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Assessment of the Medical Insurance Information Systems at the Medical Insurance Administrations in Gansu province

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Abbreviations

DRG – Diagnostic Related Groups

IT – Information Technology

LAN – Local Area Network

MS - Microsoft

PC –Personal Computer

Project – EU China Social Security Reform Co-operation Project

PROMISS – Pilot Provincial Modernisation Initiatives for Social Security

RMB – Yuan

SQL – Structured Query Languages

TB - Terabyte

1 Introduction

This report summarizes results of discussions of the expert with representatives of the provincial and municipal medical insurance administrations in Lanzhou and in Dingxi municipalities in the period November 17-21, 2008. The discussions were focused on the assessment of the medical insurance information systems that support operations of the administrations.

2 Medical insurance in Gansu province

The medical insurance system (the basic medical insurance for urban population) was analyzed at three levels-provincial, municipality and district/county levels. The medical insurance schema for rural population was out of scope of the assignment although the rural scheme may cover majority of population in the counties¹.

2.1 Provincial medical insurance scheme

There a provincial medical insurance scheme at the level of the Gansu province that insures employees and retirees of public agencies. The employees of some 570 public agencies are insured by this scheme. The provincial insurance scheme was established in 2001 and it has now approximately 81 000 insurees. The benefits of the provincial scheme have a broader range than the municipal ones. The public agencies are divided into 7 categories. The share of individual contributions with respect to employers' contributions varies according to the category of the insured institution. The contributions for the highest category are born by an employer fully. The package of benefits contains in-patient care. Out-patient care is paid out of the individual accounts or out-of – pocket. Allocation of funds to the individual accounts is done according to the age of an insuree (less 35 years, less 46 years and more). There is a small co-insurance for patients in hospitals and there is a deductible 800 RMB.

The provincial medical insurance administration has formal contracts with hospitals (currently with 33 hospitals-12 special hospitals, 11 hospitals of category 3, 7 hospitals of category 2 and 3 hospitals of category 1-the highest level). There is no contracting towards the community medical centres. Cost-sharing of insurees of the provincial medical insurance scheme is a bit lower in comparison to the municipal level.

The remuneration mechanism for hospitals is based on fee-for-service and actually rendered medicines according to nationwide list of services and medicines. Payment per case is used only for some special diagnosis. The prices for the provincial level hospitals are higher (by 15 %) in comparison to the municipal level hospitals.

Regarding checking of bills of the health care providers they check selected sample of hospital bills by a panel of invited experts. They don't evaluate quality indicators and the do benchmark comparison among the hospitals only for selected severest diagnosis. The DRG classification system or something similar is not used. They exchange information on simple

¹ See for example Tongwei county where 440 000 rural inhabitants stand versus some 30 000 urban inhabitants.

average payment per case in the hospitals with the municipal medical insurance administration in Lanzhou.

Regarding IT there is no on-line connection among working places in the provincial medical insurance administration and there is no on-line data transfer between the health care providers and the provincial medical insurance administration. However, there should be a standard on data transfers at the provincial level². The internal IT system is based on Excel tables. The tables contain basic data on an insuree, his/her employment, salary, insurance status and amount of the contributions paid. There are separate tables for employee and retired persons. Another set of tables is used for recording of amounts allocated to individual saving accounts. Health care expenditures are recorded also by means of the Excel tables. The Excel tables are prepared by the hospital themselves weekly. The tables contain date of admission and discharge, the diagnosis, total costs, subsidized share of costs by the medical insurance schema. Another more detailed table is collected from the hospitals on a monthly basis. This second table is divided into two parts and contains monthly overview of treated patients including detailed data on delivered medicines, used material and rendered services in the second part. The tables are delivered separately for common insurees and for civil servants. There is also a table for special diseases. It contains basic information on a patient, what medicines were delivered, what was paid by the patient and what are total expenditures.

Software for financial management is used (ANYI software used also by the Ministry). Problems of the information systems are in lack of sharing data between workers of the administration and a cumbersome work with the Excel tables. There is no adequate checking of the entered data and errors propagate easily in other stages of processing. The information system doesn't support development of new insurance policies.

They plan to introduce new system- based on a contract with the company Languang. They have formulated three principles for the new software. They agreed on standards for medical data exchange. The first stage of development is collection of data. They want to pilot the new system also in hospitals. It is presumed that the better information system will help to eliminate frauds.

The new system should also cover provincial level for exchanging of data. There is a need of unifying the collection of data at the provincial level and also among health care providers and of sharing of the data among different institutions and authorities. Internet based technologies are assumed to be appropriate for such sharing of data.

There are no IT staffs employed in the provincial medical insurance administration. The total number of the staffs is 17 in the administration. Some workload is taken over by social service centres. An information system for social service centres was tendered some 3 years ago. The social service centres serve for five social security schemes (pension insurance, work injury insurance, medical insurance, and maternity support). As an issue for improvement data collection mechanism was stressed.

Enhanced security medical insurance cards serve as an identification tool for insurees and for access to the individual saving accounts.

2.2 Municipal medical insurance scheme in Lanzhou

The municipal medical insurance administration belongs organizationally to the labour security bureau. The labour security bureau serves a policy maker in the field of medical insurance. It decides on the coverage of the insurees, cost sharing, licensing of health care providers. However, contracting of the licensed health care providers is responsibility of the municipal medical insurance administration.

² It was not clear whether the data standard relates only to medical insurance.

The history of the public medical insurance is relatively short. It began in 2000 when employees of state and private enterprises started to be covered on a mandatory basis by the basic insurance scheme. The coverage was extended also to retirees from the enterprises and to employees of the state enterprises in bankruptcy.

The municipality of Lanzhou has 6 districts and 3 counties. Each district and county has its own medical insurance administration with pooling of the funds at the district/county level. The level vertical integration of municipal, district and county medical insurance administrations is not clear.

The municipal medical insurance administration covers totally 1 260 000 insurees. There are 650 000 employees and 610 000 urban residents out of this amount. The coverage of population in Lanzhou is approximately 80 %. University students and employees of companies that don't pay contribution are not covered.

The following table summarizes contribution rates for the different categories of insurees. These rates are unified for the municipal level in Gansu province.

| Category | Rate | State subsidy |
|------------|----------------------------|----------------|
| employers | 6 % | |
| employees | 2 % | |
| retired | <i>300 RMB³</i> | <i>600 RMB</i> |
| disabled | <i>150 RMB</i> | <i>750 RMB</i> |
| unemployed | <i>180 RMB</i> | <i>720 RMB</i> |
| students | <i>20 RMB</i> | <i>20 RMB</i> |
| children | <i>40 RMB</i> | <i>60 RMB</i> |

Table 1 Contribution rates in the municipal medical insurance scheme in Lanzhou

The benefit package for employees is oriented towards major risks such in-patient care. Out-patient care is not covered from pooled medical insurance fund. Cost sharing schema includes deductibles, co-insurance-see the following table:

| Category of insurees | Co-insurance rate |
|----------------------|-------------------|
| employees | 15 % |
| retired | 12 % |

Table 2 Co-insurance in in-patient care in the municipal medical insurance scheme in Lanzhou

Regarding deductibles they are applied for in-patient stays according to the following table:

| Order of an in-patient stay | Deductibles (RMB) |
|------------------------------------|-------------------|
| 1 st stay in a hospital | 700 |
| 2 nd stay in a hospital | 560 |
| each subsequent stay | -20 % |

Table 3 Deductibles in in-patient care in the municipal medical insurance scheme

³ Annual rates

The municipal medical insurance administration has about 50 workers. Regarding the information system there is a centralized system with web based clients in place that runs on an internal LAN. The information system was delivered by an external software company and seems to be of a professional quality⁴. The server is located in a computation server that serves also to another social insurance scheme. The information system is built upon an Oracle database system. The information system supports registration of insurees and employers, collection of contributions⁵ and managing of individual savings accounts. Data from the employers can be obtained in an electronic format (off-line). The insurees are identified by an insurance card with both a chip and a magnetic strip.

The data from the contracted hospitals can be obtained in an electronic format as well. However, there is no on-line connection with the hospitals. The data are transferred in memory sticks. The data on in-patient treatment contain detailed information on delivered services and medicines. However, the data on the rendered services and medicines are not associated with a concrete day of the treatment.

It was told that the same information system as in the municipal medical insurance administration runs only in one of the 6 districts and 3 counties that belong to Lanzhou municipality.

2.3 Municipal medical insurance scheme in Dingxi

The municipal of Dingxi has about 3 million population with about 2 million farmers. There is about 380 000 urban residents. The municipal of Dingxi consists of one district and six counties. The district and each county has own medical insurance administrations with pooling at their level. The municipal medical insurance scheme covers employees of some enterprises according to rules based on an industry code. The same rules should apply in the whole Gansu province. The municipal medical insurance administration was established in 2000 and since that time it increases coverage of population in Dingxi. Nowadays the coverage reached 90 % for employees, 86 % for urban residents and 83 % for rural inhabitants. However, the insurance scheme for the rural population is managed by the health departments of the provincial or municipal governments and it is managed in a hierarchically distributed manner.

The categories of populations that are not covered by the municipal medical insurance scheme (14 % of residents) are university students, farmers migrating to the city and employees of the employers that are not able to pay mandatory contributions.

The rates of contributions are the same throughout Lanzhou province. Regarding the benefits the following table shows the deductibles⁶ and the co-insurance rates in the hospitals according to the categories:

⁴ The Expert has got an informational booklet highlighting main features of the information system (in Chinese). The booklet is deposited in the Project office.

⁵ The contributions are collected via a tax office. The information system calculates for the office amounts of contributions that should be collected from the employers.

⁶ The deductibles are determined by the municipal medical insurance administration.

| Category of a hospital | Deductibles (RMB) | Co-insurance rate |
|---------------------------|-------------------|-------------------|
| A | 500 | 20 % |
| B (1 st level) | 300 | 15 % |
| B (2 nd level) | 213 | 15 % |
| C | 50 | 15 % |

Table 4 Deductibles and co-insurance rates in the Dingxi municipal scheme in in-patient care

The out-patient care is paid out of the individual saving accounts. Allocation of funds to the individual accounts is according to the following table:

| Category of an insuree | Allocation to the individual saving account |
|------------------------|---|
| employee | 3.8 % of the salary |
| retired | 4.0 % of the salary |
| urban resident | 10 RMB annually |

Table 5 Allocation to the individual accounts in the Dingxi municipality

The hospitals are paid by a lump sum per each case. The lump sum corresponds to last three years average of charges per case of a given hospitals. The prices of individual services and medicines are determined by the provincial Price Bureau. There are no peer comparisons of the average expenditures per case done at the provincial level. The peer comparisons at the municipal level are of a smaller use as the medical insurance administration contracts only one hospital in each category.

When a patient comes to a hospital he/she has to pay a deposit in an amount estimated by a treating physician. At the discharge the cost/sharing of the patient is determined. The assessment base for calculation of the co-insurance is actual costs of treatment. The patient gets the deposit back out of which his/her cost-sharing is deducted. The hospital gets the lump sum per case from the medical insurance administration as a remuneration of the hospital case.

There was a discussion on salaries of the medical personnel in the hospitals in Dingxi. The salaries are only from 17 % subsidized by the government. The rest is from the revenue of the hospital. The basic salaries are determined by the Department of Human Resources at the provincial level. Bonuses are determined by the management of the hospital. The salary of a hospital physician is about 3 000 RMB/month and of a nurse about 2 000 RMB/month.

The information system of the municipal medical insurance administration consists of two separated applications residing at two PC in the service centre of the Labour Security Bureau. The first application is dealing with registration of the insurees, payment of the insurance contributions and processing of the individual accounts of the insurees, the second application support remuneration of hospitals and for checking of correctness of the bills.

The applications are developed in FoxPro Visual development system (version 6.0). There is no networking of the computers, data transfers are accomplished by means of memory sticks. What was a bit striking that no formal procedure of back-ups is implemented. The information system is used only at the visited service centre. They were developed by a hired worker (on contract) that maintains the applications and enters data into computes as well.

Regarding workload of all workplaces there has been 8 000 -10 000 contribution payers since January 2008 and about 2 000 hospital bills were processed in the same period.

2.4 County medical insurance scheme in Tongwei county

The county medical insurance administration is a part of the social insurance administration that provides pension insurance, maternity insurance, medical insurance, work injury insurance and unemployment insurance. The administration is in charge of only urban citizens. Rural citizens are covered the Health Bureau that is a part of the local government⁷. There are currently 9 996 employees covered that represents 95% coverage and 16 342 residents that represents 90% coverage.

The contribution rates are according to the following table:

| Category | Rate | State subsidy |
|-----------------------------|---------------------|---------------|
| employers | 6 % | |
| employees | 2 % | |
| poor residents ⁸ | 20 RMB ⁹ | 80 RMB |
| standard residents | 60 RMB | 80 RMB |
| students | 40 RMB | 80 RMB |

Table 6 Contribution rates in the Tongwei county

Allocation of funds to the individual accounts is according to the following table:

| Category of an insuree | Allocation to the individual account |
|------------------------|--------------------------------------|
| employee | 1.3 % of the salary |
| retired | 1.8 % of the salary |

Table 7 Allocation to individual account in the Tongwei county

A standard bank cheque book is used for payments out of the individual saving accounts. Money from the individual saving accounts can be used for the sake of whole family. However, sometimes money in the individual saving account is misused.

There are no deductibles used for in-patient care; nevertheless the co-insurance rate is rather high-40 % for employees (60 % is covered by the county medical insurance administration) and 60 % for residents.

There is no third party payment to hospitals. The hospitals are contracted but the contract stipulates only prices of individual services and medicines that are determined at the provincial level. There are contracted currently two hospitals at the county level and 18 hospitals at the

⁷ There is 440 000 rural citizens.

⁸ Poor people have annual income less 700 RMB. There is also category of extra poor people. Medical insurance contributions are subsidies by the civil bureau.

⁹ Annual rates

town level (3rd category) that are use mainly by the rural population. The patients have to pay their treatment by themselves and they subsequently remunerated by the medical insurance administration. There are randomized reviews of the invoices of the hospitals (about 30 % of cases).

Registration of insurees is done in a community service centre. The centre issues a paper certificate of medical insurance. The medical insurance administration only remunerates the patients for their hospital treatment. There are only two standalone computers (one for employees and one for residents) that run simple evidence based on the Excel program. Only financial data on the hospital cases are entered into computers. Detailed description of the hospital cases is filed in the original paper form.

Regarding workload they remunerated 665 patients in the period January-November 2008.

There is a reporting process within the multilevel medical insurance system for the lowest level (district, county) up to the country level. Each level aggregates the data of the lower level and sends them up. However, there is apparently no usage of the data at the intermediate levels and no feedback from the upper levels. The following indicators are reported:

- number of insurees according to the categories
- coverage of population
- expenditures
 - in-patient
 - others
- revenue according to the categories of insurees
- hospitalization rate
- average expenditures per case according to hospitals

The reporting is accomplished according to regulations of the Ministry of Human Resources and Social Security and it is accomplished in a paper form. Hospitals are supervised by the Bureau of the Public House.

3 Recommendations, open issues

Very limited time frame for analysis of the health information system of the medical insurance administration didn't allow studying of all functionality of the information systems in detail. However, the discussions revealed some space for further enhancing capabilities of the information system that could bring major benefits for support of business processes of the medical insurance administration. It is worth to mention especially:

- *substitution of the simple medical insurance information systems based on the Excel tables by a more robust solution based on a database system running in a network,*
- *web based transfer of data from employers and health care providers with an adequate security infrastructure,*
- *elaboration of analytical capabilities of the medical insurance information systems to facilitate peer comparisons and more detailed monitoring of provision of health care as a contribution to cost containment.*

Regarding the first recommendation the principle is to develop a standardized medical information system that is scalable and flexible enough to accommodate needs of smaller

municipal and district/county medical insurance administrations and that will be affordable even to smaller administrations.

Regarding the second recommendation a web based portal reducing the need for personal contact of representatives of employers and health care providers with medical insurance administrations using the technology of an electronic signature. A precondition is that the electronic signature is recognized by the Chinese legislative framework¹⁰.

Regarding the third recommendation it advocates for maximal usage of data that are stored in the operational database for a purpose of a better forecasting of future revenues and expenditures and for the purpose of an effective monitoring of health care costs and quality.

Such enhancement would be also in line with the objectives of the PROMISS project 4 that are targeted to an implementation of new cost containment mechanisms.

The database model of the used medical insurance information systems definitely enables to provide valuable information on:

- distribution of (total, private and pooled insurance) health care expenditures among enrolled population for modelling of expenditures according different cost-sharing schemes,
- average costs per case in in-patient care according to different patients' attributes (category of insurance, age, sex, place of living etc.),
- average costs per treatment in out-patient care according to different patients attributes,
- average costs per case/ per treatment according to a clinical group in an appropriate diagnosis based classification,
- structure of average costs per case/per treatment according to the clinical groups and according to type of rendered services and medicines
- structure of average costs per case according to timing of the average stay

A component of elaboration of the analytical part of the medical insurance information systems should also encompass an elaboration (taking over) of a classification system for in-patient care based on the attributes of a case that are currently routinely recorded in the information system both of the health care providers and the medical insurance administrations.

¹⁰ It was discussed during the meetings but with no clear answer.

Annex

Rapid assessment of the IT solutions

| Characteristics of the IT | Gansu provincial medical insurance adm. | Municipal medical insurance adm. in Lanzhou | Municipal medical insurance adm. in Dingxi | County medical insurance adm. in Tongwei |
|--|---|---|--|--|
| Supported processes | | | | |
| Registration of employers | yes | yes | yes | yes ¹¹ |
| Registration of insurees | yes | yes | yes | yes ¹¹ |
| Issuance of an insurance card | yes | yes (chip card) | no | no |
| Collection of contributions | yes | yes | yes | yes ¹¹ |
| Managing of individual health accounts | yes | yes | yes | yes ¹¹ |
| Processing in-patient bills | yes | yes | yes | yes (partly) |
| Processing out-patient bills | no | no | no | no |
| Remuneration of in-patient facilities | yes | yes | yes | yes |
| Remuneration of out-patient facilities | yes | yes | yes | yes |
| Checking of patients' bills | yes | yes | yes | yes |
| Internal operations | ? | ? | no | no |
| Decision support | | | | |
| Operational reports | yes | yes | yes | yes ? |
| Comprehensive BI solutions | no | no | no | no |
| Uniqueness of the IT solutions | | | | |
| One solution | yes | yes | yes | yes |
| Several co-operating solutions | no | no | no | no |
| Several isolated solutions | no | no | no | no |
| Type of the IT solutions | | | | |
| Centralized web based | no | yes | no | no |
| Distributed | no | no | no | no |
| Desktop | yes | no | yes | yes |
| Platforms | | | | |
| Operation system | MS Windows | MS Windows | MS Windows | MS Windows |
| Database | Excel based | Oracle | FoxPro | Excel based |
| Networking | no | yes (LAN) | no | no |
| Number of users | | | | |
| Connected on-line | | 40 (est.) | | |
| Off-line | 10 (est.) | | 2 | 2 |

¹¹ In the community service centre



| External interfaces of the IT solutions | | | | |
|---|---|---|---|---|
| To/from higher level of HI | | | | |
| -transferred data | set of standard indicators | set of standard indicators | set of standard indicators | set of standard indicators |
| -way of transfer (paper, on-line, off-line) | paper form | paper form | paper form | paper form |
| To/from lower level of HI | | | | |
| -transferred data | set of standard indicators | set of standard indicators | set of standard indicators | set of standard indicators |
| -way of transfer (paper, on-line, off-line) | paper form | paper form | paper form | paper form |
| To/from health care providers | | | | |
| -transferred data | a detailed bill with services and medicines | a detailed bill with services and medicines | a detailed bill with services and medicines | a detailed bill with services and medicines |
| -way of transfer (paper, on-line, off-line) | off-line | off-line | off-line (paper form) | by patient (paper form) |
| Development of the IT solutions | | | | |
| By internal staff of the HIA | no (only some reports) | no (only some reports) | no (only some reports) | no (only some reports) |
| By an external software company | ? | yes | yes (by a contracted specialist) | ? |
| Usage of packaged solutions | no | no | no | no |
| Maintenance of the IT solutions | | | | |
| They are not maintained at all | no | no | no | no |
| By an external commercial company | no | no | no | no |
| By an external state/public institution | no | no | no | no |
| By internal staff of the HIA | ? | yes | yes | ? |
| Organizational background for the IT | | | | |
| Internal IT department | no | yes | no | no |
| Contracted specialists | ? | no | yes | ? |
| Number of workforce | | | 1 | |
| Security of the IT solutions | | | | |
| Access to the IT solution by an username and password | yes | yes | yes | yes |
| Access to the IT solution through a personal card | no | no | no | no |
| Access controlled by another way | no | no | no | no |