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# **Assessment of the Medical insurance Information Systems at the Medical Insurance Administrations in Jilin province**

**by Jiří Němec,  
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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 Changchun in the period November 24-28, 2008. The discussions were focused on the assessment of the medical insurance information systems that support operations of the medical insurance administrations.

## 2 Medical insurance in Jilin province

The medical insurance system (the basic medical insurance for urban population) was analyzed at three levels-provincial, municipality and district/county levels.

### *2.1 Provincial medical insurance scheme in Jilin province*

There is a provincial medical insurance administration at the level of Jilin province that plays supervision and methodological roles on one hand and it insures employees of the governmental organizations and their retired on the other hand. In the first role the provincial medical insurance administration looks after business procedures applied by the municipal medical insurance administrations, it manages collection and aggregation of statistical data from 9 municipalities and it is in charge of ensuring of a compatibility of medical insurance information systems at all levels. The last task is achieved by dissemination and enforcing of centrally defined standards relating to data interfaces and to security in the medical insurance information systems.

The provincial medical insurance administration should provide three types insurance in future-medical insurance, work injury insurance and maternity allowances. The work injury insurance is not implemented yet. There are currently 120 000 insured. The ratio of the number of employees to the number of retired is currently 2.53:1. The ratio of health care expenditures is quite opposite 1:3. All citizens entitled to insurance by the provincial medical insurance scheme are insured, it means the coverage is 100 %.

The contributions are paid by government as an employer and by employees. The retired persons pay no individual contributions. All payments are accomplished through employers-state agencies. The rates for contributions are currently at 7 % for the employers and retired and at 2 % for their employees<sup>1</sup>. The state pays additional 3.5 % for public servants and retired public servant that allows ensuring a bit more generous benefits for this category. This privileged category provides for 95 % of all insured in the provincial medical insurance scheme. The remaining 5 % are employed in the governmental institutions of lesser importance. The maternity insurance is covered by the insurance rate of 0.3 %.

Regarding benefits covered by the provincial medical insurance administration both in-patient and out-patient care is covered. There is a relatively high deductible that is lowered by 35 % for each subsequent stay in a hospital during one calendar year. Above this limit there is a co-insurance paid out-of pocket or out of the individual saving accounts.

The following table shows the deductibles and co-insurance rates applied according to the category of a hospital.

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<sup>1</sup> From the total salary.

| Category of a hospital | Deductibles (RMB) | Co-insurance rate |
|------------------------|-------------------|-------------------|
| A                      | 1 500             | 15 %              |
| B                      | 1 200             | 12 %              |
| C                      | 900               | 10 %              |

**Table 1 Deductibles and co-insurance rates in in-patient care in the Jilin provincial scheme<sup>2</sup>**

The cost-sharing scheme in the table 1 is applied up to the limit of 50 000 RMB<sup>3</sup>. There is a special allowance for public servants<sup>4</sup> of institutions that pay additional 3.5 % out of salaries as contributions. There is a limit of 90 000 RMB for these insurees. Beside this allowance the public servants have to pay out-of-pocket only 40 % of the basic deductibles and only 40 % of the basic co-insurance rates are applied for them. There is a supplemental insurance for 50 RMB annually paid through employers that increases the upper limit for the coverage up to 230 000 RMB.

A higher co-insurance rate is applied (30 %) in case of treatment in a hospital outside Jilin province. There is only one deductible per year for treatment of 7 serious diseases. There are also another out-of-pocket payments for some drugs rendered during an in-patient treatment.

There are some categories of out-patient treatments that are covered from the provincial medical insurance scheme<sup>5</sup>. For these treatments annual deductible of 1 000 is applied with co-insurance rates according to the following table.

| Annual expenses (RMB) | Co-insurance rate |
|-----------------------|-------------------|
| 1 000 – 6 000         | 30 %              |
| 6 000 – 10 000        | 20 %              |

**Table 2 Co-insurance rates in out-patient care in the Jilin provincial scheme**

<sup>2</sup> For comparison an average annual salary of employees covered by the provincial fund is 25 000 RMB.

<sup>3</sup> The upper limits relate only to payments from the medical insurance administration. They don't include cost-sharing of an insuree.

<sup>4</sup> This category accounts for 95 % of all insurees of the provincial medical insurance administration.

<sup>5</sup> Probably a precondition for coverage of out-patient care from the medical insurance scheme is using of one's individual saving account first.

Another out-patient care and cost-sharing in both out-patient and in-patient care can be paid out of individual savings accounts. The following rules are used for allocation of money to the individual saving accounts:

| Category of insurees       | Allocation to the individual saving account (% of salary) |
|----------------------------|---|
| employee of age < 45 years | 3 %   |
| employee of age > 45 years | 3.5 %   |
| retired                    | 4.5 %   |

**Table 3 Allocation to the individual saving accounts**

The provincial medical insurance administration has contracts with hospitals (currently with 46 hospitals) and with pharmacies (currently with 76 pharmacies). There is no contracting towards the community medical centres.

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 diagnosis.

The provincial medical insurance administration has about 50 employees and it has only one office (in Changchun).

Regarding IT, there is a server based information system in place. The PC computers are connected via LAN. The hospitals and pharmacies are connected on-line to this information system. There is IT staff employed by the provincial medical insurance administration. However, maintenance of the information system is accomplished by an IT department in the labour security administration at the provincial level. The information system was implemented by an external software company in 2006.

The IT system supports registration of insurees, issuance of insurance cards (chip cards), keeping track of contributions payment and remuneration of hospitals and pharmacies. There is no link of the information system on the other schemes of the social insurance for cross checking of the contribution payments.

There are some reports produced by the IT system on monthly and quarterly basis. These reports summarize some aggregated data on individual employers (number of insurees and contributions) and some aggregated data on the contracted hospitals. A set of aggregated indicators is prepared for the labour security bureau annually.

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

## **2.2 Municipal medical insurance scheme in Changchun**

The municipal medical insurance administration in Changchun was established for employees at 2001 and it started to insure residents in 2006. It currently covers 1.52 million employees and 1.55 residents. The residents are covered on voluntary basis. Some categories of residents are still not covered, e.g. university students. The administration has about 100 workers in the headquarters. There are 9 districts in Changchun city; with no pooling at the level of districts. Operations at the level of the districts are ensured by local government service administrations.

Regarding contributions, benefits and remuneration mechanisms the municipal medical insurance scheme resembles the provincial medical insurance scheme. However, the scheme is not as generous as in the provincial case. The following table summarizes contribution rates for the different categories of insurees.

| Category                          | Rate/individual contribution | State subsidy |
|-----------------------------------|------------------------------|---------------|
| employers                         | 7 %                          |               |
| employees                         | 2 %                          |               |
| other residents                   | 200 RMB <sup>6</sup>         | 40 RMB        |
| elderly above 60                  | 100 RMB                      | 140 RMB       |
| enjoying Minimal Living Allowance | 0 RMB                        | 240 RMB       |
| unemployed                        | 100 RMB                      | 140 RMB       |
| students                          | 35 RMB                       | 40 RMB        |
| children                          | 35 RMB                       | 40 RMB        |

**Table 4 Contribution rates in the municipal medical insurance scheme in Changchun**

The benefit package for insurees is oriented towards major risks like in-patient care. Out-patient care is not covered from pooled medical insurance fund. The following tables show the cost-sharing scheme used for the municipal medical insurance scheme:

| Category of a hospital | Deductibles (RMB) |
|------------------------|-------------------|
| A                      | 900               |
| B                      | 600               |
| C                      | 300               |

**Table 5 Deductibles for residents in the municipal medical insurance scheme in Changchun**

| Annual expenses (RMB) | Co-insurance rate |
|-----------------------|-------------------|
| below 5 000           | 50 %              |
| 5 000 – 45 000        | 45 %              |

**Table 6 Co-insurance rates for residents in the municipal medical insurance scheme in Changchun**

There are ceilings for coverage. For a student, the limitation is 50 000 RMB. For a severe disease, it is 60 000 RMB. For other urban resident, it is 45 000 RMB. The following table shows an average structure of health care expenditures for different categories of insurees:

| Category of insurees | Out of insurance | Out of individual accounts | Out of pocket |
|----------------------|------------------|----------------------------|---------------|
| Employees            | 81 %             | 5 %                        | 14 %          |

<sup>6</sup> Annual rates for 2007



|           |      |                   |      |
|-----------|------|-------------------|------|
| Residents | 57 % | n.a. <sup>7</sup> | 43 % |
|-----------|------|-------------------|------|

**Table 7 Average structure of individual health care expenditures in Changchun**

Around 100 hospitals and around 200 pharmacies are contracted. It should be noted that in the terminology of the Changchun medical insurance scheme solely out-patient health centres are also designated as hospitals.

### **2.3 Organization, processes and information system**

The information system in the municipal medical insurance administration is from the software point of view the same as in the provincial administration. It is server based (20 servers Dell), the server operation system is UNIX and the database system MS SQL Server 2003. The total on-line hard disc space should be 30 TB. The information system is relatively new. It was upgraded in 2007. There is own staff for administration and maintenance of the information system (8 people).

The information system supports registration<sup>8</sup>, payment of contributions<sup>9</sup> and remuneration of the hospitals. The hospitals transfer data electronically on-line, once a month have to deliver to the medical insurance administration a signed invoice in a paper form. A social insurance chip card is issued; its validity starts next month after the registration and paying of the contributions. The insurance cards are issued by the community service administrations. The employers are obliged to report to the medical insurance administration all changes not later than on 20<sup>th</sup> each month.

The representatives of the municipal medical insurance administration mentioned as a major problem very restricted financing of internal operations of the medical insurance administration<sup>10</sup>.

### **2.4 Health care providers**

The expert had a chance to visit the hospital of the Jilin University. The hospital is the biggest one in the Jilin province. It has 2 200 beds and 3 000 employees. New premises of the hospital were just before finishing in time of the visit. The hospital has contracts with several medical insurance administrations- with the provincial medical insurance administration, with the municipal medical insurance administration, with farmer medical insurance scheme, with medical insurance administration of the Chinese railways and with business medical insurance (voluntary scheme). Revenue from the insurance administrations represents 60 % of total revenue of the hospital. Out-of-pocket payments stand for 40 % of revenue. Regarding insurees of the mandatory schemes, they pay around 20 % out -of- pocket, 80 % are covered by the

<sup>7</sup> There are no individual accounts for the residents.

<sup>8</sup> Necessary document are :ID card, a photo, labour contract for employees, certification on living for residents

<sup>9</sup> The residents pay the medical insurance contributions annually, the employees pay contributions monthly.

<sup>10</sup> The internal budget is not derived out of revenue but it is allocated by the local government.

medical insurance administrations. The remuneration mechanism applied by all medical insurance funds towards the hospital should be the same.

There is a hospital information system in place. The physicians in in-patient care departments directly enter the data to the information system and they transfer the data on-line to the corresponding medical insurance administration. The transfer can be cancelled before the deadline determined by terms of the remuneration by the medical insurance administration. According to discussions with the IT staff of the hospital the electronic transfer of the data to the medical insurance administration is done via a proprietary communication standard of the software company that apparently delivered both the hospital and medical insurance information systems. However, the question of an existence of a public data standard should be opened once more as there might be misunderstanding on this issue.

There is a specialized department for medical insurance affairs in the hospital. It has staff of 13 workers and its tasks comprise of training the hospital staff on medical insurance coverage, checking of data sent to the medical insurance administrations and of consultations for hospital staff and for patients. The hospital submits regularly data on its economy to the provincial Price Bureau as a background for decision on prices of the medical services.

There is a temporary difference between the support of the out-patient and in-patient care by the hospital information system. For out-patient care the whole treatment history is recorded in a medical insurance notebook of the patient. Results of diagnostic examinations are given in hands of a patient that delivers them to the examining physician. However, prescriptions to a hospital pharmacy are delivered in an electronic way. For in-patient care movement of all data on treatment is in the electronic way. However, the medical documentation is led simultaneously in a paper form.

### 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:

- *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 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 framework<sup>11</sup>.

Regarding the second 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.

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<sup>11</sup> It was discussed during the meetings but with no clear answer.



Such enhancement would be also in line with the objectives of the PROMISS project 6 that are targeted to an improvement managing and forecasting system of the medical insurance agencies.

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 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.

The representatives of the provincial medical insurance administration also discussed briefly their expectations for up coming co-operation within the PROMISS project 11, namely:

- improving of business processes of medical insurance administrations
- enhancing the analytical part of medical insurance system (in line with the recommendation above)
- improving data security measures in the health information system

## Annex

### Rapid assessment of the IT solutions

| Characteristics of the IT                             | Jilin provincial medical insurance administration <sup>12</sup> | Municipal medical insurance administration in Changchun |
|---|---|---|
| <b>Supported processes</b>                            |   |   |
| Registration of employers                             | yes   | yes   |
| Registration of insurees                              | yes   | yes   |
| Issuance of an insurance card                         | yes (chip card)   | yes (chip card)   |
| Collection of contributions                           | yes   | yes   |
| Managing of individual health accounts                | yes   | yes   |
| Processing in-patient bills                           | yes   | yes   |
| Processing out-patient bills                          | yes   | yes   |
| Remuneration of in-patient facilities                 | yes   | yes   |
| Remuneration of out-patient facilities                | yes   | yes   |
| Checking of patients' bills                           | yes   | yes   |
| Internal operations                                   | ?   | ?   |
| <b>Decision support</b>                               |   |   |
| Operational reports                                   | yes   | yes   |
| Comprehensive BI solutions                            | no  | no  |
| <b>Uniqueness of the IT solutions</b>                 |   |   |
| One solution  | yes   | yes   |
| Several co-operating solutions                        | no  | no  |
| Several isolated solutions                            | no  | no  |
| <b>Type of the IT solutions</b>                       |   |   |
| Centralized web based                                 | yes   | yes   |
| Distributed   | no  | no  |
| Desktop   | no  | no  |
| <b>Platforms</b>                                      |   |   |
| Operation system                                      | Unix (? )   | Unix  |
| Database  | MS SQL Server 2003 (?)  | MS SQL Server 2003                                      |
| Networking  | yes (LAN)   | yes (LAN)   |
| <b>Number of users</b>                                |   |   |
| Connected on-line                                     | 30 (est.)   | 100   |
| Off-line  |   |   |
| <b>External interfaces of the IT solutions</b>        |   |   |
| <i>To/from higher level of HI</i>                     |   |   |
| -transferred data                                     | set of standard indicators                                      | set of standard indicators                              |
| -way of transfer (paper, on-line, off-line)           | paper form (?)  | paper form (?)  |
| <i>To/from lower level of HI</i>                      |   |   |
| -transferred data                                     | set of standard indicators                                      | set of standard indicators                              |
| -way of transfer (paper, on-line, off-line)           | paper form (?)  | paper form (?)  |
| <i>To/from health care providers</i>                  |   |   |
| -transferred data                                     | a detailed bill with services and medicines                     | a detailed bill with services and medicines             |
| -way of transfer (paper, on-line, off-line)           | on-line   | on-line   |
| <b>Development of the IT solutions</b>                |   |   |
| By internal staff of the HIA                          | no (only some reports)  | no (only some reports)                                  |
| By an external software company                       | yes (in 2006)   | yes (in 2007)   |
| Usage of packaged solutions                           | no  | no  |
| <b>Maintenance of the IT solutions</b>                |   |   |
| They are not maintained at all                        | no  | no  |
| By an external commercial company                     | no  | no  |
| By an external state/public institution               | yes   | no  |
| By internal staff of the HIA                          | no  | yes   |
| <b>Organizational background for the IT</b>           |   |   |
| Internal IT department                                | yes   | yes   |
| Contracted specialists                                | no  | no  |
| Number of workforce                                   | ?   | 8   |
| <b>Security of the IT solutions</b>                   |   |   |
| Access to the IT solution by an username and password | yes   | yes   |
| Access to the IT solution through a personal card     | ?   | yes   |
| Access controlled by another way                      | no  | no  |

<sup>12</sup> The information system for the provincial scheme should be the same as for the municipal scheme.