

The necessity to have an integrated national information system in the public health care system: A Case study from Romania

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Abstract

In the last few years in Romania started a complex project in order to create an effective informational structure in the public health system. The aim of the project also tries to demonstrate the utility of this informational system for the deliverance of European Health Insurance Card (EHIC), as well as for a smart card for every insured person. If the first type of cards is available and operates now in Romania (see figure 1), the second type is on the stage of design. The smart card will store insured persons' details, contribution obligor's data, data concerning compulsory and voluntary health insurance, data on selected personal physicians and

organ donation, electronic order for technical aids, documentation of issued drugs, medical record pointers etc. The start point to design a proper information system is related to the network that contains the activities' flow concern county Health Insurance House and for this in the figure 2 is presented the case for Prahova Health Insurance House.

Keywords: Management Information System, Integrated national information system, public health care system, health care providers, flows activities, Health Insurance House, hospitals, information flows, efficiency of the information system, electronic circuit for medical services

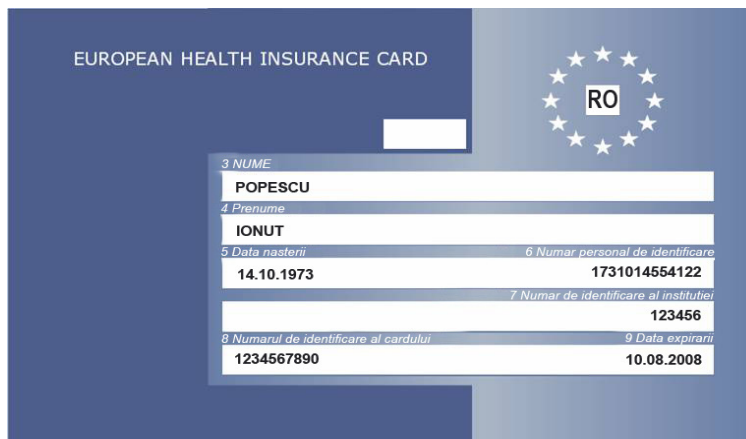


Figure 1 Example of European Health Insurance Card (EHIC) edited in Romania¹

¹ Source for the example: <http://www.ceass.ro/index.php?nav=home&lang=en>

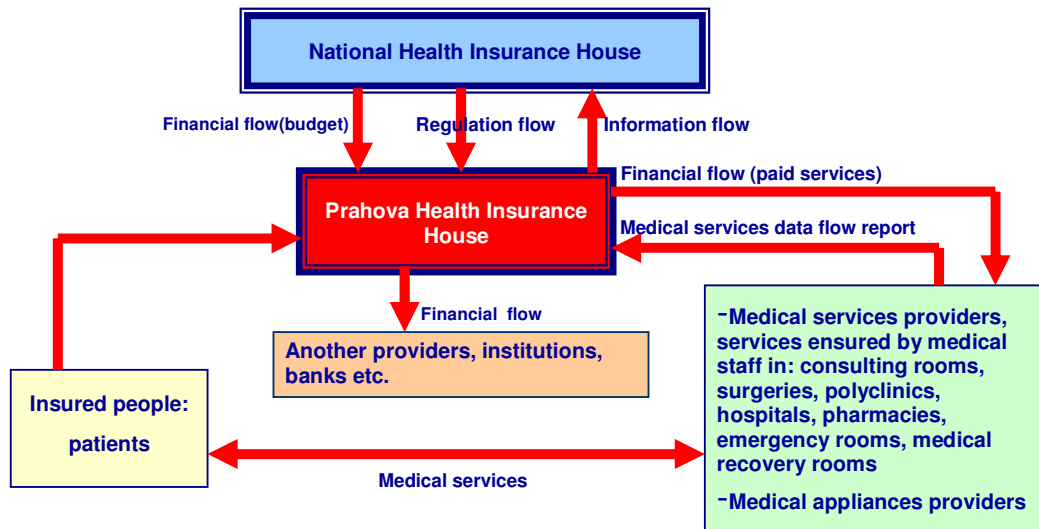


Figure 2 Flows of activities in the case of Prahova Health Insurance House

1. Opportunity for the subject

Referring to the above figure is important to know that Romanian National Insurance House (RNHIH) is an autonomous public health institution, of national interest, with legal personality, which administrates and manages the health insurance system in order to apply the government's policies and programs in the health field. The main tasks of the RNHIH are ensuring unitary insurance of the entitled population and the coordinated functioning of the Romanian health insurance system². On the other hand, regional health insurance houses (RHIH) are public institutions, with their own budgets, subordinated to the RNHIH. The RHIHs collect the contributions of the natural persons and manage the budget of the approved fund. The RHIHs ensure the functioning of the social health insurance system at the local level and can develop also activities to valorise the funds they manage. Related to this structure there is a need for a proper design of an integrated information system, that is able to gather and process a huge volume of data and information in order to have better medical services, to cut costs, to achieve important money savings, to reduce time in obtain medical and financial information, to monitor much easier each patient and each health care provider etc. This paper is focused on explaining how is managed the information to the level of a health care provider (such as a hospital). This represents only a part of the information system existing in the case of Prahova Health Insurance House. If we make some calculus concern the percent representing the medical services covered by the hospitals we could state that hospital is the main health care provider. Therefore each hospital needs to have an appropriate management information

system that enables to deliver better medical services and to be funded to the best level by the Health Insurance House. Hereinafter is presented the case of one of the most important hospitals from Ploiesti, Romania: Municipal Hospital of Ploiești.

2. The Management Information System of "Municipal" Hospital from Ploiesti

The management information system of the Municipal Hospital from Ploiești, Romania is performed within the information system, which represents an important management component, by means of its three functions:

- the decision-making function, which provides the information elements that are necessary to establish and to adopt decisions;
 - the operational function – which helps providing the informational basis needed to initiate actions required for the enforcement of decisions;
 - the documentation function, which provides the refreshment of the information within the hospital;
- For the good operation of this system, the hospital was equipped with 45 computers, all of them connected to the Internet, arranged in a network (network type: fast-ethernet 10/100 Mb/s, with upgrade possibility 1000 Mb/s, LAN). Internet access: ADSL modem, speed of 8 Mb/s, with router-distributed signal.

The main informational situations are used by:

- The medical statistics and information technology department;
- The check-in and information office;
- The accounting department;
- RUNOS (Human Resources) department;
- The juridical department.

The most commonly used information applications are: WORD, FOX-PRO, EXCEL, ACCESS.

² Source <http://www.ceass.ro/index.php?nav=glos&lang=en>

The information systems used are based on the unique data input principle and their multiple processing, in accordance with the nature of the subsystem and component applications, which leads to the concept of integrated information system.

The information used within the hospital is various and its correct processing, storage and processing are required. In this respect, we shall make a short presentation of the main responsibilities of those who manage the information within the hospital (these responsibilities are taken from the organization and operating code regulations of the hospital).

a) The Medical Statistics and Information Technology Department has the following responsibilities:

1) to design, install, configure and maintain the computer network and of the data base of the hospital;

2) to ensure the best operation of the workstations and of the server;

3) to introduce daily in the data base the hospitalised patients, the patients consulted in special surgeries from the ambulatory of the hospital who benefited of treatment in the Recovery laboratory, physical medicine and balneology, the patients who underwent paraclinical investigations, as well as the centralisation and sending of the respective data to C.A.S. Prahova, on the established deadlines;

4) to centralize the data introduced in the DRG National application (the minimum data set for each patient) and to report them to S.N.S.P.M.S. Bucharest;

5) to receive the validation of the released patients, of the activity reports of the hospital, and to communicate them to the management and to the hospital units;

6) to keep record of the released patients, to centralize the morbidity in the special ambulatory, to calculate the medical assistance indicators, to issue special registered forms specific to the medical activity (medical receipts, medical certificates, etc).

b) Check-in and information office which performs the selection of patients at check-in, makes up the medical records for the patients who are to be hospitalized, keeps the electronic evidence of the patients, performs encashment for the paid medical services, issuing fiscal documents in this respect, and offers information, directly or by telephone, to the persons who require medical assistance.

c) The juridical department guarantees the observance of the legal provisions regarding the activity in the hospital, permanently taking care of the acquirement of the normative acts in the domain by the heads of units and of the functional

departments, who are liable to apply them at their work places.

In this respect, the legal adviser:

1) shall endorse, at the request of the management, the documents that may involve the patrimonial responsibility of the unit, as well as any other documents with legal outcome;

2) shall draw up summons requests, those regarding the means of appeal, the complaints to the criminal prosecution bodies, as well as other similar documents, and shall help in drawing up the documents that require legal knowledge;

3) shall represent and defend the interests of the hospital in any kind of Law Courts or other bodies with jurisdictional character, based on the written appointment from the management;

4) shall see to obtain enforceable titles from the Law Courts and shall notify the Financial Manager or the competent enforcement body (as the case may be) in order to take enforcement measures;

5) shall monitor the issuance of new applicable normative acts within the hospital and shall notify the management and the interested departments about their responsibilities that result from these acts.

d) The Human Resources Department shall provide the unit with the appropriate personnel and with their remuneration rights, by observing the legal provisions.

In this respect, the responsibilities of the RUNOS office related to the information circulation are to keep permanent contact with the employees of the hospital, whom they have to communicate all the changes in their employment record books, to inform them about potential training courses, about the competitions for job openings. At the same time, the Human Resources department shall draw up the reports and the statistics regarding the personnel activity, as well as send these reports to the competent bodies on the established deadlines.

e) The Accounting Department provides the financial-accounting activity for the whole hospital, including student surgeries and the assigned school surgeries, performing mainly the following operations, by means of the special personnel:

- the development of the budget execution, of the reports regarding the costs of the budget assets and of the expense monitoring, as well as of other reports required by the competent bodies, on the established deadlines;

- the development of warranty agreements for administrators and of the deduction inventory, as well as the development of administration commitments for the persons in charge, but shall not represent material warranty;

- the development of monthly trial balances and of trimestrial balance sheets and their handing over on

the deadlines established by the secondary credit accountant.

There is permanent communication between the above-mentioned departments, the management of the hospital, the personnel in the units of the hospital and the special ambulatory.

The medical statistics and information technology department has a special importance in the use of information. It manages all the emails received at the address of the hospital; they are recorded and sent both to the management and to the directly interested persons.

At the same time, it centralizes the data concerning the hospitalised patients, of those who receive medical attention in the ambulatory or who benefit of paraclinical investigations. The data are introduced in specific programs, and the reports requested by the authorities are performed: CAS-PH, The Public Health Authority Prahova (ASP-PH), The National School of Public Health and Sanitary Management.

These reports have a special importance in the financing process of the hospital, whose services are discounted by CAS-PH as follows: for continuous hospitalization, according to the number of casualties afferent to the released patients and validated by SNSPMS (The National School of Public Health and Sanitary Management).

- for day hospitalization, the discount shall be made according to the number of medical services performed or according to the number of resolved casualties during the day hospitalization, without exceeding the contracted values with CAS-PH.

- for paraclinical examinations (laboratory, radiology, examination functions), according to the number of

investigations performed and within the limit of the contract with CAS-PH.

For continuous hospitalizations, there was introduced, starting with 2003, the obligation to electronically store the clinical information within the DRG (grouping in diagnosis groups) system, in order to have a better picture of the results of the hospital and to be able to compare its achievements with the achievements of other hospitals. The electronic medical record must coincide with the clinical medical record under all its aspects. If occur some errors in the recording process of the clinical data at a patient level, the respective medical record shall be invalidated by SNSPMS, which results in the reduction of the money amount paid by CAS-PH. The program used for DRG is ACCESS, a program that allows us to introduce the data and to perform a series of reports, which are necessary for other applications and for statistical reports.

The data in the DRG program are introduced for each unit and are centralized on a monthly basis by the Statistics Department. The data are taken over from the network, are imported in the central data base, are checked in order to correct potential operation errors and then are encrypted and sent via email to SNSPMS. After the data have been ranked in DRG groups and validated, SNSPMS shall send reports (also via email) both to the hospital, and to CAS-PH (Prahova Health Insurance House), which has to pay the medical cases validated by SNSPMS. The information route regarding the minimum set of data at the patient level in continuous hospitalization is presented in the diagram below (figure 3):

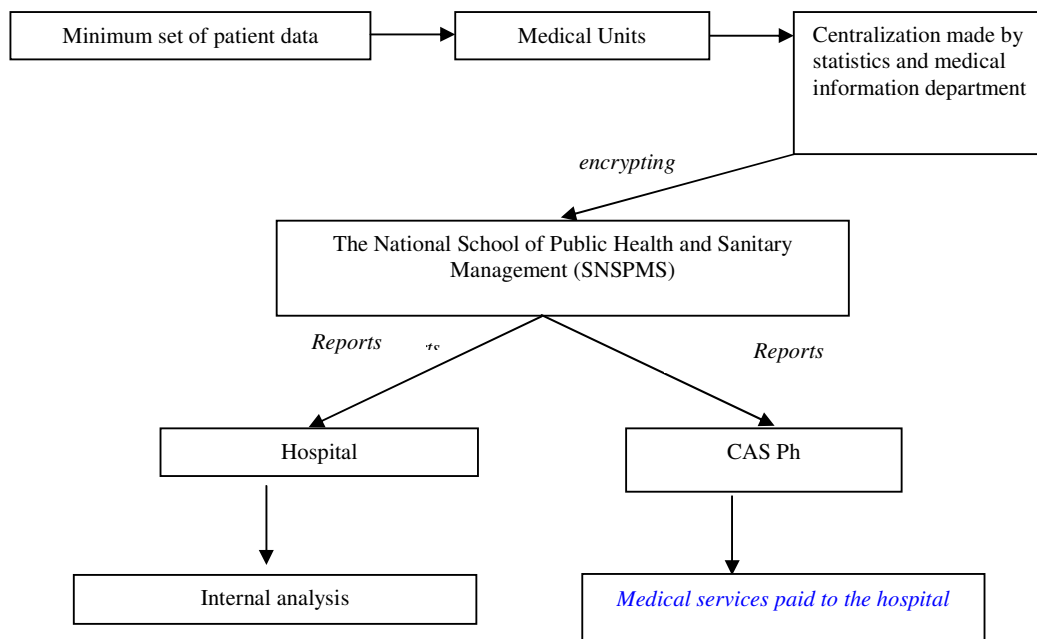


Figure 3 Information routes regarding the minimum set of data at the patient level

For day hospitalization, there also exists a process of electronic storage of data, in Access program as well (1 Day hospitalization code 1.1.), data which are sent to SNSPMS. However, this reporting is only statistical; it is not taken into account in the financing process. The reporting of the services from day hospitalization is also made towards CAS-PH, using a program made available by CAS-PH (in Fox-Pro), this reporting being the one that is important for the discount of the medical services performed. This information shall be sent to CAS-PH in electronic format (on floppy disk) and printed reports.

The information about laboratory investigations and radiology is also sent in FOX-developed programs. The introduction of the data in these programs shall be made by the Statistics Department, after the received data have been centralized from these laboratories.

Excel is used to report the performance indicators of the hospital management to ASP-PH. The calculation of indicators shall be made after all the data in the hospital and in the special ambulatory have been centralized by the Statistics Department. The outcomes are sent to the Management Board and shall also be sent to ASP-PH via email.

There are also other types of information that is sent to CAS-PH via email only (the report about the patients who benefited of medical services on the basis of the social health security European card, the reports about the patients hospitalized after accidents at work).

The Human Resource Department and the Accounting Department are permanently connected to the medical statistics department, providing it the

necessary information to calculate various statistical indicators.

We should mention the fact that data processing regarding the patients of the hospital takes place by keeping confidentiality and by protecting the information about patients. Out of this reason, the DRG reports are made after the data have been encrypted (the PNC of the patient is encrypted, as well as the seal code of the doctor, and the name of the patient is erased from the encrypted file – the operation takes place after the encrypted export from the DRG data base).

The management of the hospital showed is interested in the relation with the patients by creating a site of the hospital. The hospital has a collaboration agreement with a special firm, for the creation and maintenance of this site.

The patients who would like to find out more information about the medical service package offered by the Municipal Hospital of Ploiești, about the working schedule of the special surgeries, about the necessary documents for consultation, may obtain it by browsing the site of the hospital: www.spitalulmunicipalPloiesti.ro.

3. Conclusions

To improve the efficiency of the information system in the case of the hospital, as a main health care provider there is a need to redesign the information flows both inside and outside hospital. Below is presented an electronic circuit for medical services delivered by the hospital in relation with Health Insurance House (figure 4), which have started not so long time ago.

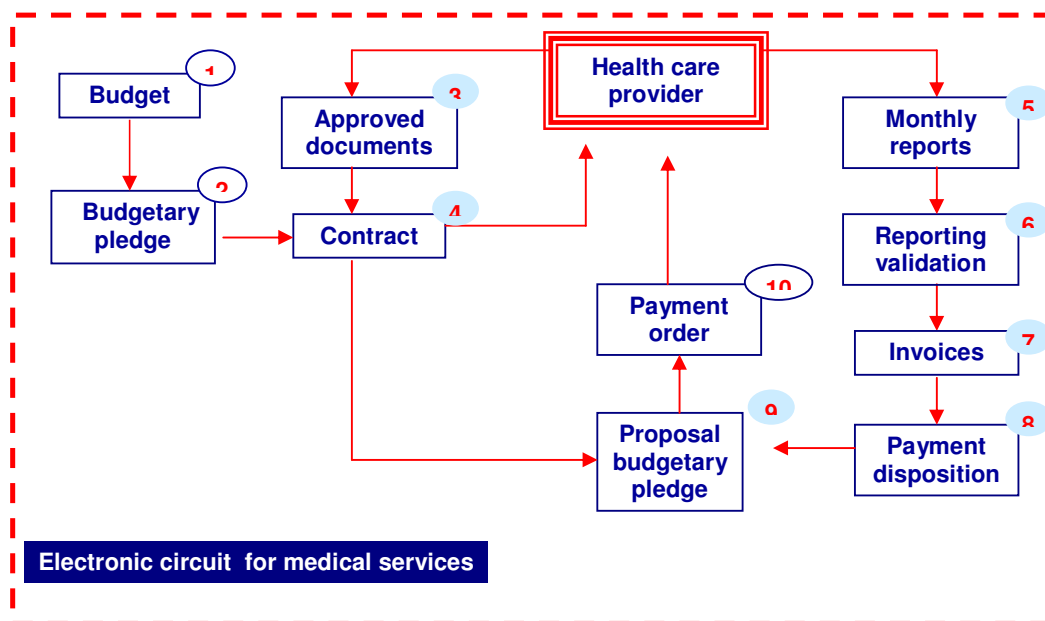


Figure 4 Electronic circuit for medical services delivered by the hospital in the contractual relation with the Health Insurance House

Overall, we consider that the Municipal Hospital of Ploiești has a good information system, which observes the requirements of the hospital activity; there is a good communication among various departments of the hospital and so all the reports required by the authorities (including Prahova Health Insurance House) that he have mentioned in this paper have been performed in due time, thus proving total transparency of activity. The fact that, at the end of 2007, the hospital had all own medical records included in the DRG system validated, that the performance indicators of the hospital were framed within the values negotiated by the managers of the hospital with the Ministry of Health with maximum score, demonstrate that information is correctly managed in our hospital, that there is good communication, both inside and outside the hospital (higher management, patients, collaborators) and the activity of the hospital has taken place at high levels of performance.

Nevertheless, there are some negative elements in this system, such as:

- deficiency in the number of personnel specialised in medical information technology;
- although the hospital has a great number of computers, some more would be needed in the special ambulatory, because not all surgeries are equipped with computers;
- the undergraduate sanitary personnel should be guided to attend information technology courses, because not all of them are capable of using a computer, which makes it impossible for them to

keep records in electronic format, especially at the level of special surgeries, where the record of patients is still done on paper, while the registration in electronic format is performed by the statistics department, which implies a much higher amount of work for this department.

4. References

- [1] Vlădescu, C. (coord.) - *Managementul serviciilor de sănătate*, Editura Expert, București, 2000.
- [2] www.euro.who.info/observatory/ctryinfo - WHO Regional Office for European health for all database
- [3] www.euro.who.info/observatory/ctryinfo - *Health Care Systems in Transition* for France, United Kingdom, Spain, Hungary, Romania, Germany, Portugal, Italy, Luxembourg, Sweden, Switzerland, Denmark, Netherlands, Belgium, Bulgaria, Estonia, Austria
- [4] www.euro.who.info/observatory/ctryinfo - European Observatory on Health Systems and Policies
- [5] www.casph.ro - web site of Prahova Health Insurance House
- [6] www.spitalulmunicipalPloiesti.ro - web site of Municipal Hospital from Ploiesti, Romania
- [7] www.ceass.ro/index.php

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