

**Assessment Report on  
Guangxi Provincial Health Information System**

**Bureau of Health, Guangxi Autonomous Region**

**Dec, 2006**

## **Background**

Guangxi is one of province participating HMN project in China. According to requirement from CHSI in Ministry of Health and HMN, the department of planning and financing and center for health statistic information in Guangxi bureau of health organized the Guangxi provincial HIS assessment workshop on Sep 12, 2006.

The experts and participants from the following institutes: Guangxi Commission for Development and Reform, Bureau of Statistics, Department of Financing, Bureau of Labor and Social Security, Population and Family Planning Commission, Bureau of Health which includes department of planning and financing, Disease Control, Health Supervision, Maternal and Child and Community Health, Rural Health, CHSI, Guangxi CDC, Guangxi Institute of Health Supervision, Guangxi People Hospital, Bureau of Health of Nanning and Guilin, Guangxi Medical University, Guangxi institute of Health Economic, and so on. All participants discussed every question and get agreement on the score.

## **Overview of Health Care System & HIS**

### **Population, Society and Economy**

Guangxi Autonomous Region has 14 cities with 33 districts, 7 cities without districts, 57 counties, 12 autonomous counties, and 1124 towns. In 2005, total population is 49.25 millions, among them, the number of urban and rural residents is 16.56 millions and 32.69 millions respectively. GDP per capita is 8788 RMB, and poverty rate is less than 2%.

According 2005 5th Census, life expectancy is 73.29 years old. In 2005, Birth rate is 14.26‰, and death rate is 6.09‰; Infant mortality rate is 14.78‰, and maternal mortality rate is 37.25 per 100,000. The number and percent of elderly (64+) is 4.71 millions and 9.56%.

### **Health Care System**

In 2005, Guangxi has 9431 health facilities. Among them, 458 hospitals, 1295 township hospitals, 106 CDCs, 93767 staffed beds (1.77 beds per 1000 people), and 129.2 thousands health personnel (2.64 per 1000 people). The total outpatients are 85.15 millions, and inpatients are 2.47 millions. Average health expenditure for each urban and rural resident is 466 RMB and 123 RMB respectively. The New Cooperative Medical Scheme has covered 15 counties with 8.28 millions; among them, scheme participants are 4.84 millions.

### **HIS Basic Information**

From 2001, Guangxi increased the development of health informationization, and have established

disease control and prevention network at provincial, city and county, health administration network, infectious disease web-based reporting network, maternal and child health network, and health supervision system, and so on. Health administrative agencies at different levels have full or part time employees who are responsible for data collecting, processing and analyzing ;CDCs at county or above have established communicable disease monitoring agency ;Hospitals at all levels have full time staff working on hospital information statistic, and about 81% of them have hospital information system. In 2004 and 2005, central and provincial government increased investment in township health facilities with 1-2 computers, and full time employees responsible for web-based reporting system.

### **Legislation for HIS Development**

Guangxi established legislation and regulation for information collection, processing and use, and released 《Guideline for Guangxi Health Informationization Development,2003 ~ 2010》, 《Comprehensive Implementation Plan for Guangxi Health Information Net Development》, 《Guangxi Communicable Disease Reporting Administration Regulation》,《GUangxi Information Net Regulation System》, 《Computer Management System》, 《Computer Security Confidentiality System》, 《Operation Process Map for Communicable Disease Reporting at city and County Level》 and so on.

### **Organizational Framework and HIS Commission**

Guangxi Bureau of Health has established independent HIS Commission for supporting HIS research, monitoring HIS implementation, and working on HIS refor. HIS Commission, that is, CHSI, subordinated with Bureau of Health in terms of administrative framework, at the same time, directed by CHSI in MOH, Guangxi Bureau of Statistics, Bureau of Information Industry in terms of technology. HIS Commission cooperate with universities, research organizations, and Guangxi CDC in areas of academic field.

### **Human Resource and Capacity Building**

In Guangxi, 109 counties and above administrative agencies have full or part-time staff working on information. 458 hospitals have 1-3 full-time employees wotking on hospital information. 1328 township health facilities have full- or part-time staff working on communicable disease

monitoring system, 106 CDCs or health supervision institutes have 2-3 full-time employees or information managers. In total, 86% health facilities in Guangxi have the specific positions with appropriate staff.

### **HIS infrastructure**

Guangxi Bureau of Health has established information exchanging platform with 14 city bureaus of health, with necessary equipments. Guangxi set up specific channel for data-transmission on Guangxi Health Information Net with specific email box, which realize rapid and safe transmission and summarize.

### **Major Database**

According to China Statistic Survey Regulation, Guangxi has integrated some routine health statistics database, including Health Facilities Basic Information Database, Health Human Resource Database, Major Medical Equipment Database, Medical Institute Operation Database, Hospital Inpatients Database, Clinics and Community Health Station Database, and Construction and Investment in Health Facilities Database. All of them can provide data and information to meet the basic demands from the government. Meanwhile, Guangxi can organize specific survey for temporary demand.

### **Major Indicators**

Health statistic indicators in Guangxi include social-economic indicator system with population, economic, household, health resources indicator system with personnel, equipment, finance et al, health service indicator system with medical, disease control, health supervision, maternal and child health care, and community health et al; health status indicator system with disease, mental health, social and economical performance, and so on.

### **Major Data-collection**

Census in Guangxi is line with international standards, conducted every 10 years (5th census in 2000), 1% population census in every 5 years, and conducted 1‰ population census in every 1 year.

Household health survey is conducted in every 5 years, the latest is in 2003. The sample size in Guangxi in first twice surveys is very small, which was just for country survey and not yet analyzed for Guangxi province. The 3rd one in 2003 expanded the sample size in Guangxi, and analyzed and provided much important costumer information.

Vital register system has one site in Guangxi, which is not representative for the province and one analyzed.

## HIS Infrastructure

According to requirement of Hospital Information System Essential Function released by Ministry of Health, 81% hospitals have established hospital information system now, but 34% of them is in the primary stage, and only 7% is higher level. In sum, they are not good enough to meet the basic need. Most of them focus on outpatient, inpatient, drug and financing department. Information system mainly is accounting system, such as social insurance management, pricing and charging system, and cost-accounting system, rather than advanced clinic information system.

## 2、 HIS Assessment Result

### 2.1 Context、 Resource and Process

With regard to the context, resource and process, the total score is 34.5 which is 37% of total possible scores. It means “present but not adequate”. Besides data availability and management, the score for legal framework, human resources, and infrastructure is blow of 60%. The scores suggest the context which HIS is operating is not good enough. Table 1 shows the score in detail.

Table 1 Assessment Result for Context, Resource and Process

	Number of questions	Total possible score	Assess score and the result		
			Score	(%)	Result
<b>Context, resource and process</b>	<b>20</b>	<b>60</b>	<b>34.5</b>	<b>58</b>	<b>present but not adequate</b>
Legal and regulatory framework	5	15	8.5	57	present but not adequate
Human resources	7	21	11.5	55	present but not adequate
Infrastructure for health information system	4	12	6.0	50	present but not adequate
Data availability and management	4	12	8.5	71	Adequate

#### 2.1.1 Legal Context

##### Advantages

- There is basic provincial legislation to ensure data collection, processing and us; Some information collection is approved by the government, which ensure the process, such as rural health information.
- A good relationship between bureau of health and bureau of statistic has been established.

### **Problems**

- Further strengthening legal framework for HIS development is needed;
- Data collection, processing and utilization in some areas is not adequate which influences quality of data;
- Lack of scientific, feasible, and local-customized HIS development strategic plan, which is the prerequisite for ensuring HIS management and realizing full function.
- HIS Commission has not yet played full role, especially in the fields of developing standard, evaluation, efficiency and policy-making.

### **2.1.2 Human Resource**

#### **Advantages**

- The positions and employees working on HIS is basically adequate. Medical institutes at different levels have related positions with employees;

#### **Problems**

- Capacity building is needed. Currently, it is lack of staff with both information technology and health, especially in county or town level, so capacity building is needed. Otherwise, it will influence data collection and process, and further affect integration, analysis and use in policy-making.
- Lack of efficient integration. Since indicator definition and standard is different among administrative departments, it is very difficult to integrate data, which results in low efficiency, poor utilization, and over workload.
- Inadequate integration in modified form. Currently it is not enough integration among various subsystem, such as disease information, hospital information and health statistic information. In addition, more communication and cooperation between MOH and National bureau of Statistics.

### **2.1.3 HIS infrastructure**

#### **Advantages**

- According to requirement of China Health Statistic Survey System, Guangxi has a complete and up-to-date list of health facilities, which classify health facilities into 15 groups. Meanwhile, in order to ensure timeliness and accuracy, Guangxi update health facilities annually.
- HIS infrastructure has been improved, data-collection and management has been enhanced. For example, exchanging platform has been developed among provincial bureau and local bureaus; most medical organizations establish intranet; Health facilities at provincial, city, county and town has the specific computers and staff for information; also some workshops have been organized for training.

#### **Problems**

- More attention (financial investment) is paid to hardware rather software;
- Less investment is put into data-collection, analysis, prediction, and early-warning;
- Unbalanced development between rich and poor areas.

#### 2.1.4 Data availability and management

##### Advantages

- According to requirement from MOH and combined with local condition, Guangxi set up basic indicators and data-collection methods.
- Some information is collected and transmitted according to the standard and with unified explanation.
- Using information for health policy making. Recently, based on collecting and analyzing social, economical information, health information, demographical and epidemiological information, Guangxi conducted health resource survey, health policy situation analysis and health care system response survey, and released Guangxi health resource allocation standard, Guangxi health policy research report et al.

##### Problems

- The availability for the microdata and analysis for household health survey and vital register system is not adequate. Household health survey is conducted every 5 years, which cannot reflect influence of social-economical development on health immediately.
- Lack of complete vital register system, and dependent on statistic department.

#### 2.2 Assessment Result for Core Indicators

Core indicators include health status, health service coverage, health care system and risk factors. The number of questions for the core indicators is 114, and total possible is 317. In the assessment result, the score is 263, which means “highly adequate” function in this area. For health status, health services coverage, health system information and risk factors, the score is 120.5, 56.5, 40 and 46 respectively. See result in Table 2.

**Table 2 Assessment result for core indicators**

	Number of question	Total possible score	Score and the result		
			Score	%	result
<b>Core Indicators</b>	114	317	263.0	83	Highly adequate
Health status	45	123	120.5	98	Highly adequate
Health services coverage	27	73	56.5	77	Adequate
Health system	22	66	40.0	61	Adequate
Risk factors	20	55	46.0	84	Highly adequate

## Advantages

- Health status indicators are included in routine surveillance or specific survey. For example, the child mortality under 5, maternal mortality, HIV prevalence, TB incidence, measles coverage, proportion of skilled birth attendance, TB treatment success rate under DOTS, per capita government's health expenses classification, et al. Data is collected in standardized way with timeliness, periodicity, and consistency which ensure good quality of data.
- Some indicators have good representative. Most of data come from medical organizations, For example, HIV prevalence, TB incidence, proportion of skilled birth attendance, TB treatment success rate under DOTS, and per capita government's health expenses classification have good consistency; The indicators with good representative are maternal mortality, obesity in adults, Density of health workforce by 1,000 population.
- Indicators can be disaggregated in terms of sex, age, social-economical, and area. Some indicators can be modified to ensure the representativeness.

## Problems

- Data source is limited since it mainly comes from medical and health organizations. Little is from the community, which can not cover all population when it has missing cases. Some indicators come from specific population, e.g. for HIV infectious rate, just conducted in ANC or high risk population surveillance in few areas.
- Few indicators is difficult to collect, for Proportion of children sleeping under insecticide treated bednets, Private expenditure on health per capita and Smoking prevalence. Meanwhile, the indicator of Proportion of children sleeping under insecticide treated bednets is not appropriate for health service coverage.
- Standard procedure is not followed in some areas which results in poor quality of data.
- Estimation is not adequate for some indicators, for example, General government expenditure on health (GGHE) per capita and Private expenditure on health per capita.

### 2.3 Assessment Result for Data-Collection Methods

There are total 130 questions classified into 9 groups in data collection methods. Shaanxi gets 283 scores (76%), which means “adequate”. Among them, National Health Account, chronic disease-TB surveillance, and household health survey got higher scores, which are “highly adequate”. But the vital register system has lowest score (49%) among them, which means “present but not adequate”. The assessment result is in Table 3.

**Table 3 Assessment result on data-collection method**

No. of Questions	Total Possible points	Assessment score and result		
		Score	%	Result

<b>Data Collection Method</b>	130	374	283.0	76	Adequate
Census	14	32	25.0	78	Adequate
Vital Register	15	41	20.0	49	Present but not adequate
Population-based Survey	19	52	43.0	83	Highly adequate
Disease Surveillance	45	138	110.5	80	Highly adequate
Acute disease	17	51	40.5	79	Adequate
Chronic-disease HIV	14	42	33.0	79	Adequate
Chronic-disease TB	14	42	37.0	88	Highly adequate
Health service statistic	29	87	63.0	72	Adequate
HMIS	16	48	35.0	73	Adequate
Health System Stat	13	39	28.0	72	Adequate
NHA	8	24	21.5	90	Highly adequate

### 2.3.1 Census

#### Advantages

- The census content is comprehensive and includes questions on demographical, education, economics, birth and death.
- The capacity to conduct and manage census is adequate; there is specific agency to work on it;
- Following core procedures for census, e.g. data-processing and confidentiality.
- Census frequency is in line with international standards: conducting a census every 10 years, 1% people sample survey every 5 years, and 1‰ people sample survey every year.
- According to national requirement, Guangxi collects and analyzes information, and releases the outcomes to the public.
- Some information is online accessible for the public.

#### Problems

- Census has not enough information related with the adult death rate, children death rate, and handicapped.
- The availability of the results from Census is needed to improve. Although the public can be access to related released, there is a time-lag, and micro-data is not available.

- Census has not been used for predicting health service coverage , which shall be further improved.
- The census is not adequately analyzed and used for local or small policy-making because of the 10-years interval and supplementary survey is summarized.

### 2.3.2 Vital register

#### Advantages

- According to MOH and social-economical status, 6 sites are selected in Guangxi, 2 in the city and 4 in rural areas, which has good representativeness;
- WHO Recommended International Form of Medical Certificate is used; ICD-10 classification currently in use
- Content includes general information, death-related diagnosis and other information.
- Analyzing the data annually including death disaggregation by different population, and geography, cause of death, life expectancy et al.
- Evaluating quality of data annually.
- To the extent results from VR is available and used. For example, publishing 《Guangxi cause of death sample survey in early 1990》 , which is used in Guangxi social and health development planning.

#### Problems

- Capacity in operating efficiently vital registration is not adequate.
- Inadequate representativeness. In sum, VR is not good enough because the small sample sites.
- Poor quality. In sampling sites, the coverage is less than 50%, lack of evaluation on completeness.
- Proportion of all deaths coded to ill defined causes more than 10% .
- Results from VR is not adequately disaggregated
- VR is widely used for demographic, health and socioeconomic data collection (poverty monitoring);
- VR results is not widely used to provide denominators for estimating of need and coverage for health service delivery

### 2.3.3 Population-based surveys

#### Advantages

- Household health surveys are done in every 5 years. National household health

survey in Guangxi has 3 sites, Guangxi added 30 sites for its own purpose in 2004. The sample framework is designed by experts, which follow academic, feasible and economical principles and represent all population

- Health surveys provide information on population health status and risk factors;
- The survey administrative agency has adequate implementation capacity in field work supervision and data processing; Surveys follow the international ethical standards for consent and confidentiality.
- The data can be disaggregated by income, education, age, sex, and urban/rural.
- Analyzing and published 《Guangxi Health Service Survey Research》, released to the public, and used in health development planning.

#### **Problems**

- Inadequate representativeness due to small sample size without death information, people body measure, hypertension et al;
- Health surveys cannot provide some key information for monitoring the health MDGs.
- Although household health survey provides some important information on health status and health service development, it was not widely and adequately used in health planning and decision-making.
- Health data collection is not incorporated into economic surveys or other important social survey;
- Lack of adequate cooperation between bureaus of health and statistics in survey design, implementation and utilization.

#### **2.3.4 Acute Disease Surveillance**

##### **Advantages**

- Comprehensive monitoring network: Shaanxi has already set up epidemic situation reporting system, emergency public health reporting system and the single infectious diseases monitoring system which include 37 kinds of infectious diseases such as heat , meningitis , rabies , cholera , typhoid fever , SARS , and bird flu, et al. It covers more than 95% township health facilities and all county or above hospitals and CDCs.
- Good quality of data because of higher standardization and clear definition. Also web-based reporting system improves timeliness;
- Continuing training and capacity building, quality is increasing.

##### **Problems**

- Some indicators are not included, e.g. the resistance of pathogens to drugs;

- The system is not able to rapidly collect information on natural history, etiology and transmission of disease related to a new event
- Laboratory support to the surveillance system is not adequate, because of the detection equipment and staff, especially in rural areas.
- Not yet established mechanism to release news to the public. The result is only reported to the CDC and administrative agency.;
- The disease surveillance system is not integrated into the health service information system;
- Existing potential security problems in the system.

### **2.3.5 Chronic Disease surveillance - HIV**

#### **Advantages**

- Establishing HIV surveillance system, including sentinel surveillance, early exam lab, and confirming lab;
- Following national project standard and international ethical standards to work, and is tailored towards the type of epidemic;
- Training employees annually and regular supervision;
- The system maintains the same sites over time to allow trend analysis, estimates of the size and course of the epidemic are done every 2 years.

#### **Problems**

- Limited coverage due to focus on high risk population;
- Quality of data needs further improvement;
- Result is not widely disseminated to the public.

### **2.3.6 Chronic Disease—TB**

#### **Advantages**

- Guangxi has TB monitoring system which includes information on treatment success, mortality, and whether or not the treatment provided is in line with DOTS strategy;
- Provincial CDC is responsible agency for TB surveillance, provides technical support to local agencies, manages and analyzes the submitted data from local CDCs, and reports result to the organizations at higher level;
- The province and cities have adequate capacity for TB monitoring, Provincial CDC does careful quality control and follow up with districts;
- District registers of TB patients are available and up to date;
- The annual report for the preceding year is timely ; The annual report provides detailed statistics by district and sex;

- The province makes estimates of TB detection rate.

#### **Problems**

- Incomplete information, and some information cannot be disaggregated by social-economic factor;
- TB surveillance is not integrated with health statistic information system, and inefficient resources use;
- Information is not widely disseminated to the public.

#### **2.3.7 HMIS**

##### **Advantages**

- Guangxi has a well-established health service information system that is based on information generated by county or above health facilities
- The health service statistics include information on a limited number of leading diseases and conditions;
- The health service statistics include information on private sector;
- The national level health information unit has necessary equipment to carry out supervision and feedback to the lower levels;
- The provincial health information unit has well-streamlined communication with the lower levels including feedback;
- The annual report, which is released in May or June every year, on health service statistics includes a careful analysis of reporting rates and biases in the data presented; and can be analyzed by district.

##### **Problems**

- Lack of adequate training for health statistic staff through specific technical training program and continuous training, which leads to fewer cadre of health information specialists;
- The volume of data collection and number of forms to be filled out at the clinical level has not adequately been reviewed with the purpose of minimizing the workload;
- Lack of integration with other reporting system such as TB and vaccination;
- The health service statistics does not make use of data from other sources on population health (surveys, VR) to assess biases in clinic based information.

#### **2.3.8 Health System**

##### **Advantages**

- Guangxi has a national database of health facilities and human resources which are updated timely;
- private sector Information is included;
- There are human resources for keeping the databases.

#### **Problems**

- The data of health facilities does not contain the Global Positioning Satellite (GPS) , Maps and the mapping information is only available for few districts;
- The quality assessment process does not include the private sector;
- Lack of information on the availability of core services such as emergency blood transfusion.

### **2.3.9 National Health Account**

#### **Advantages**

- Guangxi annually develop budget for health system, after approval, and implement the budget; tracks and supervises the budget;
- The system for tracking budgets and expenditures by the district;
- Guangxi has health account system with full-time staff; the system routinely provides information on the sources, institutions, providers, functions, inputs, also provides information on health expenditure by major diseases, health program areas, geographical areas and target population, such as ADIS, TB, EPI.

#### **Problems**

- Only government expenditure is included, no private sector information;
- NHA is not well used for policy process, and does not play full role in the process.

### **2.4 Assessment result on data synthesis, analysis and use**

Based on the assessment, total score is 55 (73%), which means “adequate”. From the detailed score, Policy advocacy and dissemination and Implementation & Action get good score (more than 80%);the scores for resource allocation and planning & priority setting both are 12 (75%) and 67%) which both mean “adequate; but the score for data analysis and use, and institutional mechanism is 12.5 and 60%,which means “present but not adequate”. The result is in Table 4.

**Table 4 Assessment on Data Synthesis, Analysis and Use**

	Number	Total	Assessment
--	--------	-------	------------

	of Questions	possible Scores	score	%	Result
<b>Data synthesis and use</b>	25	75	55.0	73	Adequate
Policy advocacy and dissemination	4	12	10.5	88	Highly adequate
Implementation and action	6	18	15.0	83	Highly adequate
Resource allocation	4	12	9.0	75	Adequate
Planning and priority setting	4	12	8.0	67	Adequate
Data analysis and use, and institutional mechanism	7	21	12.5	60	Present but not adequate

#### 2.4.1 Policy advocacy and dissemination

##### Advantages

- HIS collects information on some important MDGs indicators, and release Health Information Digest to some organizations, such as administrative institutes, health facilities.
- The national under 5 mortality rate, maternal mortality rate, immunization rate and HIV prevalence is somewhat known among policy/decision makers or politicians.

##### Problems

- Although some institutes can access to HIS information, the completeness and depth of analysis is needed further improvement;
- Parliament did not regularly and widely use HIS information to evaluate last year health development; lack of using health information in policy-making;
- Annual report is not widely released to the public.

#### 2.4.2 Implementation and Action

##### Advantages

- Currently administrative organizations and managers increase using information in health planning, monitoring the implementation, and priority setting. For example, in Guangxi decides to strengthen rural health facilities development based on information on rural health, and set comprehensive methods to control HIV based on higher HIV prevalence, especially for high risk population;
- Health policy-makers and managers compare Guangxi with other provinces on health data.

- Managers at all levels are able to, and actually use information from HIS for local program management, planning and monitoring;
- Some problems/challenges from different program areas have been addressed through a written action plan based on HIS data/indicators.

**Problems:** More HIS information use is needed in the future.

### **2.4.3 Resource Allocation**

#### **Advantages**

- HIS information are used, by provincial and city governmental organizations, to advocate for targets and resource allocation in the annual budget process;
- In recent 5 years, HIS data/information has resulted in significant changes in annual budgets and/or general resource allocation;

#### **Problems**

- In general, Health data and indicators are insufficiently used in the budgeting process;
- HIS information are not adequately used to advocate for equity and increased resources to disadvantaged groups and communities, calculate disease burden, and link socio-economic indicators and poor access to health services and other public services.

### **2.4.4 Planning and priority setting**

#### **Advantages**

- Health data and indicators are used in the planning process, administrative institutes and medical facilities use them in annual plan, medium-term, and long-term plan or objective.

**Problems:** Lack of timely and accurate information, the use of information is inadequate.

### **2.4.5 Data analysis and use, and institutional mechanism**

#### **Advantages**

- Health administrative institute often provides information to Bureau of Finance for budgeting and resource allocating;
- Relevant data from census, vital registration, household surveys and research reports are partially used in evaluation and cross-checking;
- Health managers are generally demanding complete and validated HIS information delivered on time;

- Graphs and maps are sometimes used to display information.

#### **Problems**

- Lack of adequate analysis;
- Information is not widely released to the public, or content is limited;
- Lack of incentive mechanisms for good information performance, such as awards for the best HIS products/utilization.

### **3、 Policy Suggestion**

#### **3.1 Strengthening the legal framework for health information system:**

The law, regulation and policy are essential for HIS development, the assessment results shows that it is very important to develop comprehensive legal and regulatory framework in Guangxi to ensure HIS rapid development in the future, and make sure that the information is collected in timely and accurate manner, and serve as basis for policy-making.

#### **3.2 Improving organizational framework**

In order to ensure efficient operation of HIS, it is essential to strengthen organizational framework with HIS staff, especially for rural areas and health facilities. It is necessary to recruit new employees and keep training them. At the same time, technical capacity building is very important in the field and analysis. HIS commission needs to play full role in consulting, directing and supervision.

#### **3.3 Comprehensive planning and balanced development**

In order to ensure healthy, rapid and durable development, it is essential to pay attention on all provincial balanced development, not just focus on urban areas.

#### **3.4 Improving integration among subsystems**

The fragmented HIS results in resource waste, low efficiency and incomplete information, which cannot provide scientific evidence for policy-making. Thus, further integration is needed. At the same time, establishing community health information system is very important in the next step.

#### **3.5 Developing standards**

Standard is basis for efficient integration. Related technique, agreement, regulation must follow national directions, which can grantee clear indicators and definitions. Also it is prerequisite for security, openness, feasibility, and information sharing among different organizations and subsystems.

### **3.6 Improving information utilization**

Data and information play their role only when it can be analyzed and used. It is essential to improve effectiveness of using information. In particular, facing health reform, social-economical transition, and urbanization, analyzing and using timely and accurate information is basis for health policy-making.