number of patients treated and in-patients, major diseases as the causes of death and the proportion to the total deaths, the incidence of, and the deaths caused by infectious diseases. Data on public health are from the MOH.

22. 'Other Social Activities and Environment Protection; provides information on participation in social activities, public security, procuratorial, legal and judicial affairs, civil affairs, labour protection, environment protection and disabled population. Data were provided by the MOPS, SPP, SPC, MOJ, MOCA, MOLSS, SEPA, ACFTU and ACFDP. Data were collected and tabulated in accordance with the regular statistical reporting systems of the departments concerned.

23. 'Main Social and Economic Indicators of Hong Kong Special Administrative Region (SAR)' shows main social and economic developments of the Hong Kong SAR, including data on land, population, employment, national income, Balance of Payments account, industry, energy, construction, transportation, external trade, finance and banking, education, housing, health and social security. Data are provided by the Census and Statistics Department, the Government of the Hong Kong Special SAR.

24. 'Main Social and Economic Indicators of Macao Special Administrative Region (SAR)' shows main social and economic developments of the Macao SAR, including data on land, population, employment, national accounts, industry, energy, construction, transportation, communication,

external trade, public finance and banking, prices, education, health, housing and social security. Data provided by the Statistics and Census Services, the Government of the Macao SAR.

25. 'Main Social and Economic Indicators of Taiwan Province' provides summary statistics, based on Monthly Statistics Bulletin of Taiwan.

26. 'Comparison of Economic and Social Indicators among China and Other Countries' provides information compiled from UN publications.

## GLOSSARY

**Barefoot doctors (*chi jiao yi sheng*):** lay health care workers in rural China, with average six to twelve months training. They provide in such activities as first aid, childbirth assistance, the dispensing of drugs, and preventive medicine. Pre the 1980s, they were financially supported through village collective fund or CMS fund. Currently, most of them operate private clinics and charge rural patients in form of out of pocket. In official document, their title was changed as village doctor in 1986.

**Cultural Revolution (*wen hua da ge ming*):** a comprehensive reform movement in China initiated by Mao Zedong to eliminate counterrevolutionary elements in the country's institutions and leadership. It started in October 1966 and ended in October 1976. It was characterised by political zealotry, purges of intellectuals, and social and economic chaos.

**First Hand (*yi ba shou*):** a banteringly title of person who master real power and made final decision in institution. Commonly, the person is party secretary of the institution.

**Four modernisations (*si ge xian dai hua*):** Modernisations of industry, agriculture, defence, and science and technology. In 1964, Mao Zedong set up the four modernisations as national socio-economic target by the end of twenty century. In 1979, Deng Xiaoping provides his annotation as 'GDP per capita excesses US\$1,000, and people have well-off life'.

**Great Leap Forward (*da yue jin*):** a rash advanced economic plan of China from 1958-1960. It was thought that through collectivisation and mass labour, china's steel production would surpass that of the UK only 15 years after the start of the 'leap'. It is now widely seen as a major economic disaster, which resulted the greatest famine in history.

**Informationalisation (*xin xi hua*):** In many China's official documents, e-commerce is discussed under the name of informationalisation. MII has a key role in the area of e-commerce development. The term of health informationalisation is also frequently used as meaning of e-health or e-hospital.

**Mother-in-law (*po po*):** a banteringly title of immediate supervising institution. Chinese women always complain their husband's mother is autocratic and fastidious.

**Political performance and administrative performance (*zheng ji, ye ji*):** visible evidences of politicians or officials who gained promotion or encouragement.

**Red title document (*hong tou wen jian*):** the Party and government release documents, which titles always printed as red characters. The commands from central party and government is informally called red title document.

**Gang of Four (*si ren bang*):** term of opprobrium given by the Chinese Communist authorities to four persons held responsible for the excesses of the Cultural Revolution. The most notable of the Gang of Four was Jiang Qing, Mao's widow. The others were Wang Hongwen, Yao Wenyuan, and Zhang Chunqiao. They were imprisoned in 1976, tried in 1980, and sentenced in 1981.

## BIBLIOGRAPHY

- ABS (2000). *How Australia Takes a Census*. Canberra: ABS. Catalogue no. 2903.0.  
<<http://www.abs.gov.au>>.
- ABS (2002). *Discover the ABS: Statistical Solutions - Not Just Numbers*. Canberra: ABS.  
1-17. <<http://www.abs.gov.au>>.
- ABS (2004). *Annual Report 2003-04: Australian Bureau of Statistics*. Canberra: ABS. vi.  
<<http://www.abs.gov.au>>.
- Achterberg, C. (1988). "Qualitative Methods in Nutrition Education Evaluation  
Research." *Journal of Nutrition Education* 20(5): 244-50.
- Agbamu, D. A. and Sim, E. (1997). "Public Health Information on World Wide Web is  
Hard to Find." *BMJ* 315(7120): 1469-. <<http://bmj.com>>.
- Ahituv, N. and Neumann, S. (1986). *Principles of Information Systems for Management*.  
2. Dubuque, Wm. C. Brown Publishers.
- AIHW (1996). *Australian Institute of Health and Welfare Annual Report 1995-96*.  
Canberra: AIHW. Cat. No. AUS-1.  
<<http://www.aihw.gov.au/publications/corporate/ar95-6/ar95-6-c00.html>>.
- AIHW (1997). *Australian Institute of Health and Welfare Annual Report 1996-97*.  
Canberra: AIHW. Cat. No. AUS-7.  
<<http://www.aihw.gov.au/publications/corporate/ar96-7/ar96-7-c00.html>>.
- AIHW (1998). *Australian Institute of Health and Welfare Annual Report 1997-98*.  
Canberra: AIHW. Cat. No. AUS-11.  
<<http://www.aihw.gov.au/publications/corporate/ar97-8/index.html>>.
- AIHW (1999). *Australian Institute of Health and Welfare Annual Report 1998-99*.  
Canberra: AIHW. Cat. no. AUS-15. 51.  
<<http://www.aihw.gov.au/publications/corporate/ar98-9/>>.
- AIHW (2000). *Australian Institute of Health and Welfare Annual Report 1999-00*.  
Canberra: AIHW. Cat. No. AUS-20.  
<<http://www.aihw.gov.au/publications/aus/ar99-00/>>.
- AIHW (2001a). *Australian Health Trends 2001: Chapter 7 Health Service Delivery,  
Costs and Performance*. Canberra: AIHW. Cat. No. PHE-24. 86-90.  
<<http://www.aihw.gov.au/publications/phe/aht01/>>.
- AIHW (2001b). *Australian Institute of Health and Welfare Annual Report 2000-01*.  
Canberra: AIHW. Cat. No. AUS-23.  
<<http://www.aihw.gov.au/publications/aus/ar00-01/index.html>>.

- AIHW (2002a). *Australian Institute of Health and Welfare Annual Report 2001-02*. Canberra: AIHW. Cat. No. AUS-28.  
<<http://www.aihw.gov.au/publications/aus/ar01-02/>>.
- AIHW (2002b). *National Health Data Dictionary, vision 10*. Canberra: AIHW. Cat. No. HW1-30. 1. <<http://www.aihw.gov.au/publications/index.cfm/title/6724>>.
- AIHW (2003a). *AIHW Corporate Plan 2003-2006*. Canberra: AIHW. Cat. No. AUS-32.  
<<http://www.aihw.gov.au/publications/index.cfm/title/8942>>.
- AIHW (2003b). *Australian Institute of Health and Welfare Annual Report 2002-03*. Canberra: AIHW. Cat. No. AUS-37.  
<<http://www.aihw.gov.au/publications/aus/ar02-03/index.html>>.
- AIHW (2003c). 'Mission of the Australian Institute of Health and Welfare'.  
<<http://www.aihw.gov.au/aboutus/capability.html>> (Accessed 2003 2 Dec).
- AIHW (2004a). *Australia's Health - the Ninth Biennial Health Report of Australian Institute of Health and Welfare*. Canberra: AIHW. Cat. No. AUS-44.  
<<http://www.aihw.gov.au/publications/index.cfm/title/10014>>.
- AIHW (2004b). 'National Hospital Separation Database'.  
<<http://www.aihw.gov.au/hospitaldata/morbidity.html>> (Accessed 18 May 2004).
- Albert Keidel (2001). "China's GDP Expenditure Accounts." *China Economic Review* 12(4): 355-67.
- Allotey, P. A. and Reidpath, D. (2000). "Information Quality in a Remote Rural Maternity Unit in Ghana." *Health Policy Planning* 15(2): 170-176.  
<<http://heapol.oupjournals.org/cgi/content/abstract/15/2/170>>.
- An, N., Meng, Q. Y., Zhao, W. et al. (2003). "Development of Community Health Services and Urban Medical Assistance: Major Findings and Policy Suggestions (in Chinese)." *Chinese Health Economics* 22(6): 18-9.
- An, R. and Du, Y. P. (2004). "Demands and Uses of Community Health Services for Aged Urban Residences in Xiachang District of Hangzhou City (in Chinese)." *Chinese General Practice* 7(7): 488-9.
- Anastasi, A. (1988). *Psychological Testing*. 6th Edition. New York, Macmillan Publishing Company. Department of Psychology, Fordham University.
- Aubel, J. and Mansour, M. (1989). "Qualitative Community Health Research: A Tunisian Example." *Health Policy and Planning* 4(3): 244-56.
- Avison, D. and Fitzgerald, G. (1988). *Information Systems Development: Methodologies, Techniques and Tool*. Oxford, Blackwell Scientific Publications.
- Ballou, D., Wang, R., Pazer, H. et al. (1998). "Modeling Information Manufacturing systems to Determine Information Product Quality." *Management Science* 44(4): 462-84.

- BBC (2004). 'How China is Ruled'.  
<[http://www.bbc.co.uk/1/shared/sp1/asia+pac/02/china\\_party\\_congress/china\\_ruling](http://www.bbc.co.uk/1/shared/sp1/asia+pac/02/china_party_congress/china_ruling)> (Accessed 24 May 2004).
- Beijing Health Bureau (2003). 'Establishment of Beijing Health Information Center (in Chinese)'. <<http://www.bjhb.gov.cn/>> (Accessed 4 April 2003).
- Beijing People's Congress (2002). 'Introduction on Beijing People's Congress (in Chinese)'. <<http://www.bjrd.gov.cn/rmdbdh/index.html>> (Accessed 28 May 2004).
- Beijing Youth Daily (2002). 'China Drafting Act for Daylight Information, Deliberately Hiding Will be Investigated (in Chinese)'. *Beijing Youth Daily*: p. 3.  
<<http://www.people.com.cn/GB/shehui/43/20020924/829629.html>>.
- Beynon-Davies, P. and Lloyd-Williams, M. (1999). "When Health Information Systems Fail." *Topics in Health Information Management* 20(1): 66-79.
- Bloom, G. (2003). *Primary Health Care Meets the Market: Lessons from China and Vietnam*. Brighton, UK: Institute of Development Studies, University of Sussex. IDS Working Paper 53. 1-29.
- Bloom, G., Lu, Y. and Chen, J. (2003). *Financing Health Care in China's Cities: Balancing Needs and Entitlements During Rapid Change*. Institute of Development Studies. IDS Working Papers - 176. 1-26.
- Brown, A. (1994). *Appraising Intangible Benefits from Information Technology Investment*. Papers presented in the First European Conference on Information Technology Investment Evaluation, UK.
- Burnside, R. and Farrell, E. (2001). *Electronic Data Reporting - Recent Developments at the Australian Bureau of Statistics*. Papers presented in the Statistics Canada Symposium.
- Cai, R. H. (2003). *History and Current Situation of China's Medical and Health System (in Chinese)*. Papers presented in the International Dialogs on SARS Crises, Chinese Economic Education Network.
- Cao, K. T. (2003). *Chinese Health Legislation System (in Chinese)*. Beijing: Legislation Office of the State Council. 1. <[http://www.news.xinhuanet.com/zhengfu/2003-11/04/content\\_1159846.htm](http://www.news.xinhuanet.com/zhengfu/2003-11/04/content_1159846.htm)>.
- Cao, R. C. and Wu, J. M. (2002). "Establish a framework for Information Quality Evaluation (in Chinese)." *Journal of Information Research*(4): 6-8.  
<<http://www.fjinfo.gov.cn/publicat/qbts/024/3.htm> (Accessed 23 Sept. 2003)>.
- Carr-Hill, R. (1989). "Allocating Resources to Health Care: RAWP (Resources Allocation Working Party) is Dead - Long Live RAWP." *Health Policy* 13(2): 135-44.

- Carr-Hill, R., Maynard, A. and Slack, R. (1990). "Morbidity Variation and RAWP." *Journal of Epidemiological Community Health* 44(4): 271-273.  
<<http://jech.bmjournals.com/cgi/content/abstract/44/4/271>>.
- Cauffman, J., Lloyd, J., Lyons, M. et al. (1973). "Health Information and Referral Services within Los Angeles County." *Am J Public Health* 63(10): 872-877.  
<<http://www.ajph.org>>.
- CCCPC (1969). *Political Report in Ninth CCCPC (in Chinese)*. Beijing: CCCPC.
- CCCPC (1973). *Political Report in Tenth CCCPC (in Chinese)*. Beijing: CCCPC.
- CCCPC (1977). *Political Report in Eleventh CCCPC (in Chinese)*. Beijing: CCCPC.
- CCCPC (1993). *Decision on Several Issues of Socialist Market Economy System (in Chinese)*. Beijing: 14th Congress of CCCPC. 1-9.
- CCCPC (2000). *Suggestions for Tenth Five-Year Plan of National Social and Economic Development (in Chinese)*. Beijing: Fifth Plenary of Fifteenth CCCPC. 1-10.
- CCCPC (2002). *To Build a Well-off Society in An All-round Way and to Create A New Situation in Building Socialism with Chinese Characteristics: Report of 16th CPC Conference (in Chinese)*. Beijing: CCCPC. 1-9.
- CCCPC (2003). *CCCPC Decision on Improving Socialist Market Economy System (in Chinese)*. Beijing: CCCPC. 1-5.
- CCCPC & State Council (1997). 'CCCPC and State Council Decision Paper of Health Reform and Development (in Chinese)'. In (Eds.). *Collection of Policies for Health Reform and Development*. Beijing, General Office of MOH, pp. 5-6.
- CCTV (1997). 'Premier Li Peng's Epigraph for CCTV's Focus Discussion (in Chinese)'. <<http://www.cctv.com/news/focus/guanhuai.html>> (Accessed 16 Feb. 2004).
- CCTV (2003). 'CCTV Forum: Why Difficult of Disjoining Financial Management of Medical and Pharmaceutical Services (in Chinese)'. <[http://www.cctv.com/news/china/20031228/100139\\_1.shtml](http://www.cctv.com/news/china/20031228/100139_1.shtml)> (Accessed 5 Feb. 2004).
- Chai, Y., Xu, Z. G., Mao, Z. F. et al. (2003). "Analysis on Rural Residents' Needs and Utilisation of Health Services in Wudang Town (in Chinese)." *Journal of Yunyang Medical College* 22(6): 336-9.
- Chandler, J. S. (1982). "A Multiple Approach for Evaluating Information System." *MIS Quarterly* 6(1): 61-74.
- Chang, H. J. and Nolan, P. (1995). 'Europe versus Asia: Contrasting Paths to the Reform of Centrally Planned Systems of Political Economy'. In Ha-Joon Chang, P. N. (Eds.). *The Transformation of the Communist Economics - Against the Mainstream*. London, MacMillan Press Ltd, pp. 7-8.

- Chang, W. H. (1999). 'Regional Health Planning: Seek Truth From Facts (in Chinese)'. In social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 102-10.
- Channel News Asia (2004). 'US Launches 15 Million-Dollar Programme to Fight HIV/AIDS in China'.  
<[http://www.channelnewsasia.com/stories/afp\\_asiapacific/view/73508/1/.html](http://www.channelnewsasia.com/stories/afp_asiapacific/view/73508/1/.html)>  
(Accessed 4 March 2004).
- Chatwin, D. (2002). *A 'Knowledge Enabled' Environment: Knowledge Management at the Australian Bureau of Statistics*. Papers presented in the Consultative Seminar on Governance of National Statistical System, Singapore, Singapore Department of Statistics. <<http://www.singstat.gov.sg/conferences/consultative/gnss.html>>.
- Chen, D. (1981). *Population of Contemporary China*. Tianjin, Tianjin People's Publisher.
- Chen, H., He, S. B., Sun, J. et al. (2003). "Investigation on Rural Residents' Needs and Utilisation of Health Services in Yichang City in Hubei Province (in Chinese)." *Chinese Rural Health Service Administration* 23(2): 32-4.
- Chen, M. (2004). 'Regulation of Government Information Daylighting of Shanghai City will be Implemented in May (in Chinese)'. <<http://www.sina.com.cn/me/2004-01-21/0931284875.shtml>> (Accessed 28 Jan. 2004).
- Chen, Q., Fu, M. T., Huang, Y. et al. (2003). "The urgent issues in the development of rural health project in Zhuhai city (in Chinese)." *South China Journal of Preventive Medicine* 29(5): 55-7.
- Chen, W. L., Yang, J. and Shi, J. (2003). "Establish Disease-specific Quality Control Platform Based on Evidence-based Medicine and Clinical Protocol (in Chinese)." *Journal of Huazhong University of Science and Technology (Medical Science)* 23(2): 108-11.
- Chen, X. M. (2000a). *Qualitative Research in Social Sciences (in Chinese)*. Beijing, Chinese Education Science Publisher.
- Chen, Y., Cheng, X. M., Xu, W. et al. (2003). "Analysis of Demand and Utilisation of Community Health Services in Shenyang City (in Chinese)." *Chinese Health Economics* 22(3): 8-10.
- Chen, Y. D. (1993). *World Bank Loan Project Promoted the Development of Health Statistics Information Works*. Papers presented in the World Bank Health Loan Project I Workshop, Beijing.
- Chen, Y. D. (1996). "Facing Challenges and Catching Opportunities, Working Hardly to Improve Health Statistical Information Work to a New Stage (in Chinese)." *Chinese Journal of Hospital Administration* 16(1): 15-6.

- Chen, Y. D. (2000b). "If Health Administrative Authorities Intend to Improve Their Management Performance, They Must Pay More Attention on Statistical Information (in Chinese)." *Chinese Journal of Health Statistics* 17(2): 68-9.
- Chen, Y. D. (2001). *Discussion on Chinese Hospital Resource Utilisation (in Chinese)*. Beijing, Beijing Medical University Department of Health Policy and Management.
- Chen, Y. D. and Rao, K. Q. (1994). "To Fit government Function Restructuring, to Strengthen Health Statistical Information Work, and to Serve Health Reform and Development (in Chinese)." *Chinese Journal of Health Care Management*(7): 378-80.
- Chen, Y. D., Yang, H., Song, W. Z. et al. (2001). 'Information Theory and Application on Health Information System Management (in Chinese)'. In Chen, Y. D. (Eds.). *Health Care Management: Teaching Material*. Beijing, Peking University, pp. 130-56.
- Chen, Y. F. (2003). 'What is Intellectuals (in Chinese)'.  
<<http://www.chinasociology.com/rzgd/rzgd009.htm>> (Accessed 18 March 2004).
- Chen, Z., Jiang, G. H. and Hu, S. L. (1999). 'Regional Health Planning and the Development of Preventive Health Care (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 170-83.
- Cheng, M. B. and Cai, Z. X. (2000). 'Study in South China: Practice of History and Anthropology (in Chinese)'. *Guangming Daily (Dec. 22, 2002)*: p. 5.  
<<http://www.home.ust.hk/~scenter/newsletter/news/news22.htm>>.
- Cheng, X. M. (2004). "Features of Demands and Supplies of Community Health Services (in Chinese)." *Chinese General Practice* 7(7): 445-6.
- Chi, B. L. (1996). *Guidebook of Regional Medical Planning (in Chinese)*. Beijing.
- Chi, F. L. (2003). 'China's Reform Focuses on Streamlining Government'.  
<<http://www.worldbank.org/transitionletter/janfebmar03/pgs10-12.htm>>  
(Accessed 24 March 2004).
- China Daily (2003). 'Anhui Vice-Governor Gets Death Penalty'.  
<[http://www.chinadaily.com.cn/en/doc/2003-12/30/content\\_294409.htm](http://www.chinadaily.com.cn/en/doc/2003-12/30/content_294409.htm)>  
(Accessed 10 Jan. 2004).
- Chinese Academic of Social Science (2002). 'Socialist Market Economy (in Chinese)'.  
<[http://www.cass.net.cn/zhuanti/y\\_party/yd/yd\\_m/yd\\_m\\_024.htm](http://www.cass.net.cn/zhuanti/y_party/yd/yd_m/yd_m_024.htm)> (Accessed 8 August 2003).
- Chinese Cochrane Centre Hong Kong Branch (2003). 'Evidence-based Medicine: New Model of Medical Practice in the 21st Century'.  
<<http://www.hkcochrane.cuhk.edu.hk>> (Accessed 22 May 2004).

- Chinese Medical and Biologic Information (2004). 'Hypertension in China (in Chinese)'. <<http://cmbi.bjmu.edu.cn/epidemic/epi-hyper/chyper2.htm>> (Accessed 18 May 2004).
- Choi, C. (1995). *Data Development: Achievement and Directions (in Australia's Welfare 1995: Services and Assistance)*. Canberra: AIHW.
- Chou, Y. L. (2003). 'Medical Services and Vulnerable Group Supports. To March on Equitable Society: Social Development Research Report (in Chinese)'. <<http://www1.china.cn/chinese/zhuanti/263722.htm>> (Accessed 25 June 2004).
- CHSI (1998). *Report of National Health Service Research (in Chinese)*. Beijing: CHSI, MOH.
- CHSI (1999). "Chinese Hospital Resources and Utilisation in the 1980s (in Chinese)." *Chinese Journal of Quality of Care* 26(1): 49-53.
- CHSI (2001). *Chinese Health Statistics Digest (in Chinese, internal publication)*. Beijing, CHSI of MOH.
- CHSI (2002). 'Functions of Centre for Health Statistics and Information'. <<http://www.moh.gov.cn/tjxxxxx.htm>> (Accessed April 2002).
- CIHI (2002). 'National Health Expenditure Trends 1975 to 2002'. <<http://www.library.mcgill.ca/edrs/data/other/CIHI/NHEX/nhex.html>> (Accessed 11 June 2004).
- CIHI (2004a). 'Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines)'. <[http://secure.cihi.ca/cihiweb/dispPage.jsp?cw\\_page=mis\\_e](http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=mis_e)> (Accessed 9 May 2004).
- CIHI (2004b). 'National Health Expenditure Database (NHEX)'. <[http://www.secure.cihi.ca/cihiweb/dispPage.jsp?cw\\_page=statistics\\_results\\_source\\_nhex\\_e](http://www.secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=statistics_results_source_nhex_e)> (Accessed 11 June 2004).
- Clark, R. C. and DeMarco, M. L. (2001). "Development of an Information Management System Using a Strategic Planning Process." *Topics in Health Information Management* 22(2): 44-51.
- Clikeman, P. M. (1999). 'Improving Information Quality'. <[library.usask.ca/ejournals](http://library.usask.ca/ejournals)> (Accessed 20 Jan. 2004).
- Computer World (2003). *Serious Drawback of Information Exchanging and Sharing (in Chinese)*. Papers presented in the Reviewing Hospital Information System Construction after SARS Crisis, Beijing, Computer World. <<http://www.yiyuan.net/read/news.asp?newsid=110>>.
- Contemporary China Series Editing Group (1989). 'Contemporary China's Statistics'. In Contemporary China Series Editing Group (Eds.). *Contemporary China*. Beijing, China Social Science Publisher, pp. 484-8.

- Cottlieb, S. (2000). "Health Information on Internet is Often Unreliable." *BMJ* 321(7254): 136b-. <<http://www.bmj.com> (accessed 3 May 2003)>.
- CPIRC (2004). 'Population Periodicals in China (in Chinese)'. <<http://www.cpirc.org.cn/rkzz/rkzz.asp>> (Accessed 18 May 2004).
- Csiki, I. E., Marcu, A. and Ungurean, C. (2004). *Description of the National Health Information System in Romania - Results of a Participative Evaluation Conducted in June 2003*. Denmark: The Regional Office for Europe of the World Health Organisation. EUR/03/5033028.
- Dai, J. L. (2004). 'To Reform Administrative Regionalism To Satisfy China's Modernisation (in Chinese)'. <<http://www.xzqh.org.cn/qh/3/tt45.htm>> (Accessed 16 April 2004).
- Davenport, T. H. (2000). 'Improving Company Performance: Re-conforming Position of Information on Information Technology (in Chinese)'. In Marchard, D. A., Davenport, T. H. and Dickson, T. (Eds.). *Information Management: Complete MBA Companion in Information Management (original title: Mastering Information Management)*. Beijing, Chinese Social Science Publisher., pp. 1-32.
- Deng, X. P. (1980). *Reform the leadership system of Party and Government*. Beijing: Political Committee of CPC.
- Department of Civil Affairs Taipei City Government (2003). 'Household Registration System in China and Some Developed Countries'. <<http://www.ca.taipei.gov.tw/civil/museum/world/system.html>> (Accessed 19 Jan. 2004).
- Department of Health (2000). *Health Authority Revenue Resource Limits 2001-02*. London: Department of Health. HSC 2000/034.
- Department of Health and Social Security (1976). *Sharing Resources for Health in England: Report of the Resource Allocation Working Party*. London: HMSO.
- DHA (2003). 'About Department of Health and Ageing'. <<http://www.health.gov.au/>> (Accessed 10, Jan. 2003).
- DHA (2004). 'HealthWIZ Overview'. <<http://www7.health.gov.au/healthwiz/overview/index.htm>> (Accessed 10 Oct. 2004).
- Ding, Y. L., Mao, Z. F., Kong, D. L. et al. (2003). "A Survey on Demand and Utilisation of Health Care in Disabled Veterans in Hubei Province (in Chinese)." *Journal of Guangdong Medical College* 21: 6.
- Diseker, R., Michielutte, R. and Morrison, V. (1980). "Use and Reported Effectiveness of Tel-Med: a Telephone Health Information System." *Am J Public Health* 70(3): 229-234. <<http://www.ajph.org/cgi/content/abstract/70/3/229>>.

- Djankov, S., Porta, R. L. and Slanes, F. L. d. (2001). *World Bank Technical Report: The Regulation of Entry*. Washington DC: World Bank. <<http://econ.worldbank.org>>.
- Donato, J. D. and Walker, S. (2003). "Health Information Management: What Business Are We In?" *Health Information Management* 31(4): 5-9.
- Dong, F. N. (2003a). 'Government Institution Reform Needs a Clear Model (in Chinese)'. <<http://business.sol.sohu.com/88/83/article207918388.shtml>> (Accessed 5 May 2003).
- Dong, S. M. (2003b). 'On expected and on Sense: Reform of Beijing's Household Registration Has a Long Way to Go (in Chinese)'. <<http://www.huaxia.com/zk/tp/00047281.html>> (Accessed 19 Jan. 2004).
- Dong, X. M., Wang, S., Wang, Y. M. et al. (2004). "Investigation of the Knowledge, Attitude and Requirement Related to Hospice Care among Guangzhou Residents." *Chinese Journal of Geriatrics* 23(3): 196-8.
- Dong, Z. K. (2001). *Transition of Ownership Structure in 50 Years of New China*. Beijing: Division of Contemporary China's Economy History, Institute of Economics, Chinese Academy of Social Science. <<http://www1.cei.gov.cn/union/doc/lhcasrep/200108010858.htm>>.
- Du, J. and Fei, Z. H. (1999). 'Policy Perspectives on the Implementation of Regional Health Planning (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 16-27.
- Du, L. X. (2000). 'The Financing and Allocating of the Fund in Health Sector of China'. <<http://w3.whosea.org/healthreport/pdf/5-harbin.pdf>> (Accessed 21 May 2004).
- Du, L. X. and Zhao, Y. X. (1999). "Total Health Expenditures in China: A time-series Analysis and Evaluation 1978-1995." *Asia Pacific Health Economics Network*(1). <<http://www.unescap.org/aphen/china-harbin-news.htm>>.
- Du, L. X. and Zhao, Y. X. (2004). 'Estimate of Chinese Total Health Expenditure 1978-2002 (in Chinese)'. <[http://www.jjwj.com.cn/news\\_detail.jsp?keyno=3348](http://www.jjwj.com.cn/news_detail.jsp?keyno=3348)> (Accessed 11 June 2004).
- Duan, M. Y. (2004). "The Influence of Health Projects Supported by the World Bank on Health Development in China (in Chinese)." *Chinese Journal of Rural Health Management* 24(1): 16-8.
- Duckett, S. J. (1983). "Changing Hospitals: The Role of Hospital Accreditation." *Social Science & Medicine* 17(20): 16573-9.
- Eagar, K. (1996). Classification systems for psychiatric, sub-acute and non-acute services: implications for health information management, Proceedings of the 17th Conference of the Health Information Management Association of Australia, Sydney Convention and Exhibition Centre, Darling Harbour 16-18 October 1996.

- Sydney, N.S.W. : Health Information Management Association of Australia 1996 : 60-5 URL: No.
- Eagar, K., Garrett, P. and Lin, V. (2001). *Health Planning: Australian Perspectives*. Crows Nest New South Wales, Allen & Unwin.
- Eaton, L. (2002a). "A Third of Europeans and almost Half of Americans Use Internet for Health Information." *BMJ* 325(7371): 989b-. <<http://bmj.com>>.
- Eaton, L. (2002b). "UK Government Aims to Integrate Health Information on the Internet." *BMJ* 324(7337): 566b-. <<http://bmj.com>>.
- Edejer, T. T.-T. (2000). "Disseminating Health Information in Developing Countries: the Role of the Internet." *BMJ* 321(7264): 797-800. <<http://bmj.com>>.
- Editing Committee of Chinese Population of New Century (1994). *Chinese Population of New Century, General Volume and Provincial Sub-volumes*. Beijing.
- Education Department of Health Science Centre of PKU (2003). 'Curriculum of Medical Education (in Chinese)'.  
<<http://www.bjmu.edu.cn/jiaoyuchu/pyfa/peiyangfanan1.htm>> (Accessed 12 June 2003).
- Eppler, M. J. and Wittig, D. (2000). *Conceptualising Information Quality: A Review of Information Quality Framework from the Last Ten Years*. Papers presented in the IQ 2000-The Conference on Information Quality, Massachusetts Institute of Technology (MIT), Boston, Institute for Media and Communications Management, University of St. Gallen.  
<[http://www.informationobjects.ch/netacademy/naservice/publications.nsf/all\\_pk/1649](http://www.informationobjects.ch/netacademy/naservice/publications.nsf/all_pk/1649) (accessed 19 Jan. 2004)>.
- Eysenbach, G. and Kohler, C. (2002). "How Do Consumers Search for and Appraise Health Information on the World Wide Web? Qualitative Study Using Focus Groups, Usability Tests, and In-depth Interviews." *BMJ* 324(7337): 573-577. <<http://bmj.com/cgi/content/abstract/324/7337/573>>.
- Ezzy, D. (2002). *Qualitative Analysis: Practice and Innovation*. Crows Nest NSW, Allen & Unwin.
- Fang, P. (2003). 'It is Inappropriate to Ignore Social Sciences (in Chinese)'. *Guangming Daily* (14 April 2003): p. 2.  
<[http://www.sd.nankai.edu.cn/kuaidi/prin\\_20030416\\_2.htm](http://www.sd.nankai.edu.cn/kuaidi/prin_20030416_2.htm)>. (Accessed 10 Dec. 2003).
- Farbey, B., Land, F. F. and Targett, D. (1993). *How to Assess Your IT Investment: A Study of Methods and Practice*. Butterworth Heinemann, Oxford.
- Feng, L. Z. (2002). 'Health Administrative Management Information System in Anhui (in Chinese)'. *Health Daily* (24 Dec.): p. 7.  
<<http://www.jkb.com.cn/trsweb/Detail.wct?SeclectID=4744&RecID=2>>.

- Feng, X. S., Tang, S. L., Bloom, G. et al. (1995). "Cooperative Medical Schemes in Contemporary Rural China." *Social Science & Medicine* 41(8): 1111-8.
- Feng, Z. X. and Du, Y. P. (2003). "An Investigation for the Demand of Community Health Service and the Inclination of Payment in Urban Residents (in Chinese)." *Zhejiang Journal of Preventive Medicine* 15(3): 57-9.
- Ferriman, A. (2002). "Patients Get Access to Evidence Based, Online Health Information." *BMJ* 325(7365): 618a-. <<http://bmj.com>>.
- FLO (2002a). 'Introduction on World Bank Health Project I: Rural Health and Medical Education'. <<http://flomoh.moh.gov.cn/xmjs/xm/2002062201.htm>> (Accessed 16 Jan. 2004).
- FLO (2002b). 'Introduction on World Bank Health Projects'. <<http://flomoh.moh.gov.cn/xmjs/xm/2002062203.htm>> (Accessed 16 Jan. 2004).
- Friede, A., Reid, J. and Ory, H. (1993). "CDC WONDER: A Comprehensive On-line Public Health Information System of the Centres for Disease Control and Prevention." *Am J Public Health* 83(9): 1289-1294. <<http://www.ajph.org/cgi/content/abstract/83/9/1289>>.
- FriedlNet (2003). 'Shenzhen: China's Guinea Pig for Reform'. <<http://www.friedlnet.com/news/03020201.html>> (Accessed 02 Feb. 2004).
- Frossard, M. (1990). "Hospital Strategy and Regional Planning in France." *International Journal of Health Planning and Management* 5(1): 59-63.
- Fu, P., Jiang, H., Liao, H. J. et al. (2003). "Survey on health status and needs among middle-aged and aged population in community of Zhanlanlu District (in Chinese)." *Chinese General Practice* 6(8): 649-52.
- Gagliardi, A. and Jadad, A. R. (2002). "Examination of instruments used to rate quality of health information on the internet: chronicle of a voyage with an unclear destination." *BMJ* 324(7337): 569-573. <<http://bmj.com/cgi/content/abstract/324/7337/569>>.
- Gallagher, M. R. (2002). 'Shenzhen Introduction'. <[www.asu.edu/caed/proceedings02/GALLAGH1/gallagh1.htm](http://www.asu.edu/caed/proceedings02/GALLAGH1/gallagh1.htm)> (Accessed 02 Jan. 2004).
- Gao, C. D., Yang, X. S., Yu, Q. W. et al. (2002a). *Management and Legislation Study on Government Information Resources (in Chinese)*. Beijing: Chinese Information Association. <<http://www.cnii.com.cn>>.
- Gao, J., Qian, J. C., Tang, S. L. et al. (2002b). "Health Equity in Transition from Planned to Market Economy in China." *Health Policy Planning* 17(1): 20-9. <[http://heapol.oupjournals.org/cgi/content/abstract/17/suppl\\_1/20](http://heapol.oupjournals.org/cgi/content/abstract/17/suppl_1/20)>.

- GDDS (2004). 'County Data: China, the People's Republic'.  
<<http://dsbb.imf.org/Applications/web/gdds/gddscountrycategorylist/?strcode=CHN>> (Accessed Feb. 17 2004).
- Giacomini, K. (2000). "User's Guides to the Medical Literature: Qualitative Research in Health Care: Are the Results of the Study Valid?" *JAMA* 284: 357-362.
- Gladwin, J., Dixon, R. and Wilson, T. (2002). "Rejection of an Innovation: Health Information Management Training Materials in East Africa." *Health Policy Plan.* 17(4): 354-361. <<http://heapol.oupjournals.org/cgi/content/abstract/17/4/354>>.
- Glasser, J. H. (1971). "Health-Information Systems: A Crisis or Just More of the Usual?" *American Journal of Public Health* 61(8): 1524-30.
- Glouberman, S. and Millar, J. (2003). "Evolution of the Determinants of Health, Health Policy, and Health Information Systems in Canada." *Am J Public Health* 93(3): 388-392. <<http://www.ajph.org/cgi/content/abstract/93/3/388>>.
- Gong, X. G. (2003a). "Analysis on China's Public Health System (in Chinese)." *Chinese Journal of Health Economics* 22(11): 9-10.
- Gong, X. G. (2003b). "Government Responsibilities on Public Health (in Chinese)." *Chinese Journal of Health Economics* 22(11): 12-3.
- Gong, Y. L. (1987). "Health Services Research in Shanghai County (in Chinese)." *Transaction of Shanghai First Medical University*.
- Gong, Y. L. and Feng, X. S. (2002). *Health Services Research and Regional Health Planning*. Shanghai, Fudan University Publisher. Fudan University.
- Gong, Z. P., Duckett, S. J., Legge, D. G. et al. (2004). "Describing Chinese Hospital Activity with Diagnosis Related Groups (DRGs): A Case Study in Chengdu." *Health Policy* 69(2004): 93-100.
- Guangdong People's Congress (2004). 'FAQ of the People's Congress Authority (in Chinese)'. <<http://www.rd.gd.cn/wjf/abc/04/newrd005.htm>> (Accessed 28 May 2004).
- Guangxi Health Bureau (2004). 'Responsibilities of Centre of Health Statistical Information of Guangxi Autonomous Region (in Chinese)'.  
<<http://www.gxws.gov.cn/tjxx/tjxx-1.htm>> (Accessed 19 April 2004).
- Guangzhou Statistics Bureau (2002). *Key Statistics Indicators of 12 Prefectures in Zhujiang Delta (in Chinese)*. Guangzhou: Guangzhou Statistics Bureau.
- Guimaraes, T. and McKeen, J. D. (1989). "The Process of Selecting Information System Projects." *Data Base* 20(2): 18-24.
- Guo, D. S. (2002a). 'Discussion on Equity First Principle in Social Security System of Contemporary China (in Chinese)'.

- <<http://www.csir.org.cn/darticle.asp?id=SS,20021209,00010031&columid=30001167>> (Accessed 24 June 2004).
- Guo, Z. M. (2002b). 'To Persist Efficiency Prioritised Principle and Take Account to Equity (in Chinese)'. *Guangming Daily* (25 Dec.): p. 5.
- Han, Q. X. (2002). *Development and Its Costs: A Cost Analysis on China's Reform and Development (in Chinese)*. Beijing, People's Publisher. Department of Philosophy of Chinese Communist Party School.
- Hao, M. (2001). "Study on Strategic Targets for Regional Health Development (in Chinese)." *Chinese Journal of Hospital Administration* 17(4): 209-210.
- Hao, M., Yu, G. L., Wang, X. N. et al. (2001). "A Study on the Coordinated Development Strategy of Medical and Health, Medical Security and Social Economy (in Chinese)." *Chinese Journal of Hospital Administration* 17(4): 197-200.
- Hargreaves, J. (2001). *The Quality of Indigenous Identification and Other Demographic Data in Australian Hospital Morbidity Records*. Papers presented in the Statistics Canada Symposium 2001.
- Havrylyshyn, O. and Wolf, T. (1999). "Determinants of Growth in Transition Countries." *Finance and Development* 36(June): 12-5.
- Havrylyshyn, O., Wolf, T., Berengaut, J. et al. (1999). *Growth Experience in Transition Countries, 1990-98*. International Monetary Fund. Occasional Paper No. 184.
- He, H. Q. (1999). "Issues and Measurements When Use Front Page as Source of Health Statistics Information." *Chinese Journal of Health Statistics* 16(1): 15-8.
- He, J. D. (2004). 'Discussion Once More on Party-Government Separation (in Chinese)'. <<http://www.tyjf.net/sixiang/dangzheng.html>> (Accessed 25 May 2004).
- He, Q. L. (1998). *The Pitfalls of Modernisation - The Economic and Social Problems in China (in Chinese)*. Beijing, Today's China Publisher. People's Daily.
- Health News (2003). 'New Concept of Health: Physical and Mental Well-being (in Chinese)'. *Health News of China*: p. 4.  
<[www.cosn.net/news/page/2003211140901.html](http://www.cosn.net/news/page/2003211140901.html)>.
- Henan Planning Commission, Finance Bureau and Health Bureau (2000). *Standard of Health Resource Allocation for Henan Province (in Chinese)*. Zhengzhou: Henan Planning Commission, Finance Bureau and Health Bureau., Yu Ji (2000) 31. 1-4.
- Henderson, G., Jin, S. G., Akin, J. et al. (1995). "Distribution of Medical Insurance in China." *Social Science & Medicine* 41(8): 1119-30.
- Herbst, K., Littlejohns, P., Rawlinson, J. et al. (1999). "Evaluating Computerised Health Information Systems: Hardware, Software and Human Ware: Experiences from the Northern Province, South Africa." *J Public Health Med* 21(3): 305-310.  
<<http://jpubhealth.oupjournals.org/cgi/content/abstract/21/3/305>>.

- Hesketh, T. and Zhu, W. X. (1997). "Health in China: The healthcare market." *BMJ* 314(7094): 1616-. <<http://bmj.com/cgi/content/abstract/314/7094/1616>>.
- Heywood, A. and Campbell, B. (1995). "Development of a Primary Health Care Information System in Ghana: Lesson Learned." *Methods of Information in Medicine* 36(2): 63-8.
- HIPAA (2003). 'Definition of Health Information'. <<http://www.hipaabasics.com/glossary.ht>,> (Accessed 19 Jan. 2004).
- Holmes, B. G. and Roser, N. L. (1980). *A Comparison of Techniques Used to Assess Readers' Prior Knowledge*. Papers presented in the 30th Annual Meeting of the National Reading Conference.
- Holz, C. (2003). "Fast, Clear and Accurate: How Reliable Are Chinese Output and Economic Growth Statistics?" *The China Quarterly* March 2003(173).
- Hou, Y. (1999). 'Regional Health Planning: the Breakthrough Point in Reforming Health System (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 87-94.
- Hou, Y. (2001). "Regional Health Planning and Marketplace Competition (in Chinese)." *Chinese Health Economics* 20(8): 7-9.
- Hou, Y. and An, N. (2003). "Ideas on Pushing Implementation of the Regional Health Planning (in Chinese)." *Chinese Journal of Health Economics* 22(1): 19-20.
- Hou, Y. N. (2002). 'Puzzled Way of Hospital Information System Development (in Chinese)'. *Health Daily* (26 March): p. 7. <<http://www.jkb.com.cn/trsweb/Detail.wct?SelectID=4744&RecID=5>>.
- Hovenga, E. and Lloyd, S. (2002). 'Working With Information'. In Harris, M. G. (Eds.). *Managing Health Services: Concepts and Practice*. Eastgardens, NSW, MacLennan & Petty Pty Limited, pp. 195-228.
- Hu, A. G. (1998). *Postponed Reform: A Suggestion of Repeal Prefectural Government (in Chinese)*. Beijing: Chinese National Institution. 1. <<http://www.finance-cn.com/hgjj/gqfx/006.htm>>.
- Hu, A. G. (2002). 'Professor Hu Angang Suggested To Find Trade-off Between Efficiency and Equality (in Chinese)'. <<http://www.news.cis.tsinghua.edu.cn/new/news.php?id=3841>> (Accessed 24 June 2004).
- Hu, H., Xu, Y. Y. and Pan, F. (2001). "Comparing and Projection of Casemix Index and Cost (in Chinese)." *Chinese Journal of Hospital Administration* 17(10): 593-4.
- Hu, X. D. (2003a). 'Core Value of Socialism is to Protect Vulnerable Groups (in Chinese)'. <<http://www.cn.mlcool.com/~mlcool/html/ns001999.htm>> (Accessed 24 June 2004).

- Hu, Y. S. (2003b). 'Understanding of Front Page of Hospital Medical Record (in Chinese)'. <<http://hzsyxh.51.net/xsjz/jz13.htm>> (Accessed 10 Nov. 2003).
- Hu, Y. Y. (2003c). 'Battleground Diary in Xiaotangshan SRAS Hospital: Establishing Hospital Information System within Ten Days - Mission Impossible? (in Chinese)'. <[http://www.ccw.com.cn/work2/culture/zcnw/htm2003/20030530\\_16ZP4.asp](http://www.ccw.com.cn/work2/culture/zcnw/htm2003/20030530_16ZP4.asp)> (Accessed 20 Jan. 2004).
- Huang, R. Q. (1997). "Estimate Population's Life Expectancy." *Journal of Population Study*(1): 1-4.
- Huang, R. Q. (2003). 'Studies on China's Mortality'. <<http://cpirc.org.ch/paper2.htm>> (Accessed 24 Nov. 2003).
- Huang, S. G. and Shi, W. J. (2003). "Defining the Connotation of Equity in Health Service and Its Policy Analysis." *Journal of Chinese Health Service Management* 19(12): 714-5.
- Huenemann, R. W. (2001). "Are China's Recent Transport Statistics Plausible?" *China Economic Review* 12(4): 368-72.
- Hui, X. M., Liu, X. C. and Jia, J. M. (1999). "Health Service Demands and Utilisations of Retired Military Carders in Xinjiang (in Chinese)." *Medical Journal of National Defending Forces in Northwest China*(2): 19-20.
- Impicciatore, P., Pandolfini, C., Casella, N. et al. (1997). "Reliability of health information for the public on the world wide web: systematic survey of advice on managing fever in children at home." *BMJ* 314(7098): 1875-. <<http://bmj.com/cgi/content/abstract/314/7098/1875>>.
- Islam, R. (2003). *Do More Transparent Government Govern Better?* Washington, D.C.: The World Bank. 3077. 1-17. <<http://www.worldbank.org/data/tas/scbpaper.pdf>>.
- Jerva, M. (2001). "Systems Analysis and Design Methodologies: Practicalities and Use in Today's Information Systems Development Efforts." *Topics in Health Information Management* 21(1): 13-20.
- Jia, K. (2004). 'Financing and Tax System Reform in China (in Chinese)'. <<http://www.jscj.com/jscjpubfin/cztz/0d001.htm>> (Accessed 16 March 2004).
- Jiang, D. X. (2003). 'Yan Yangchu: the Fifth Freedom: Freedom from Ignorance (in Chinese)'. <<http://www.cclw.net/witess/3-04/yyc.html>> (Accessed 11 Dec. 2003).
- Jiang, J. Y. and Yao, Z. H. (2003). "Demands on Reproductive Health Education (in Chinese)." *Chinese Journal of Misdiagnostics* 3(3): 466.
- Jiang, Y. (2004). *Allocative Efficiency and Equity of Public Health Budget in Three Provinces of China*. Faculty of Economics, Chulalongkom University Thailand.

- Jiang, Z., Yan, D. M., Zuo, C. Z. et al. (2003). "Health Status and Health Service Demands in Urban and Rural Yancheng City (in Chinese)." *Chinese General Practice* 6(1): 46-8.
- Jiang, Z. H. (1984). *Population Analysis and Planning (in Chinese)*. Xi'an, Shannxi Science and Technology Publisher.
- Jiang, Z. H. and Li, N. (1987). 'Methods and Results of Estimating Chinese Population Change (in Chinese)'. In (Eds.). *Chinese Population Yearbook*. Beijing, Chinese Economic Management Publisher, pp. 1-30.
- Jiangnan Daily (2003). 'Totally Different Satisfaction Rates Between Health Department and Consumer Association: Who is Wrong? (in Chinese)'. *Jiangnan Daily*: p. 2. <<http://www.jschina.com.cn/gb/jschina/node1759/node2868/userobjectlai417868.html>>. (Accessed 13 March 2004).
- Jiangsu Health Bureau (2003). 'Number of health Institution, hospital bed and health professional in Jiangsu province 2002'. <<http://www.jsbst.gov.cn/tjxx/sheet005.htm>> (Accessed 10 Feb. 2003).
- Jiangsu Planning Commission, Finance Bureau and Health Bureau (2001). *Standard of Health Resource Allocation for Jiangsu Province (in Chinese)*. Nanjing: Jiangsu Planning Commission, Finance Bureau and Health Bureau,. Su Ji She Hui Fa (2001) 948. 1-4.
- Jiangsu Statistics Bureau (2003). 'Major Statistics Indicators in Lianyungang City (in Chinese)'. <<http://www.jssb.gov.cn/sjzl/szsj/200401180102.htm>> (Accessed 2 April 2004).
- Jilin Government (2003). 'Introduction of Jilin Province (in Chinese)'. <[http://www.jl.gov.cn/jlgo\\_1/index.jsp](http://www.jl.gov.cn/jlgo_1/index.jsp)> (Accessed 6 April 2004).
- Jin, T. J. (2003). 'Reviewing and Prospecting Politics Science in Contemporary China (in Chinese)'. <<http://www.studa.com/newspaper/2003-9-10/2003910145604.asp>> (Accessed 20 May 2004).
- Jin, X. and Xu, X. P. (2000). *China's Problem Report: Serious Challenges to China in the New Century*. Beijing, Chinese Social Sciences Publisher.
- Jin, Y. H. (2002). 'Hospital Information System is not a Toy (in Chinese)'. *Health Daily (26 Feb.)*: p. 7. <<http://www.jkb.com.cn/trsweb/Detail.wct?SelectID=4744&RecID=7>>.
- Johansen, S. and Orthofer, J. (1975). "Development of a school health information system." *Am J Public Health* 65(11): 1203-1207. <<http://www.ajph.org>>.
- Jue, X., Xu, C., Wu, W. et al. (2000). "Living and Health Status of Farmers in Yongding County (in Chinese)." *Strait Journal of Preventive Medicine* 6(3): 24-5.
- Kale, R. (1994). "Health information for the developing world." *BMJ* 309(6959): 939-942. <<http://bmj.com>>.

- Kaplan, R. S. and Norton, D. P. (1996). *The Balanced Scorecard: Translating Strategy into Action*. Houston, President and Fellows of Harvard College.
- Koplan, J., Hinman, A., Parker, R. et al. (1985). "The barefoot doctor: Shanghai County revisited." *Am J Public Health* 75(7): 768-770.  
<<http://www.ajph.org/cgi/content/abstract/75/7/768>>.
- Kroneman, M. and Zee, V. D. (1997). "Health Policy as a Fuzzy Concept: Methodological Problems Encountered When Evaluating Health Policy Reforms in an International Perspective." *Health Policy* 40(2): 139-55.
- Kwiatkowski, K. and Brennan, P. (2001). "Linking Personal and Public Health Information: a Vision for Community-Centred Health Information System." *Medinfo*. 10(Pt 1): 33-7.
- Lancet Editorial (2001). "China Faces AIDS." *The Lancet* 358(8 Sept.): 773.
- Lanvin, B. (2003). 'Leaders and Facilitators: The New Roles of Governments in Digital Economics'. In World Economic Forum and World Bank (Eds.). *Global Information Technology 2002-2003 - Readiness for the Networked World*, World Economic Forum, pp. 74-83.
- Lee, L. M. (2004). "The Current State of Public Health in China." *Annual Review of Public Health* 25: 327-39. <<http://www.publichealth.annualreview.org>>.
- Lei, H. C. (2001). 'Establishing Health System Prosperity Monitoring System (in Chinese)'. *Health Daily* (1 Feb.): p. 2.  
<<http://www.jkb.com.cn/trsweb/Detail.wct?SelectIS=6697&RecID=6>>.
- Leonard, K., Tan, J. K. and Pink, G. (1998). "Designing Health Care Information Systems for Integrated Delivery Systems: Where We Are and Where We Need To Be." *Topics in Health Information Management* 19(1): 19-30.
- Li, B., Chen, W., Chen, Y. et al. (2003). "Application of a Management Information System for Community Health Services in Foshan City of Guangdong Province (in Chinese)." *Medical Information* 16(9): 488.
- Li, B. L. (2003a). "Hospital Information System and Gusty Public Health Crisis." *Hospital Management Forum (in Chinese)* 86(12): 8-10.
- Li, D. S. (2003b). 'New Concept of Intellectuals'.  
<[http://www.cass.net.cn/chinese/s14\\_zxs/facu/lideshun/030\\_lunw.htm](http://www.cass.net.cn/chinese/s14_zxs/facu/lideshun/030_lunw.htm)>  
(Accessed 18 March 2004).
- Li, D. Y. (2002a). "Historical Context, Issues and Countermeasures on Changing of Government Functions in China (in Chinese)." *Journal of Yanshan University*(2).  
<<http://www.xslx.com/htm/zmfz/gjzz/2003-9-7-14687.htm>>.
- Li, G. (2003c). "Finality of University: University and College Restructuring in the 1950s (in Chinese)." *China's Reform*(8).  
<<http://www.edubridge.com/erxiantang/library/yuanxitiaozheng.htm>>.

- Li, G., Wu, C. Y. and Zhang, Y. X. (2003). "Health Status of Shangdong Urban and Rural Residences (in Chinese)." *Chinese Journal of Public Health Management* 19(6): 563-4.
- Li, G. L., Zhang, X. X. and Wang, Q. (2002). "The investigation of health services in Anqing suburb (in Chinese)." *Chinese Journal of Disease Control and Prevention* 6(4): 321-3.
- Li, J. P. (2002b). 'Bitter Ages of Hospital Information System (in Chinese)'. *China Computer World* (8 July): p. c1.
- Li, L., Cheng, X. M., Cai, W. et al. (2003). "Analysis of the Demands and Utilisation of Health Services for Urban Residents in Shizuishan City (in Chinese)." *Chinese General Practice* 6(1): 41-2.
- Li, L. L. (2004a). *On Two Critical Issues in China's Social Economic Development*. Papers presented in the China: Goals, Strategy and Trends, Sanya, Hainan Province, China, China Development Institute.  
<[http://www.cdi.com.cn/english/research\\_content.asp?id=110](http://www.cdi.com.cn/english/research_content.asp?id=110)>.
- Li, L. M. (2003d). 'Radical or Incremental Approach: Which for China's Economy Reform? (in Chinese)'.  
<<http://business.sohu.com/2004/01/13/51/article218475100.shtml>> (Accessed 10 Feb. 2004).
- Li, M. and Cai, M. P. (2002). 'Hospital Information System Make Hopsital More than Accounting (in Chinese)'. *Health Daily* (5 March): p. 7.  
<<http://www.jkb.com.cn/trsweb/Detail.wct?SelectID=4744&RecID=6>>.
- Li, N. and Sun, F. L. (1994). "A New Method for Estimating Mortality Underreport (in Chinese)." *Journal of Population Study*: 23-8.
- Li, O. F. and Wang, H. (2001). 'What is Cultural Study (in Chinese)'.  
<<http://www.cc.org.cn>> (Accessed 2 June 2004).
- Li, Q. (2002c). *Chinese Social Structure in Transition (in Chinese)*. Harbin, People's Publisher in Heilongjiang.
- Li, R. Y. (2000). 'To Celebrate 20th Anniversary of Institute of Sociology of China's Social Science Academy (in Chinese)'. *Guangming Daily (in Chinese)* (March 20, 2000): p. 6.  
<[http://www.gmdaily.com.cn/0\\_gm/2000/03/20000322/gb/03^18367^0^GMA3](http://www.gmdaily.com.cn/0_gm/2000/03/20000322/gb/03^18367^0^GMA3)>.
- Li, W. P. (2004b). "Community Health Service Institution Development Based on Demands and Supplies (in Chinese)." *Chinese General Practice* 7(7): 444-5.
- Li, W. P. and Zhu, D. B. (2003). "Current Situation, Problems and Future Perspectives of Chinese Medical Service Industry (in Chinese)." *Chinese Health Economics* 22(5): 1-5.

- Li, X. J., Yan, H., Liu, C. J. et al. (2004). "Health Service Utilisation of Residents in Poverty in Chongdu (in Chinese)." *Modern Preventive Medicine* 31(2): 169-71.
- Liang, P. K. (2003). 'Introduction of Liang Shuming (in Chinese)'.  
<<http://phil.pku.edu.cn/resguide/liangsm/bio.htm>> (Accessed 12 Dec. 2003).
- Liang, W. N. and Duan, M. Y. (1999). 'The Performances and Considerations of Comprehensive Regional Health Planning Project (Health Project Three) (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 399-410.
- Lianyungang Government (2003). 'Introduction of Lianyungang City'.  
<<http://www.lyg.gov.cn/newgov/city/index.htm>> (Accessed 6 April 2004).
- Lim, M.-K., Yang, H., Zhang, T. et al. (2004). "China's Evolving Health Care Market: How Doctors Feel and What They Think." *Health Policy* 69: 329-37.
- Lin, A. D. and Tang, J. X. (2004). "Turpan Medical Resource and Utilisation (in Chinese)." *Journal of Chinese Physician* 6(4): 570-1.
- Lin, H. N. and Tang, G. B. (2002). "Report of Community Health Service Demands in Siming Community of Xiamen city (in Chinese)." *Fujian Medical Journal* 24(6): 165-6.
- Lin, J. C. (1999). "Arguments on Hospital Accreditation (in Chinese)." *Chinese Journal of Hospital Administration* 15(3): 15-9.
- Lin, T. and Jiang, X. Y. (2001). "Investigation on the Nursing Requirements of the Residents in Communities and the Related Factors (in Chinese)." *Journal of Nursing Science* 16(7): 400-2.
- Lin, V. and Gibson, B. (2003). *Evidence-based Health Policy*. New York, Oxford.
- Lin, Y. F., Cai, F. and Li, Z. (1996). "The Lessons of China's Transition to a Market Economy." *The Cato Journal* 16(2): 1-20.
- Lin, Y. F. and Liu, Z. Q. (2000). "Fiscal Decentralisation and Economy Growth in China." *Economic Development and Cultural Change*(49): 1.
- Littlejohns, P., Wyatt, J. C. and Garvican, L. (2003). "Evaluating computerised health information systems: hard lessons still to be learnt." *BMJ* 326(7394): 860-863.  
<<http://bmj.com>>.
- Liu, B. and Jiang, F. (2002). 'Challenges on Health Information System'. *Health Daily* (2 May): p. 2.  
<<http://www.jkb.com.cn/trsweb/Detail.wct?SelectID=4744&RecID=4>>.
- Liu, B. L. and Zhu, Q. W. (1999). *Contemporary Public Policy of China (in Chinese)*. Shanghai, Fudan University Press.

- Liu, C. J. (2003a). *Closing the Gap Between Policy and Reality: A study of Community Health Services in Chengdu and Panzhihua*. (PhD study). Melbourne: School of Public Health of Faculty of Health Sciences, La Trobe University.
- Liu, G. Z. (1999a). 'Regional Health Planning Juncture for the Transformation of Government's Role in Health Care (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 125-31.
- Liu, H. S., Cheng, X. M., Peng, J. Y. et al. (2002). "Analysis of the equity of utilisation of health services of urban residents in Baoding City (in Chinese)." *Chinese General Practice* 5(7): 543-5.
- Liu, M. L., Huang, W. Y., Song, S. C. et al. (2004). "A Study on Medical Service Needed and Health Care Utilisation in Impoverished Rural Areas of Guizhou Province (in Chinese)." *Journal of Guiyang Medical College* 29(1): 44-7.
- Liu, Q. (1999b). 'China's Higher Education: From Planned to Market (in Chinese)'. <<http://old.ccer.edu.cn/newsletter/99/117.htm>> (Accessed 10 Dec. 2003).
- Liu, T. X., Li, L., Cheng, H. et al. (2001). "Health Service Demands of Ningxia (in Chinese)." *Chinese Journal of Hospital Administration* 17(7): 438-9.
- Liu, X. C. (2003b). 'Globalisation and Cultural Study (in Chinese)'. <[http://www.cass.net.cn/chinese/s15\\_wxs/qianyan/whyyj/07.htm](http://www.cass.net.cn/chinese/s15_wxs/qianyan/whyyj/07.htm)> (Accessed 2 June 2004).
- Liu, X. J. (2003c). 'Dingxian County Experiment 77 Years Ago (in Chinese)'. <<http://www.yzdsb.com.cn/20030823/ca272825.htm>> (Accessed 12 Dec. 2003).
- Liu, X. M., Wang, Y. X. and Yu, S. L. (1999). 'Issues of Implementing Regional Health Planning (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 28-34.
- Liu, Y. and Wu, Q. H. (2002). "An Analysis on Community Health Services Demand, Utilisation and Influencing Factors in Harbin City (in Chinese)." *Medicine and Society* 15(1): 11-3.
- Liu, Y. L., Hsiao, W. C. L., Li, Q. et al. (1995). "Transformation of China's Rural Health Care Financing." *Social Science & Medicine* 41(8): 1085-93.
- Liu, Y. L., Rao, K. Q. and Fei, J. (1998). "Economic transition and health transition: comparing China and Russia." *Health Policy* 44(2): 103-22. <<http://www.sciencedirect.com/science/article/B6V8X-3T3S3H9-2/2/ce248aba2ea502a5559d9106a6717991>>.
- Liu, Y. M., Zhu, Y., Chen, G. M. et al. (2002). "A Survey on Health Status and Health Service Demand among Part of Middle and Old Age Residents in Hong Kou

- District in Shanghai (in Chinese)." *Journal of Tongji University (Medical Science)* 23(4): 289-91.
- Lopez, A. D. (1998). "Counting the Dead in China: Measuring Tobacco's Impact in the Developing World." *BMJ*: 1399-1400.
- Lu, J. H., Wang, W. W. and Zhang, J. (2002). "Discussion on Demands on Family Rehabilitation Bed in Community (in Chinese)." *Chinese Journal of Clinical Rehabilitation* 6(9): 1343.
- Lu, X. (2000). 'Issues and Measurements on Quality of Medical Record 22(3)'.  
<<http://www.37c.com.cn/literature/analecta/data/yjmzyxyxb/200003/134.html>>  
(Accessed 11 Nov. 2003).
- Luo, M. (2003). "Sun Zhigang Case and Reform on Household Registration System (in Chinese)." *Research of People's Congress*(12).
- Lycett, M. and Giaglis, G. M. (2000). *Component-Based Information Systems: Toward a Framework for Evaluation*. Papers presented in the HICSS 2000 Hawaii International Conference of System Sciences, Hawaii.
- Lyytinen, K. and Hirschheim, R. (1987). "Information Systems Failures: A Survey and Classification of the Empirical Literature." *Oxford Surveys in Information Technology* 4: 257-309.
- Ma, J., Wang, L. S., Huang, C. L. et al. (2003). "Cause analysis on self-report morbidities of poor residents in rural areas (in Chinese)." *Health Economics Research*(8): 20-2.
- Ma, Y. T. and Feng, L. T. (2004). 'Study of Sex Ratio at Birth in China (in Chinese)'.  
<[http://www.cpirc.org.cn/yjwx/yjwx\\_detail.asp?id=33](http://www.cpirc.org.cn/yjwx/yjwx_detail.asp?id=33)> (Accessed 18 May 2004).
- Maeda, A. (2003). *The Strategic Importance of Health Information Management Systems in Improving the World's Healthcare Systems*. Papers presented in the HIMSS First International Symposium.
- Malone, S. M. (2001). "Knowledge Management: White Knight or White Elephant?" *Topics in Health Information Management* 21(3): 33-43.
- Mathers, C., Vos, T. and Stevenson, C. (1999). *The Burden of Disease and Injury in Australia*. AIHW cat. no. PHE 17. Canberra: AIHW. AIHW cat. No. PHE 17. 5.
- Matokovic, B. (1994). "Prerequisite Matrix in Decision-making Process through the Business Systems Planning (BSP) Study of the Public Health Institute of Split." *Journal of Medical Systems* 18(1): 1-7.
- Matthews, P. (2000). "Planing for Successful Outcome s in the New Millennium." *Topics in Health Information Management* 20(3): 55-64.

- Medical Record Management Committee of Chinese Hospital Management Society (2001). *Practical Guideline for Hospital Medical Statistics*. Beijing: Medical Record Management Committee of Chinese Hospital Management Society.
- Medical Record Office of First Hospital of Suzhou University (2003). 'To Improve Quality of Front Page and Provide Accurate Medical Statistics Data'. <<http://www.sdfyy.cn/jgsz/xzbn/xxc/bas/baswz.htm>> (Accessed 11 Nov. 2003).
- Meng, Q. Y., Liu, X. Z. and Shi, J. S. (2000). "Comparing the services and quality of private and public clinics in rural China." *Health Policy Plan*. 15(4): 349-356. <<http://heapol.oupjournals.org/cgi/content/abstract/15/4/349>>.
- Meng, Q. Y., Sun, Q. and Hearst, N. (2002). "Hospital Charge Exemptions for the Poor in Shandong, China." *Health Policy Plan*. 17(90001): 56-63. <[http://heapol.oupjournals.org/cgi/content/abstract/17/suppl\\_1/56](http://heapol.oupjournals.org/cgi/content/abstract/17/suppl_1/56)>.
- Meng, X. H. and Jiang, Q. C. (2003). "Study on Health Service Needs and Utilisation of Undergraduates in Anhui Province (in Chinese)." *Chinese Health Economics* 22(12): 46-8.
- Miao, M. (2003). "Government Macro Responsibilities in Health Reform and Development (in Chinese)." *Chinese Health Economics* 22(5): 6-7.
- Miles, M. B. (1979). "Qualitative Data as an Attractive Nuisance: The Problem of Analysis." *Administrative Science Quarterly* 24: 590-601.
- Milne, R., Booth-Clibborn, N. and Oliver, S. (2000). "Consumer health information needs to be rigorous, complete, and relevant." *BMJ* 321(7255): 240-. <<http://bmj.com>>.
- MOH (1985). *National Rural Health Service Research: Data and Report (internal publication, in Chinese)*. Beijing: MOH.
- MOH (1986). *National Urban Medical Services Research: Data and Report (internal publication, in Chinese)*. Beijing: MOH.
- MOH (1989a). *Forty Years Health Statistics Information in China: 1949-1988 (internal publication, in Chinese)*. Beijing: MOH.
- MOH (1989b). *Methods on Managing Hospital (departmental policy document, in Chinese)*. Beijing: MOH. 1-2.
- MOH (1989c). *Policies on Put Social and Private Medical Practice In Order (in Chinese)*. Beijing: MOH. 1-2.
- MOH (1994a). *Guideline of Medical Institution Planning (departmental policy document, in Chinese)*. Beijing: MOH. 1-2.
- MOH (1994b). *Implementation Regulation of Ordinance of Medical Institution Management (departmental policy document, in Chinese)*. Beijing: MOH. 1-7.

- MOH (1995). *Guideline of Regional Health Planning for Three Gorges Project Area (departmental policy document, in Chinese)*. Beijing: MOH. 1-5.
- MOH (1996). *To Strengthen Hospital Classified Management and Accreditation (departmental policy document, in Chinese)*. Beijing: MOH. 1-2.
- MOH (1999). *Research on National Health Services - An Analysis Report of the Second National Health Services Survey in 1998 (in Chinese)*. Beijing: Ministry of Health of China. 7-94.
- MOH (2000). *Tenth Five-Year Plan for Health Development (departmental policy document, in Chinese)*. Beijing: MOH. <[www.moh.gov.cn](http://www.moh.gov.cn)>.
- MOH (2001a). *Announcement on Amending Front Page of Hospital Medical Record (departmental policy document, in Chinese)*. Beijing: MOH. Health - Medical Administration [2001] 286.
- MOH (2001b). *Chinese Health Statistics Digest (internal publication, in Chinese)*. Beijing: CHSI.
- MOH (2001c). *Government Regulation on Health Statistical Information's Departmental Functions and Structure (department policy document, in Chinese)*. Beijing: Department of Personal Affairs of MOH. 122.
- MOH (2002a). *China's Health Statistical Survey Regulation (in Chinese)*. Beijing, People's Health Publisher.
- MOH (2002b). *Chinese Health Statistical Digest (internal publication, in Chinese)*. Beijing: Ministry of Health. 7.
- MOH (2002c). *Development Strategy for Online National Health Informatics 2003-2010 (departmental policy document, in Chinese)*. Beijing: MOH.
- MOH (2002d). *Health Statistical Survey Regulation (in Chinese)*. Beijing, People's Health Publisher.
- MOH (2002e). *Regulations of Health Statistical Investigation of China (in Chinese)*. Beijing: Ministry of Health. 29.
- MOH (2002f). 'Situation Analysis for Policy (SAP) in Shanxi, Guangxi and Zhejiang (in Chinese)'. <<http://www.moh.gov.cn>> (Accessed 23 May 2002).
- MOH (2002g). 'Total Health Expenditure in China (in Chinese)'. <<http://www.moh.gov.cn/statistics/digest03/t28.htm>> (Accessed 19 Nov. 2003).
- MOH (2003a). *Joint Report on HIV/AIDS Prevention and Treatment in China*. Beijing: MOH-WHO China HIV/AIDS Study Task Force. release by MOH in Dec. 2003.
- MOH (2003b). *Macro Economy and Health Development in China (in Chinese)*. Papers presented in the Minister Conference of WHO on Macro Economy and Health Development, Geneva, MOH.

- MOH (2003c). *National Health Information Modernisation Plan 2003-2010* (departmental policy document, in Chinese). Beijing: MOH. <<http://www.moh.gov.cn>>.
- MOH (2003d). 'Proposal of Third National Health Services Survey (in Chinese)'. <<http://www.moh.gov.cn/tjxxzx/dcyj/gjwsfwdc/1200309280005.htm>> (Accessed 13 Nov. 2003).
- MOH (2004). *Chinese Health Statistics Digest* (in Chinese). Beijing: CHSI. <<http://61.49.18.68/statistics/digest04/s32.htm>>.
- MOH and NDPC (2002). *Policies on Quicken Development of Urban Community Health Services* (departmental policy document, in Chinese). Beijing: MOH & NDPC. 1-4.
- MOH,NDPC,MOE et al. (1999). *Policies on Development of Urban Community Health Services* (departmental policy document, in Chinese). Beijing: 1-10.
- MOH & GLD (1996). *Decision on Several Issues of Strengthen Military Medical Management* (departmental policy document, in Chinese). Beijing: General Logistics Department, Chinese People's Liberation Army; MOH. 1-4.
- MOLSS (1999). 'Concepts of Regional Health Planning and Regional Medical Institution Planning (in Chinese)'. In Medical Insurance Company of MOLSS (Eds.). *Reform Policy and Management of China's Medical Insurance System*. Beijing, Chinese Labor and Social Security Publisher, pp. 1-9.
- MOLSS (2001). *Reform of Labour and Social Security: Yearbook of Labour and Social Security* (in Chinese). Beijing: Ministry of Labour and Social Security. <<http://www.molss.gov.cn/tongji/2001nj/08/8-19.htm>>.
- Mooney, G. (2003). "Health Information Management in the Australian Health Care System as a Whole." *Health Information Management* 21(2). <[http://www.himaa.org.au/members/journal/21\\_2\\_2003/mooney.asp](http://www.himaa.org.au/members/journal/21_2_2003/mooney.asp)>.
- MOPS (2004). 'Policy and Regulation for Residential Identification Card (departmental policy document, in Chinese)'. <<http://www.mps.gov.cn/webPage/showfagui.asp?ID=1027>> (Accessed 18 May 2004).
- Morrill, E., Jr, Oser, J. and Kusnetz, H. (1971). "Occupational Health Information Systems--Their Concepts and Functions." *Am J Public Health* 61(12): 2469-2473. <<http://www.ajph.org>>.
- Murray, C. J. and Lopez, A. D. (1997). "The utility of DALYs for Public Health Policy and Research: a Reply." *Bulletin of the World Health Organisation* 75(4): 377-81.
- Naisbitt, J. (1982). *Megatrends: Ten New Directions Transforming Our Lives*. New York, Warner Books, Inc.

- Nanjing Revolutionary Committee of the Kuomintang (2004). 'Several Suggestions on Community Health Service Development'.  
<[http://njmg.nj.gov.cn/cps/site/njmg/czyz-mb\\_a2004032618060.htm](http://njmg.nj.gov.cn/cps/site/njmg/czyz-mb_a2004032618060.htm)> (Accessed 18 May 2004).
- National Statistics (2003a). 'The Concept of Health Care in A system of Health Accounts'.  
<<http://www.statistics.gov.uk/healthaccounts/system.asp>> (Accessed 11 June 2004).
- National Statistics (2003b). 'International Comparison of Total Health Expenditure'.  
<<http://www.statistics.gov.uk/healthaccounts/>> (Accessed 11 June 2004).
- NBS (2002a). 'Functions of National Bureau of Statistics'. <[www.stats.gov.cn](http://www.stats.gov.cn)>  
(Accessed 15 March 2002).
- NBS (2002b). 'Review on NBS history: Commemorating 50th Anniversary of the National Statistics Bureau'.  
<<http://www.stats.gov.cn/50znjn/tjdsj/200208060247.htm>> (Accessed 10 July 2003).
- NBS (2002c). 'Yearbook of Statistics 2001 (CD version)'. (Accessed 11 March 2003).
- NBS (2003a). 'Annual Statistics Report 2002'. <<http://www.stats.gov.cn>> (Accessed 2 April 2004).
- NBS (2003b). 'Remarks by Ms. Carol S. Carson at the 20th Anniversary of the Statistical Law of China'.  
<<http://www.stats.gov.cn/english/newsandcomingevents/200312090056.htm>>  
(Accessed 17 Feb. 2004).
- NBS (2004). 'Adjustments on National Census (in Chinese)'.  
<[http://www.stats.gov.cn/zgjpc/jysh/t20040210\\_402141443.htm](http://www.stats.gov.cn/zgjpc/jysh/t20040210_402141443.htm)> (Accessed 12 May 2004).
- NDPC, MOF and MOH (1999). *Guideline of Regional Health Planning (departmental policy document, in Chinese)*. Beijing. 1-8.
- Newell, A. and Simon, H. A. (1972). *Human Problem Solving*. Englewood Cliffs, N. J., Prentice-Hall.
- Nilsson, T. and Ljunggren, G. (2003). *European Commission - Health Monitoring Program: Health Information System in Europe: Structure and Processes (Country Report Sweden)*. Centrum for Gerontologi och Halsökonomi.
- Ning, Y. and Ren, R. (2003). "Progress of Health Service Efficiency Evaluation Techniques." *Chinese Journal of Health Economics* 22(11): 49-51.
- Nolan, R. L., Brennan, J., Coyne, K. P. et al. (1998). "Connectivity and Control in the Year 2000 and Beyond." *Harvard Business Review* 76(4): 148.

- Nolan, R. L. and Croson, D. C. (1995). *Creative Destruction: A Six-Stage Process for Transforming the Organisation*. Boston, Harvard Business School Press.
- Norman, D. A. (1986). 'Cognitive Engineering'. In Norman, D. A. and Draper, S. W. (Eds.). *User Centred System Design: New Perspectives on Human-Computer Interaction*. Hillsdale, NJ, Lawrence Erlbaum Associates, pp. 31-61.
- NPFPC (2003). 'Introduction on Population and Family Planning Committee'. <<http://www.chinapop.gov.cn/department/department.asp#tag2>> (Accessed 11 March 2003).
- Oberlander, J. (2002). "The US health care system: On a road to nowhere?" *CMAJ* 167(2): 163-168. <<http://www.cmaj.ca/cgi/content/abstract/167/2/163>>.
- O'Carroll, P., Friede, A., Noji, E. et al. (1995). "The Rapid Implementation of a State-wide Emergency Health Information System During the 1993 Iowa Flood." *Am J Public Health* 85(4): 564-567. <<http://www.ajph.org/cgi/content/abstract/85/4/564>>.
- Office for National Statistics (2002). *The Governance of Official Statistics in the UK: The new Arrangement for National Statistics and Current Influences*. Papers presented in the Conference of National Statistics System Governance, Singapore.
- Palme, S. and Torgerson, D. J. (1999). "Definitions of Efficiency." *BMJ* 318(24 April): 1136.
- Pan, C. M., Tian, X. B., Zhang, X. F. et al. (2002). "Willingness of Nanchong Urban Residences on Medical Services Utilisation (in Chinese)." *Journal of North Sichuan Medical College* 17(3): 118-20.
- Pan, F., Hu, H. and Yu, C. H. (2002). "Casemix Plan and Casemix Index based on China's Patient Medical Record Abstract (in Chinese)." *Chinese Journal of Hospital Management* 17(1): 34-6.
- Pandolfini, C. and Bonati, M. (2002). "Follow up of quality of public oriented health information on the world wide web: systematic re-evaluation." *BMJ* 324(7337): 582-583. <<http://bmj.com>>.
- Pappaioanou, M., Malison, M., Wilkins, K. et al. (2003). "Strengthening Capacity in Developing Countries for Evidence-Based Public Health: The Data for Decision-Making Project." *Social Science & Medicine* 57(10): 1925-37.
- Parker, J. M. (1995). *Information Technology and Telecommunications in Health in Queensland*. Papers presented in the 3rd National Health Information Conference (HIC'95), Adelaide, Australia. 1-7.
- Parker, M. M., Benson, R. J. and Trainor, H. E. (1988). *Information Economics: Linking Business Performance to Information Technology*. Englewood Cliffs, Prentice Hall, NJ.

- Pei, L. K. (1998). *Hospital Management in a Time of Change: the Need for Management Training (and Policy Reform) in the Teaching Hospitals in Yunnan*. (PhD). Melbourne: Faculty of Health Sciences School of Public Health, La Trobe University: 52.
- Peng, Y., Chen, S. X. and He, Z. G. (1999). "Application and Development of the Cost Accounting in Hospitals (in Chinese)." *Academic Journal of Second Military Medical University*(7): 12-35.
- People's Daily (1998). 'Premier Zhu Rongji Identified Four Roles for CCTV Focus Discussion: Public's Auditor, Mass's Voice, Government's Mirror and Reform Pioneer'. *People's Daily* (Oct. 8, 1998): p. 1.
- People's Daily (2000). 'Population and Population Census'.  
<<http://www.people.com/GB/channel1/10/20001023/282986.html>> (Accessed 19 Jan 2004).
- People's Daily (2002a). 'China's Statistics Open, Transparent, Say IMF Official'. *People's Daily* (Aug. 9, 2002): p.  
<[http://english.peopledaily.com.cn/200208/08/eng20020808\\_101115.shtml](http://english.peopledaily.com.cn/200208/08/eng20020808_101115.shtml)>.
- People's Daily (2002b). 'Reviewing Report on Representatives' Proposals (in Chinese)'.  
<<http://www.npcnews.com.cn/gb/paper381/1/class038100004/hwz226412.htm>> (Accessed 28 May 2004).
- People's Daily (2003). 'Zhang Wenkang Announced China is Safe for Living and Travelling (in Chinese)'.  
<<http://www.people.com.cn/GB/shizheng/19/20030404/962749.html>> (Accessed 5 Jan. 2004).
- Pipino, L. L., Lee, Y. W. and Wang, R. Y. (2002). "Data Quality Assessment." *Communications of the ACM* 45(April): 211-8.
- PKU (2003). 'Introduction of Department of Sociology of Peking University (in Chinese)'.  
<<http://www.beida-online.com/xueli/sociology.htm>> (Accessed 10 Dec. 2003).
- Pomfret, R. (1996). 'The Asian Transition Economics'. In Richard Pomfret (Eds.). *Asian Economics in Transition - Reforming Centrally Planned Economics*. Cheltenham, Edward Elgar Publishing Limited, pp. 2-3.
- Popin, C. (2003). 'Institutions of Population in China'.  
<<http://www.cpirc.org.cn/jigou.html>> (Accessed 7 April 2003).
- Pun, A. and Holliday, J. (1991). "A computerised system to complement the CAP-workload recording method." *Australian Medical Record Journal* Mar. 21(1): 29-30.
- Purcell, G. P., Wilson, P. and Delamothe, T. (2002). "The quality of health information on the internet " *BMJ* 324(7337): 557-558. <<http://bmj.com>>.

- Qi, H. S. (1996). "Pro and Con of University and College Re-arrangement in the 1950s (in Chinese)." *Liaoning High Education Research*(8).  
<<http://www.rbqhjy.net/xueshuyanjiu/qhsyd.htm>>.
- Qian, Y. and Lin, P. (1998). "Redistributing health care facilities and optimising health resources allocation (in Chinese)." *Chinese Journal of Hospital Administration* 14(9): 4-7.
- Qian, Y. Y. and Wu, J. L. (2003). 'China's Transition to a Market Economy: How Far across the River?' In Hope, N. C., Yang, D. T. and Li, M. Y. (Eds.). *How Far Across the River: Chinese Policy Reform at the Millennium*, Stanford University Press, pp. 31-63.
- Qin, X., Ding, H., Li, G. L. et al. (2003). "An investigation of the rate of rural farmers suffering from chronic diseases in Zongyang county of Anhui province (in Chinese)." *Chinese Rural Health Service Administration* 23(12): 44-6.
- Qiu, J. B. (2000). 'Management of Information system'. In Qiu, J. (Eds.). *Principles of Information Management*. Beijing, Tsinghua University Publisher, pp. 188-9.
- Rao, K. Q. (2003). 'Economy on Transition and Health Sector Reform (in Chinese)'. <<http://www.moh.gov.cn>> (Accessed 16 March 2004).
- Rao, K. Q. and Chen, Y. D. (1999a). 'The Issues on Conducting the Standard of Health Resources Allocation (in Chinese)'. In social Development Department of National Commission of Development and Planning (Eds.). *Forum of Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 283-300.
- Rao, K. Q. and Chen, Y. D. (1999b). 'Research on the Standard of Medical Care Resource Allocation in China (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 272-82.
- Rao, K. Q., Liu, Y. L., Chen, Y. D. et al. (1998). "A Policy Study on Factors Affecting Utilisation of Outpatient Services in Rural Residency (in Chinese)." *Chinese Journal of Hospital Administration*(2): 2.
- Rawski, T. G. (2001a). "China by the Numbers: How Reform Affected China's Economic Statistics." *China Perspectives* 33(Jan/Feb): 25-34.
- Rawski, T. G. (2001b). *What's Happening to China's GDP Statistics?* Papers presented in the China Economic Review Symposium on Chinese Statistics, Beijing.
- Ren, R. (2000). "Regional Health Planning and Health Resource Allocation (in Chinese)." *Chinese Journal of Medicine and Philosophy* 21(5): 8-10.
- Ren, T. and Li, L. M. (1999). "Current Status and Trend of Global Burden of Disease and Approaches of Prevention and Control Program (in Chinese)." *Chinese Journal of Non-communicable Disease Control and Prevention* 17(1): 1-3.

- Ren, Z. P. (2004). 'To Plan The First Two Decades of The 21st Century: The Critical Period of China's Reform and Development (in Chinese)'. *People's Daily* (12 July 2004): p. 1. <<http://www.news.sohu.com/20040712/n220953733.shtml>>.
- Renhard, R. (2003). "Outcome Data and Quality: The Critical Role of Policy." *Health Information Management* 32(1).  
<[http://www.himaa.org.au/members/journal/21\\_2\\_2003/renhard.asp](http://www.himaa.org.au/members/journal/21_2_2003/renhard.asp)>.
- Research Centre for Chronic Disease and Risk Factors (1999). 'Report of Chinese Disease Surveillance Points 1998'. <[http://chinadsps.com/yufang/baogao\\_98.asp](http://chinadsps.com/yufang/baogao_98.asp)> (Accessed 23 Nov. 2003).
- Research Centre for Chronic Disease and Risk Factors (2003a). 'Introduction of Surveillance System'. <[http://www.chinadsps.com/yufang/en\\_jianjie.asp](http://www.chinadsps.com/yufang/en_jianjie.asp)> (Accessed 23 Nov. 2003).
- Research Centre for Chronic Disease and Risk Factors (2003b). 'Introduction on the National Disease Surveillance Point System (in Chinese)'. <<http://www.chinadsps.com/yufang/jianjie1.asp>> (Accessed 23 Nov, 2003).
- Richards, T. (2004). "Poor countries lack relevant health information, says Cochrane editor." *BMJ* 328(7435): 310-b-0. <<http://bmj.com>>.
- Rivard, D. and HKaiser, K. (1992). "The Benefits of Quality IS." *Datamation*(January): 53-8.
- Rong, S. D. and Li, J. H. (1981). "Statistical Analysis of Resident's Average Life Expectation of China, 1972-1995 (in Chinese)." *Journal of Population and Economy*(3): 23-5.
- Rusin, R. S. and Williams, A. M. (2001). "Challenges in Incorporating a Quality Strategy into Information systems Development Efforts." *Topics in Health Information Management* 21(4): 21-9.
- Schirnding, Y. v. (2002). "Health and Sustainable Development: Can We Rise to the Challenge?" *Lancet* 360(August 24): 632-7.
- Schwartz, J. B., Guilkey, D. K. and Racelis, R. (2002). *Decentralisation, Allocative Efficiency and Health Service Outcomes in the Philippines*. Chapel Hill: Carolina Population Centre University of North Carolina. 18-23.
- Shams, K. and Farishta, M. (2001). "Data Warehousing: Toward Knowledge Management." *Topics in Health Information Management* 21(3): 24-32.
- Shannxi Finance Bureau, Planning Commission and Health Bureau (2001). *Standard of Health Resource Allocation for Shannxi Province (in Chinese)*. Xian: Shannxi Finance Bureau, Planning Commission and Health Bureau,. 1-6.  
<<http://www.37c.com.cn/literature/library/law/law03.asp?name=%C9%C2%CE%F7%C...>>.

- Shanxi Medical University (2002). 'Introduction of the First Hospital of Shanxi Medical University'. <<http://www.sxmu.edu.cn/hospital/introduce/index1.htm>> (Accessed 6 April 2004).
- Shaw, R. and Smith, P. (2001). *Health Care UK 2001: Allocating Health Care Resources to Reduce Health Inequalities*. 7-13.
- She, J. (1999). 'Regional Health Planning and the Traditional Chinese Medicine (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 132-8.
- Shen, Y. F., Li, M. C. and Zhang, H. X. (1999). "A study on the need of 1 000 old people for health services and the purpose of community health services (in Chinese)." *Chinese Journal of Hospital Administration*(12): 27-30.
- Shentu, M. J., Xu, H. F., Zhang, X. Y. et al. (2002). "Investigation on Patients' Demand in the Circumstance of Medical Treatment Reform (in Chinese)." *Journal of Nursing Science* 17(5): 370-1.
- Shenzhen Government (2003). *Regional Health Planning of Shenzhen City 2001-2003 (in Chinese)*. Shenzhen City, Guangdong Province: Shenzhen Government. (2003) 59. 1-10.
- Shenzhen Library (2003). 'Briefing Health Undertaking of Shenzhen (in Chinese)'. <<http://www.szlib.net.cn/szgl/weisheng/weisheng/htm>> (Accessed 6 April 2004).
- Shenzhen Social Science Association (2004). 'Migrating Population of Shenzhen City (in Chinese)'. <<http://www.finance.sina.com.cn/g/20040530/1715786031.shtml>> (Accessed 12 June 2004).
- Shenzhen Statistics Bureau (2002). 'Introduction of Shenzhen City (in Chinese)'. <<http://www.szjtj.com/sztjpublic/szgj/>> (Accessed 2 April 2004).
- Shi, G. (2004). 'Market Failure, Government Failure, Third Party Failure, and Health Reform (in Chinese)'. <<http://www.social-policy.info/986.htm>> (Accessed 12 Jan 2004).
- Shi, Y. P., Quan, K. M., Shen, Y. Y. et al. (2003). "Occupational Health Demands, Utilisation and Further Improvement in Beijing Foreign Venture Enterprises (in Chinese)." *Modern Preventive Medicine* 30(5): 676-7.
- SIC (2001). 'Functions of State Information Centre'. <[www.sic.gov.cn](http://www.sic.gov.cn)> (Accessed 10 Dec. 2001).
- Singer, P. A. (2001). "Vision is needed to address problem of global health information." *BMJ* 322(7287): 673b-. <<http://bmj.com>>.
- Slater, C. H. (1999). "Outcomes research and community health information systems." *Journal of Medical Systems* 23(4): 335-47.

- Slater, M. D. and Zimmerman, D. E. (2003). "Descriptions of Web Sites in Search Listings: A Potential Obstacle to Informed Choice of Health Information." *Am J Public Health* 93(8): 1281-1282. <<http://www.ajph.org>>.
- Smith, C. S. (2001). 'China Reports 7.8% Growth in Economy'. *New York Times* (July 18, 2001): p. W1.
- Smith, P.,TA, S.,Carr-Hill, R. et al. (1994). "Allocating Resources to Health Authorities: Results and Policy Implications of Small Area Analysis of Use of Inpatient Services." *BMJ* 309: 1050-54.
- Smithson, S. and Hirschheim, R. (1998). "Analysing Information Systems Evaluation: Another Look at an Old Problems." *European Journal of Information Systems* 7(3): 158-74.
- Sociology Department of Tsinghua University (2004). *Harmonised Economic and Social Development in China: Background Report for Senior Seminar of Development in China (in Chinese)*. Beijing: Tsinghua University,. 1-9. <<http://www.ccgov.org.cn/ldwx/chunj/chj0448.htm>>.
- Song, J. W. (2004). 'Relationship between Equity and Efficiency (in Chinese)'. <<http://www.cp.org.cn/2233/ReadNews.asp?NewsID=2652>> (Accessed 24 June 2004).
- Song, W. K. (1999). 'Working Procedure on Agenda of Regional Health Planning (in Chinese)'. In Chinese health economic training and research network (Eds.). *Reports of Chinese health economic training and research network*. Beijing, Beijing Medical University Press, pp. 15-6.
- Song, W. K. and Ren, H. X. (1999). 'Organisation and Management of Regional Health Planning (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 111-24.
- Southard, P. B., Hong, S. and Siau, K. (2000). *Information Technology in the Health Care Industry: A Primer*. Papers presented in the 33rd Hawaii International Conference on System Sciences, Hawaii.
- State Council (1979). *MOH Report on National Health Conference Attended by Provincial Health Director Endorsed by the State Council (in Chinese)*. Beijing: the State Council. 14.
- State Council (1980). *State Council Approves MOH Report on Allowing Individual Private Medical Practices (in Chinese)*. Beijing: State Council. 1.
- State Council (1985a). *MOH Report on Several Political Issues of Health Work Reform- Endorsed by the State Council (in Chinese)*. Beijing: State Council. 1.
- State Council (1985b). *State Council Approves MOH Report on Several Political Issues of Health Reform (in Chinese)*. Beijing: State Council. 1-3.

- State Council (1994). *Ordinance of Medical Institution Administration (in Chinese)*. Beijing: State Council. 1-5.
- State Council (1996). 'Statistics Law (in Chinese)'. In Ministry of Health (Eds.). *National Health Statistics System*. Beijing, Ministry of Health, pp. 3.
- State Council (1998). *Ministry of Health: institution's structure, responsibility, and personal allocation (in Chinese)*. Beijing: State Council. 329.
- State Council (2002). *General Plan of West China Development in the Tenth Five Year Plan Period (in Chinese)*. Beijing: Office of Leading Group of China West Development, State Council.
- State Council,NDPC,NETC et al. (2000). *Policies on Urban Medical and Pharmaceutical System Reform (in Chinese)*. Beijing.
- Stewart, J.,Schroeder, D.,Marsh, D. et al. (2001). "Assessing a computerised routine health information system in Mali using LQAS." *Health Policy Plan*. 16(3): 248-255. <<http://heapol.oupjournals.org/cgi/content/abstract/16/3/248>>.
- Strong, D. M., Lee, Y. W. and Wang, R. Y. (1997a). "10 Potholes in the Road to Information Quality." *Computer* 1997(August): 38-46.
- Strong, D. M., Lee, Y. W. and Wang, R. Y. (1997b). "Data Quality in Context: A New Study Reveals Business are Defining Data Quality with the Consumer in Mind." *Communications of the ACM* 40(5): 103-10.
- Sule, S. (2004). "Community Participation in Health and Development." *Niger J Med*. 13(2): 276-81.
- Sun, C. Y. (2004). 'Series Report on Household Registration System (in Chinese)'. <<http://www.mps.gov.cn/webPage/showfagui.asp?ID=1325>> (Accessed 18 May 2004).
- Takunpao (2004a). 'China's State Council Plans to Use Ten Years to Establish Law-based Government (in Chinese)'. <<http://www.takunpao.com:8080/>> (Accessed 02 Feb. 2004).
- Takunpao (2004b). 'Shanghai Mayor Bitterly Attached Industrial Association'. *Takunpao (March 3, 2004)*: p. <<http://www.takunpao.com:8080/>>.
- Tan, J. K. H. and Modrow, R. E. (1999). "Strategic Relevance and Accountability Expectations: New Perspectives for Health Care Information Technology Design." *Topics in Health Information Management* 19(4): 84-97.
- Tang, X. L.,Jiao, J. G.,Li, A. L. et al. (2001). "Survey of quality of life among aging population in the rural areas of Qionghai in Hainan (in Chinese)." *Chinese Journal of Rehabilitation Theory and Practice* 7(2): 76-8.
- Tao, Y. Z. (2001). 'Pushing Statistical Information Innovation in the Tenth-Five-Year Planning Period (in Chinese)'

- <<http://www.stats.gov.cn/tjjj/tigggyi/1200203310295.htm>> (Accessed 20 Jan. 2004).
- Taylor, A. G. (1999). *The Organisation of Information*. Englewood, Colo: Libraries Unlimited.
- Taylor, J. (2003). 'WHO Believes More Cases of SARS in China'.  
<<http://www.abc.net.au/cgi-bin/common/printfriendly.pl?http://www.abc.net.au/am/content/2003/s834337.htm>> (Accessed 15 March 2004).
- Tchokobou, B.,Leduff, F.,Beux, P. et al. (2003). "Health Data Management and Strategic Management in Brittany: Some Practical Problems." *Studies in Health Technology & Informatics* 95: 839-44.
- Tian, G. Y.,Tian, X. F.,Zhou, W. et al. (2002). "Study on medical needs and health service utilisation of the basic level officers and soldiers of Chinese People's Armed Police Forces (in Chinese)." *ACTA Academiae Medicinae Cpapf* 11(2): 99-101.
- Tian, M. S., Li, W. and Zhao, Y. F. (2003). "To Implement Regional Health Planning and to Push Urban Medical System Reform (in Chinese)." *Chinese Health Economics* 22(3): 43-4.
- Tianjin Health Bureau (2000). *ICD and Statistics of Causes of Death (internal publication, in Chinese)*. Tianjin, Tianjin Health Bureau.
- Tianjin Planning Commission, Finance Bureau and Health Bureau (2002). *Standard of Health Resource Allocation for Tianjin City (in Chinese)*. Tianjin: Tianjin Planning Commission, Finance Bureau and Health Bureau,. 1-3.
- Toffler, A. (1980). *The Third Wave*. New York, William Morrow and Company Inc.
- Tolhurst, R.,Zhang, T.,Yang, H. et al. (2003). "Improving Maternal and Infant Health Care For the Rural Poor? A Case Study of the Implementation of Maternal and Infant Health Care Law in Two Poor Counties." *Development Bulletin, Development Studies Networks* 61(May 2003): 25-28.
- Tolhurst, R.,Zhang, T.,Yang, H. et al. (2004). "Factors Affecting the Implementation of Health Legislation and Its Impact on the Rural Poor in China: A Case Study of Implementation of the Maternal and Infant Health Care Law in Two Poor Countries." *International Journal of Health Planning and Management* 19: 247-65.
- Toms, E. G. (2002). "Information Interaction: Providing a Framework for Information Architecture." *Journal of the American Society for Information Science and Technology* 53(10): 855-62.

- Trewin, D. (2001). *The Importance of a Quality Culture*. Papers presented in the Statistics Canada Symposium 2001: Achieving Data Quality in a Statistical Agency: a Methodological Perspective, Ottawa.
- Tsinghua University (2004). 'General Information of Tsinghua University: History of Tsinghua University'. <<http://www.tsinghua.edu.cn/eng/about/index.htm>> (Accessed Oct. 12 2003).
- Tuffs, A. (2002). "German health ministry forum monitors quality of health information." *BMJ* 324(7337): 568a-. <<http://bmj.com>>.
- United Nations (2000). *United Nations Millennium Declaration*. Geneva: United Nations. A/RES/55/2. <<http://www.un.org>>.
- University Newsletter of Zhongshan University (2003). 'Legislative Herald of Government Information Transparency in China: Guangzhou FOI: The First Local Legislation'. <<http://www.zsu.edu.cn/publication/get/campaper/114/9.html>> (Accessed 24 Jan. 2004).
- VicHealth (2003). *The Partnership Analysis Tool: For Partner in Health Promotion*. Melbourne: Victorian Health Promotion Foundation. 3. <<http://www.vichealth.vic.gov.au>>.
- Wan, P. (2003). 'To Balance the Importance of Physical Science and Social Science'. <[http://www.sd.nankai.edu.cn/kuaidi/prin\\_20030416\\_2.htm](http://www.sd.nankai.edu.cn/kuaidi/prin_20030416_2.htm)> (Accessed 10 Dec. 2003).
- Wan, Q., Zhao, Y. X. and Fang, H. (2003). "Research on the Vertical Fairness and Progression of Health Financing (in Chinese)." *Chinese Health Economics* 22(3): 4-6.
- Wang, B. Z. and Zhang, M. R. (2003). "Analysis on Scale and Structure of China's Total Health Expenditure 1995-2000 (in Chinese)." *Chinese Health Economics* 22(4): 23-5.
- Wang, F., Cheng, M. J. and Wang, H. (2003). "Discussion on China's Migrate Population's Health Insurance Approaches (in Chinese)." *China Public Health* 19(1): 125-6.
- Wang, H. M. (2003). "Discussion on Relationship between Equity and Efficiency (in Chinese)." *University Transaction of Southwest Normal University*(12): 34-65.
- Wang, J. and Meng, Q. Y. (2003). "The Progress of Analysis Method of Priority Setting in Health Research (in Chinese)." *Chinese Health Economics* 22(7): 37-8.
- Wang, K. (2001). 'Strategies and Suggestions for China's Social Science Development (in Chinese)'. <<http://www.people.com.cn/GB/guandian/30/200010830/547770.htm>> (Accessed 10 Dec. 2003).
- Wang, K. J., Dai, L. P. and Zhang, M. (2002). "Health Service Demands and Utilisations of Rural Residences (in Chinese)." *China Public Health* 18(7): 854.

- Wang, L. S., Ma, J. and Xing, Y. Y. (2004). "Trends of Changing Health Service Needs and Demands in Rural Areas: Report on Strategic Study on Rural Health Planning (in Chinese)." *Chinese Health Economics* 23(1): 21-4.
- Wang, N. (2002a). *Globalisation and Chinese Culture: Confront or Dialog (in Chinese)*. Beijing, Peking University Publisher. Tsinghua University, Department of Foreign Language.
- Wang, R. Y., Kon, H. B. and Madnick, S. E. (1993). *Data Quality Requirements analysis and Modelling*. Papers presented in the Ninth International Conference on Data Engineering, Vienna, Austria.
- Wang, R. Y., Storey, V. C. and Firth, C. P. (1995). "A Framework for Analysis of Data Quality Research." *IEEE Transactions on Information Technology in Biomedicine* 7(4): 623-40.
- Wang, S. G. (2002b). "Political Logics of Chinese Government Financial Transfer Scheme (in Chinese)." *Strategy and Management*(3): 2-10.
- Wang, X. W. and Chen, X. H. (2003). "Motive and Policy Selected of Health Care System Reform." *Chinese Health Economics* 22(6): 27-9.
- Wang, X. W. and Liu, L. H. (1999). 'Regional Health Planning and Regional Health Policy (in Chinese)'. In Chinese Health Economic Training and Research Network (Eds.). *Reports of Chinese Health Economic Training and Research Network*. Beijing, Beijing Medical University Press, pp. 45-55.
- Wang, Y. M. and Zhu, G. L. (2004). 'Voice from Chinese Rural Area: Medical Expense is the Heaviest Burden (in Chinese)'.  
<<http://news.anhuinews.com/system/2004/01/20/000547403.shtml>> (Accessed 20, Feb 2004).
- Wang, Y. N. (2004). 'Hot and Difficult Topics of Consumer Rights Protection - a Report of National Consumer Association (in Chinese)'. *Beijing Morning Post (15 March, 2004)*: p. 1.
- Wang, Y. X. (2000). "Regional Health Planning and Health Resource Allocation (in Chinese)." *Chinese Journal of Medicine and Philosophy* 21(1): 9-12.
- Wei, F., Wright, K., Heaton, T. et al. (1996). "A regional integrated information system to assure maternal-child health services: a progress report." *American Journal of Preventive Medicine* 12(4 Suppl): 20-5.
- Wei, Y. and Du, L. X. (1998). *Health Economics and Health Finance Management (in Chinese)*. Beijing, People's Health Publisher. CHEI of MOH, Beijing.
- West, L. A. and Wong, C. P. W. (1995). "Fiscal Decentralisation and Growing Regional Disparities in Rural China: Some Evidence in the Provision of Social Services." *Oxford Review of Economy Policy* 11(4): 70-84.

- WHO (1994). *Implementation of the Global Strategy for Health For All by the Year 2000. Vol 2, Africa Region, Second Evaluation, Eighth Report on the World Health Situation*. Brazzaville: World Health Organisation Regional Office Africa. 10.
- WHO (2000). *The World Health Report 2000: Health System: Improving Performance: Statistical Annex*. Geneva: WHO. 190.
- WHO (2002). 'Chapter 5 Evaluation of Health Information System'. In Sapirie, S. (Eds.). *Design and Implementation of Health Information System*. Beijing, People's Health Publisher, pp. 53.
- WHO (2003a). *Health Systems, Including Primary Health Care*. Geneva: WHO. EB113/11. 1, 4.
- WHO (2003b). 'Responsible and Task of WHO Collaborating Centre'. <<http://imicams.ac.cn/gb/who/report1.htm>> (Accessed 24 Nov. 2003).
- WHO (2004). 'About WHO'. <<http://www.who.int/about/en/>> (Accessed 10 Jan. 2004).
- WHO/AFRO (1999). *Final Report on Working Group for the Evaluation of Approaches, Methodologies and Tools Developed for the Strengthening of National Health Information Systems in Africa*. Lome: WHO/AFRO. 1-27. <<http://www.afro.who.int/his/publications/overview.html>>.
- Williams, R. and Wright, J. (1998). "Health needs assessment: Epidemiological issues in health needs assessment." *BMJ* 316(7141): 1379-1382. <<http://bmj.com>>.
- Wilson, P. and Risk, A. (2002). "How to Find the Good and Avoid the Bad or Ugly: a Short Guide to Tools for Rating Quality of Health Information on the Internet. Commentary: On the Way to Quality." *BMJ* 324(7337): 598-602. <<http://bmj.com>>.
- Wolf, T. A. (1990). "Reference." *Seasonal Journal of IMF and World Bank*(3).
- Wong, B. A. and Gabriel, S. J. (1998). 'The Influence of Economic Liberalisation on Urban Health Care Access in the People's Republic of China'. <<http://www.metholyoke.edu/courses/sgabriel/health.htm>> (Accessed 16 March 2004).
- Word IQ (2004). 'Politics of China'. <[http://www.wordiq.com/definition/politics\\_of\\_the\\_people's\\_republic\\_of\\_china](http://www.wordiq.com/definition/politics_of_the_people's_republic_of_china)> (Accessed 24 May 2004).
- World Bank (1993). *The World Bank Development Report 1993: Investing in Health*. Washington DC: World Bank.
- World Bank (1995). *China: Macroeconomic Stability in a Decentralised Economy*. Washington, D.C.: World Bank.
- World Bank (1997). *Financing Health Care: Issues and Options for China*. Washington, D.C.: The World Bank.

- World Bank (1998). *China: Managing Public Expenditure for Better Results*. Washington, D.C.: The World Bank.
- World Bank (2002a). 'Integrated Regional Health Development.'  
<<http://www.worldbank.org.cn/English/other/contentdetail.asp>> (Accessed 10 May 2002).
- World Bank (2002b). 'Qualitative Methods'.  
<<http://www.worldbank.org/proverty/impact/methods/qualitative.htm>> (Accessed 2 April 2004).
- WPRO (2001). 'Health Information and Evidence for Policy'. In WPRO (Eds.). *The Work of WHO in the Western Pacific Region: Report of the Regional Director - 1 July 2000 - 30 June 2001*. Manila, WPRO, pp. 179-84.
- Wright, J. and Walley, J. (1998). "Health needs assessment: Assessing health needs in developing countries." *BMJ* 316(7147): 1819-1823. <<http://bmj.com>>.
- Wright, J., Williams, R. and Wilkinson, J. R. (1998). "Health needs assessment: Development and importance of health needs assessment." *BMJ* 316(7140): 1310-1313. <<http://bmj.com>>.
- Wu, J., Li, Z., Ye, R. W. et al. (2003). "Equalities in Health and Relative Changes in Yuzhong County of Shannxi Province (in Chinese)." *Chinese Journal of Public Health* 19(2): 225-7.
- Wu, L. (2003a). "Description on Economic Functions of Chinese Government 1949-2002 (in Chinese)." *Chinese Study on Economic History*(4).  
<<http://www.xslx.com/hm/jjlc/jjzx/2003-12-31-15796.htm>>.
- Wu, L. (2003b). 'Review and Evaluation on China's Planned Economy (in Chinese)'.  
<[http://www.cass.net.cn/chinese/s01\\_jjs/grxszlzgxds/wuli/lw030911.htm](http://www.cass.net.cn/chinese/s01_jjs/grxszlzgxds/wuli/lw030911.htm)>  
(Accessed 14 Jan. 2004).
- Wu, M. and Wang, H. (1999). 'The Research of Allocation Criterion of Health Resources (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 259-71.
- Wu, S. (2001). *Latent Rule: Real Games in Chinese History (in Chinese)*. 2. Kunming, Yunnan People's Publisher.
- Wu, S. D., She, M. X., Lu, J. et al. (2000). "Research on Occupational Health Service Model Adopted in Small-scale Industries (in Chinese)." *Journal of Occupational Medicine* 17(3): 138-41.
- Wu, S. Z. (1999a). 'Reviewing the Fei Xiaotong's Collection (in Chinese)'.  
<[http://www.gmdaily.com.cn/0\\_ds/1999/19991020/GB/ds^271^0^DS705.htm](http://www.gmdaily.com.cn/0_ds/1999/19991020/GB/ds^271^0^DS705.htm)>  
(Accessed 10 Dec. 2003).

- Wu, X. L., Mao, J. W., Chen, Y. D. et al. (1999). "Chinese Health Resources in 1980s and 1990s (in Chinese)." *Chinese Journal of Health Care Management* 127(1): 26-9.
- Wu, X. Y., Li, X. Y. and Li, M. C. (2004). "Contents and Customers of Community Health Services in Two Districts of Urban Beijing (in Chinese)." *Chinese General Practice* 7(7): 485-6.
- Wu, X. Z. (1999b). 'Critical Thinking on Unify and Open Policy (in Chinese)'. In Wu, X. (Eds.). *Critical Thinking on Tradition*. Beijing, Huawen Publisher, pp.
- Wu, Z. S. (1999c). 'Address for Publishment of Fei Xiaotong Corpus (in Chinese)'. *Guangming Daily* (20 Oct. 1999): p. 6.  
<[http://www.gmdaily.com.cn/0\\_ds/1999/19991020/GB/ds^271^0^DS705.htm](http://www.gmdaily.com.cn/0_ds/1999/19991020/GB/ds^271^0^DS705.htm)>.
- Xi, T. (2002). 'Transition of Government Managerial Functions in China'. In Chinese Social Academy Institute of Public Policy (Eds.). *Analysis of Public Policies of China*. Beijing, Social Science Publisher, pp. 57.
- Xin, S. S. (2003). 'SARS - One of Seven Significant Event in Chinese IT in 2003 (in Chinese)'.  
<<http://publish.it168.com/2003/1120/20031120031701.shtml?cChanNel=13&positioncode=305>> (Accessed 18 Feb. 2004).
- Xinhua Net (2003). 'Tenth National People's Congress Plans Reviewing 59 Proposals Within Five Years (in Chinese)'. <[http://www.news.xinhuanet.com/zhengfu/2003-12/18/content\\_1237102.htm](http://www.news.xinhuanet.com/zhengfu/2003-12/18/content_1237102.htm)> (Accessed 28 May 2004).
- Xinhua Net (2004). 'Legislation Plan of Tenth National People's Congress (in Chinese)'. <[http://www.news.xinhuanet.com/zhengfu/2004-01/09/content\\_1268128.htm](http://www.news.xinhuanet.com/zhengfu/2004-01/09/content_1268128.htm)> (Accessed 28 May 2004).
- Xinhua News Agency (2003). 'National Development and Planning Commission Will be Restructured as National Development and Reform Commission'. <<http://www.cer.net/article/20030306/3079141/shtml>> (Accessed 6 April 2003).
- Xiong, P., Guo, P. and Yang, Z. Y. (2002). "Discussion on DRG of Injury and Poisoning (in Chinese)." *Journal of Mathematical Medicine* 15(3): 238-41.
- Xu, C. G. and Zhuang, J. Z. (1998). 'Why China Grew: the Role of Decentralisation'. In Boone, P., Gomulka, S. and Layard, R. (Eds.). *Emerging from Communism: Lessons from Russia, China, and Eastern Europe*. Cambridge, MA, MIT Press, pp. 201.
- Xu, L. W., Chen, D. E., Wang, X. H. et al. (2003). "Health Service Utilisation of Retried Workers in Community of Hangzhou City (in Chinese)." *Zhejiang Journal of Preventive Medicine* 15(9): 48-9.
- Xu, Y. S. and You, J. W. (2002). 'The In-depth Context and the Most Difficulty of Local Government Re-structuring (in Chinese)'. <<http://www.mpa.3322.net>> (Accessed 25 Jan. 2004).

- Xu, Y. Y., Zhao, Q. B. and Yan, Y. X. (2001). "Introduction on China's Casemix Plan Study." *Chinese Journal of Hospital Administration* 17(10): 586-8.
- Yan, Y. X., Pan, F. and Xu, Y. Y. (2001). "Casemix Study of Inpatient Treatment Service in Hospital Internal and Surgical Department (in Chinese)." *Chinese Journal of Hospital Administration* 17(10): 588-90.
- Yang, B. (2003a). 'Health Resource Allocation: Provide Timely Help is More Important than Bless With a Double Portion of Good Fortune (in Chinese)'.  
<<http://www.thebeijingnews.com/2003-12-1/200312132413.htm>> (Accessed 24 June 2004).
- Yang, H. (1999a). "A Rapid Survey of the Current situation of Urban Community Health Service Programs in China (in Chinese)." *Chinese Journal of Primary Health Care* 16(2): 28-30.
- Yang, J., Xu, W. G. and Chen, Z. X. (2003). "Government's Orientation and Function Transition in Medical Service Marketisation." *Hospital Management Forum (in Chinese)* 86(12): 13-15.
- Yang, J. S. (2002). 'Current Situation of Chinese Intellectuals'.  
<<http://www.dajun.com.cn/zhishifenzi.html>> (Accessed 19 March 2004).
- Yang, K., Liu, J. Z. and Xu, J. (2001). "Study on dust hazard and hygienic demand in township and village cement factories (in Chinese)." *Chinese Journal of Industrial Medicine* 14(4): 247-8.
- Yang, M., Bryant, J. and Henry, P. (1982). "Background of US-PRC Government Cooperation in Health: Descriptive Study and Workshop on Health Services in Shanghai County." *American Journal of Public Health* 72(9): 9-11.
- Yang, Q. (2003b). "Relationship Between Age, Gender, Education and Community Health Service Demands (in Chinese)." *Chinese Journal of Public Health Management* 19(3): 280-1.
- Yang, Q. Y. (1999b). 'The Cardinal Principles and Policy Measures of Regional Health Planning (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 1-15.
- Yang, Y. B. (2000). "China's Sociologist Take Social Development as Their Responsibility (in Chinese)." *People's Forum* 12: 2.  
<<http://www.booker.com.cn/gb/paper18/7/calss001800010/hwz56471.htm>>.
- Yang, Z. G., Xu, J., Ni, L. Z. et al. (2003). "Analysis on Health Demand in the Rural Area of Feixi County (in Chinese)." *Chinese Journal of Disease Control and Prevention* 7(6): 497-500.

- Yangcheng Evening News (2003). 'Government Leads Progress of Health Informatics'. <[http://www.ycwb.com/gb/content/2003-11/29/content\\_608274.htm](http://www.ycwb.com/gb/content/2003-11/29/content_608274.htm)> (Accessed 7 April 2004).
- Yin, L. (1999). 'In Theory and in Practice: Regional Health Planning (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 35-43.
- Yin, L. (2003). 'To Strengthen Public Health Construction and to Promote Harmonised Social and Economic Development - A top Level Workshop in Zhongnanhai (in Chinese)'. (Accessed 23 June 2003).
- Yip, W. C. and Hsiao, W. C. (1997). "Medical savings accounts: lessons from China." *Health Aff* 16(6): 244-251. <<http://content.healthaffairs.org>>.
- Yu, X. J. (2002). "Estimate on Population Size and Structure based on the Fifth Population Census (in Chinese)." *Population Study*(3): 1-4.
- Yuan, F. (2003). 'Brief History of China's Anthropology (in Chinese)'. In (Eds.). *To Develop Chinese Anthropology*. Beijing, University Transaction of Peking University, pp.
- Zelman, W., Pink, G. and Matthias, C. (2003). "Use of the Balanced Scorecard in Health Care." *Health Care Finance* 29(4): 1-16.
- Zeng, G. and Lv, F. (1999). 'Preventive Services in Regional Health Planning (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 154-69.
- Zhan, S. K., Sun, Z. W. and Erik, B. (2002). "Economic transition and maternal health care for internal migrants in Shanghai, China." *Health Policy and Planning* 17(90001): 47-55. <[http://heapol.oupjournals.org/cgi/content/abstract/17/suppl\\_1/47](http://heapol.oupjournals.org/cgi/content/abstract/17/suppl_1/47)>.
- Zhang, G. P. (2000a). "Spring Up and Development of Cultural Study (in Chinese)." *South East Academic* 154(6): 129-34.
- Zhang, H. Y. (2003). 'Argument on Household Registration Regulation (in Chinese)'. <[http://www.6000year.com/readcon.asp?t\\_id=62072&classid=>](http://www.6000year.com/readcon.asp?t_id=62072&classid=>) (Accessed 11 March 2003).
- Zhang, L. and Li, J. H. (2003). "Health Status and Healthcare Demands of Aged Urban Residence (in Chinese)." *Journal of Jilin University (Medicine Edition)* 29(5): 619.
- Zhang, L. Z. (2000b). "Cai Ruanpei." *The Quarterly Review of Comparative Education* XXIII(1/2): 147-57.

- Zhang, M. G. and Liao, Z. W. (2003). 'From Single Ownership to Entire Opening - Community Health Development in Haikou (in Chinese)'.  
<<http://www.chinagp.net/kzb3-2-5.htm>> (Accessed 18 May 2004).
- Zhang, Q. H., Wang, Z. L., Chen, Y. C. et al. (2003). "Demands and Willingness on Community Health Services of Hubei Urban Residences (in Chinese)." *Chinese General Practice* 6(6): 486-8.
- Zhang, R. L. (2002a). 'Examining Intellectuals'. *Wenhui Newspaper*: p. 8.  
<<http://www.china.org.cn/chinese/archive/247917.htm>>.
- Zhang, T. H. (2002b). *Social Medicine (in Chinese)*. Beijing, Beijing Medical University Publisher.
- Zhang, W. M. and Cui, H. Y. (2002). *Primary Evaluation on Population Size in Census 2000 (in Chinese)*. Papers presented in the 2000/2001 Workshop of Population Census Data Analysis, Hong Kong. <<http://www.ust.hk/~soazgw/Cuihy.doc> , retrieved in 6 June 2004>.
- Zhang, W. Q., Tan, J. Y., Han, A. H. et al. (2002). "A Survey of Demand on Health Service of Aged in Communities of Cities and Towns (in Chinese)." *Chinese Nursing Research* 16(2): 78-9.
- Zhang, W. W. (1992). *Ideology and Economic Reform under Deng Xiaoping*. London, Kegan Paul International.
- Zhang, Y. M., Xu, Y. Y. and Liu, L. H. (2001). "Casemix Study on Outpatient Treatment (in Chinese)." *Chinese Journal of Hospital Administration* 17(10): 591-2.
- Zhang, Z. Y. and Ran, C. (2003). "To Implement Regional Health Planning and to Optimize Allocation of Health Resources (in Chinese)." *Journal of Chinese Health Service Management* 19(12): 716-7.
- Zhao, F. G., Zhou, L. Y., Zhang, H. et al. (2001). "Study on the Main Health Problem and its Countermeasure in the Old Population in Guiyang City (in Chinese)." *China Public Health* 17(8): 681-3.
- Zhao, H. W. (2004). *Governing the Health Market: Regulatory Challenges and Options for China in Transition*. (PhD Study). Melbourne: School of Public Health Faculty of Health Sciences, La Trobe University.
- Zhao, L. Z. (2003). *Shang Yang's Reform vs Contemporary Reform*. Papers presented in the 5th Conference of Qin Cultural and History Study, Xi'an, Shanxi, Emperor Qin's Terra-cotta Museum.
- Zhao, Y. X., Wan, Q., Gao, G. Y. et al. (2003). "Estimate and Analysis of China's Total Health Expenditure 2001 (in Chinese)." *Chinese Health Economics* 22(3): 1-3.
- Zheng, G. H. (2003). 'China's Reform Enters a Critical Stage'.  
<<http://www.china.org.cn/english/2003/Oct/76692.htm>> (Accessed 24 March 2004).

- Zheng, H. S. and Li, Y. S. (2003). *March Forward to a More Equitable Society: Study Report on Social Development (in Chinese)*. Beijing: Chinese People's University. <<http://www.china.org.cn/chinese/zhuanti/264615.htm>>.
- Zhi, X. M. (2004). 'Exploiter of Chinese Politics - Zhang Wei Ci (in Chinese)'. <<http://www.acriticism.com/article.asp?Newsid=4762&type=1004>> (Accessed 20 May 2004).
- Zhong, D. B. (2003). "System Framework of Chinese Government Medical Industry Regulation (in Chinese)." *Chinese Health Economics* 22(1): 14-8.
- Zhong, X. B. (2004). 'Reformation of Administrative Regionalism: China will Restructure 50 Provincial Administrative Area (in Chinese)'. <<http://news.soufun.com/more/%D6%D0%BB%AA%B9%A4%C9%CC%CA%B1%B1%A8/2.html>> (Accessed 16 April 2004).
- Zhou, N. (2001). *The Organisation of Information: Introduction (in Chinese)*. 1. Wuhan, Wuhan University Publisher.
- Zhou, Y. B. (1999). 'Regional Health Planning and Socialisation of Medical Establishments Owned by Enterprises (in Chinese)'. In Social Development Department of National Commission of Development and Planning (Eds.). *Forum on Regional Health Planning*. Beijing, Chinese Planning Publisher, pp. 139-45.
- Zhou, Y. S., Rao, K. Q. and Zhang, D. Y. (1989). "Analysis of China's Infant Mortality Rate (in Chinese)." *Journal of Chinese Population Science*.
- Zhou, Z. R. (2003). 'Charlatan: The Most Terrible Fatuous Bureaucrat Wang Huaizhong (in Chinese)'. <<http://news/sohu.com/2003/12/03/09news216380993.shtml>> (Accessed 12 March 2003).
- Zhou, Z. Z. and Qian, Y. P. (2003). "Research on Maternal and Child Health Care in Rural of Three Gorges Area(in Chinese)." *Journal of Chinese Practical Medicine* 5(19): 55-7.
- Zhu, J. H. (2002a). 'NBS Deputy Director: China's Statistical Data Reliable (in Chinese)'. *The People's Daily (18 July 2002)*: p. 5.
- Zhu, R. J. (1998). *Speech on State Council Conference (in Chinese)*. Papers presented in the State Council Conference, Beijing, Reform Publisher. 5.
- Zhu, Y. (2002b). 'Observation: Who will be the shelter of Chinese medical institutions (in Chinese)'. <[http://news.xinhuanet.com/fortune/2002-01/28/content\\_257475.htm](http://news.xinhuanet.com/fortune/2002-01/28/content_257475.htm)> (Accessed 4 March 2004).
- Zhu, Z., Shou, J., Yang, L. Y. et al. (2003). "Investigation on health state and service requirements of the elderly in a certain community of Shanghai (in Chinese)." *Chinese General Practice* 6(1): 43-5.

Zuo, H. J., Deng, L. Q. and Yao, C. H. (2004). "Survey on health status and demands of health care service of rural areas in Beijing (in Chinese)." *Chinese General Practice* 7(3): 187-9.