eHealth strategy and implementation activities in Romania

Report in the framework of the eHealth ERA project

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About *eHealth ERA* and this report

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1 Executive summary

The healthcare environment

Romania is a semi-presidential democratic republic where executive functions are shared between the president and the prime minister. The country entered the European Union in 2007. Romania is divided into 41e counties (*județ*). The municipality of Bucharest (Bucureşti) is considered also a county. Recently, the counties were grouped in eight regions.

The Ministry of Public Health (MPH) is responsible for the health policy, regulations, health programmes, investments in public health establishments. The main regulatory law in the Romanian healthcare environment is currently the *Health Reform Law* 95/2006 which establishes the organization of healthcare, institutions, financing, organization of health insurance, personnel (doctors, dentists, pharmacists etc.), their responsibilities and official organizations etc.

The public healthcare is financed from the state budget, local budgets, social health insurance and other sources. There is also an optional, voluntary health insurance network, for complementary and supplementary services. The state and local budgets are mainly sustaining health programmes and investments in buildings, appliances, endowment etc., while the health insurance covers mainly the healthcare services, the drugs reimbursement and the „per capita" wages of the general practitioners.

As a result of the Romanian health reform, after 1999, most of the healthcare units, except the hospitals, were privatized (however, some new private hospitals were set up). Also, in the nineties, most of the pharmacies and the drug distribution were privatized. After this reform, including also decentralization, the funding process became polycentric. Therefore the previous, pyramidal, unique, reporting and information system in health services administration was replaced by several independent (sometimes pyramidal) systems.

Romanian eHealth

The Law 95/2006 requires the Ministry of Public Health to establish an integrated information system for public health management. Other eHealth provisions in the same law relate to requirements for information on communicable diseases, emergency care, community assistance, hospital information, recognition of national Romanian health insurance cards and other similar foreign cards etc.

The *Information and Communication Technology (ICT)* endowment of the public hospitals is in development. In 2005 the national average was 14.75 hospital beds per one workstation. All public hospitals use software for a *Diagnosis Related Group (DRG)* system. In many cities, computerized information systems for emergency healthcare and telemedicine applications are running. National databases of healthcare professionals, healthcare units, endowment etc. and computerized national registers for some chronic diseases are operating since the mid-seventies.

Medical informatics is accepted as a regular course in all medical universities and faculties of Romania. In some universities optional ICT training for healthcare professionals as well as public courses are organized. The job profile "Health ICT specialist" is not yet recognized in Romania. Jobs equivalent of "Chief Information Officer" are only in some administrative

structures, as in Health Insurance Houses. Only larger hospitals have some ICT specialists, the hospitals usually outsource the more complex ICT activities.

Government eHealth strategies and projects

The Ministry of Public Health (MPH) has a *Strategic Plan for 2008-2010* underlining the necessity of a new integrated health services information system, with patient monitoring. But in 2007 no official eHealth strategy and no formal eHealth national roadmap are in force.

Several eHealth strategies were adopted in the nineties by the MPH, and after 2000 in cooperation with the Ministry of Communications and Information Technology (MCIT – responsible of a greater eGovernment project). The representative of MPH announced in April 2007 that efforts are in progress to elaborate a new National eHealth Strategy for Romania. A project funded in the framework of the European programme "Phare" at the Ministry of Public Health is targeting such a strategy for 2008.

The *Centre for Health Computing and Statistics* (CHCS) was responsible for decades for the health coding and statistics in Romania (in accordance with WHO, EU etc. regulations or recommendations), and carried on reporting to the *World Health Organization* (WHO) and other organizations. It has helped to coordinate Romanian healthcare sector IT policy. In 2006 CHCS was restructured as a "*National Centre for Organizing and Ensuring the Health Information System*" (NCOEHIS).

No major eHealth research programmes are underway or in preparation. However, there are a number of eHealth research projects, but they are not organized in programmes and sometimes are not correlated.

The most important eHealth project in Romania in the last years, started in 2003 and still in progress, is the *Unique Integrated Information System of Social Health Insurances* (SIUI) of Romania, realized by HP and SIVECO Romania, and funded by the social insurance system.

Another important project, funded by *Phare*, was the "*Improvement of accountability and transparency in the allocation and use of healthcare resources through implementation of a computerized monitoring system for hospital morbidity and a hospital case based financing system*", based on the Australian AR-DRG version 5 classification. The project was realized between 2005 and 2007 and is now in operation in all Romanian public hospitals.

In 2007, the Ministry of Public Health started a huge health evaluation programme, collecting health information on all citizens. The data collected by this programme is expected to be included, until end of 2008, in an integrated, citizen oriented, public health management information system.

At the end of 2007 an electronic *National health insurance card* should be issued for all citizens, with a minimum personal and health data, for use in emergencies, and proving that the owner is insured in the social health insurance system of Romania. A unique identifier – a 13 digit ID number – will be used for all patients, physicians, pharmacists etc. It was proposed also as an identifier of Romanian citizens in the EU (with the country prefix RO).

Although a national *health portal* project was carried on by the Ministry of Communications and Information Technology in cooperation with the Ministry of Public Health and with some IT companies, frequent changes in the management of both ministries a relatively low priority for the portal, as well as some administrative barriers stopped the proper updating of this portal. A partial substitute for the public health portal are the sites of the *Ministry of Public Health*, of the *National House of Health Insurance*, and of the Romanian *National Medicines Agency*. More

successful were in this direction some smaller commercial portals, administrated by private companies.

In all county capitals and in most cities *emergency centres* are organized, with computerized ambulance dispatching applications. These applications are of different origin. All are accessed by the Unique Call Number 112. Personal wearable tele-monitoring systems are proposed by some commercial companies on foreign solutions. Projects are in progress for telemedicine solutions, mainly for emergency (ambulances connected to the hospital), helping the population with medical advice, consulting and/or giving a second opinion in remote places and education and training for medical staff.

There are many other smaller eHealth projects in progress for Hospital information systems, telemedicine etc. Their funding is done from the budget of the beneficiary institution, or of the research institution. A number of eHealth projects gained grants from non-eHealth or from EU programmes.

Interoperability and standards

Romania is represented, mainly by experts from Ministry of Public Health and Ministry of Communication and Information Technology in the i2010 Subgroup on *eHealth* and the *eHealth interoperability expert group* organized by The European Commission – Information Society and Media Directorate General. Also, in August 2007 the Minister of Public Health signed, on behalf of Romania, the "Letter of Intent" for the participation in the *eHealth Initiative* for initiating the preparation of a successful proposal for a Large Scale Pilot on interoperability. Romania is still participating at two international eHealth projects for interoperability: "*Near to Needs"*, (2001-2007) with Italy, and *Health Optimum* started in January 2007 with Italy (coordinator), Spain, Denmark, Sweden, and Belgium.

The *National Centre for Organising and Ensuring the Health Information System* (NCOEHIS) was responsible for introducing in the Romanian healthcare environment a set of regulations and standards, mainly for coding, recommended also for eHealth projects. In October 2006 the *HL7 Romania* organization was set up, including the main national stakeholders.

Resources:

http://www.ms.ro/

http://mcti.ro/index.php?L=1

http://www.casan.ro/

http://medinfo.umft.ro/rsmi/

http://www.anm.ro/en/home.html

http://www.asro.ro/engleza2005/default_eng.html

2 Healthcare system overview

Healthcare in Romania

Romania is a republic where executive functions are shared between the president and the prime minister. The country entered into the European Union in 2007. Romania is divided into forty-one counties (*judeţ*) as well as the municipality of Bucharest (Bucureşti), which is its own administrative unit. For better administration, the counties were grouped in eight regions. Recently, several health services (State Health Inspection, Medical Assistance Agency, Institutes for Public Health) were reorganized corresponding to these regions.

In 2006 Romania had, for a population of 21,584,365 people, 46,936 physicians, with 11,606 general practitioners. There were 496 public hospitals, including social medical centres, 2363 clinical ambulatories, 963 para-clinical ambulatories, 4709 dentistries, 3168 pharmacies, 44 ambulance departments, 47 home care service providers.

The *Ministry of Public Health (MPH)* is responsible for the public health, the health policy, regulations, health programmes, investments in public health establishments. MPH coordinates, through *Regional Health Authorities*, and county offices, the public healthcare policy for all types of health units, public or private. However, some ministries have their own healthcare network. The national health programmes are administrated by a *National Agency for Health Programmes*, in the framework of the Ministry of Public Health.

Regulatory framework

The main regulatory law in the Romanian healthcare environment is the *Health Reform Law 95/2006* which establishes the organization of healthcare, institutions, financing, organization of health insurance, personnel (doctors, dentists, pharmacists etc.), their responsibilities and professional organizations etc. There are also appropriate Government Decrees (e.g. for health programmes), Ministry Orders, strategies and others.

The main measures undertaken in the last ten years, in the frame of the „health reform", were: privatizing almost all primary and specialty outpatient healthcare, introducing public (social) and private health insurance and stimulating the primary healthcare, prevention, decentralization and professional management of hospitals. Patients are recommended to have a family physician (GP) and to announce him about changes in their health status. The citizens can freely choose the family physician but should stay at least three months before change him. To have the hospital expenses reimbursed, the patient should go to the hospital recommended by the family physician. Some steps were made to expand community based healthcare services, mainly for elder, handicapped etc.

A Public Integrated Emergency Assistance is ensured by public structures subordinated to the Ministry of Public Health, Ministry of Interior and Administrative Reform and/or local authorities by a *unique call number 112*.

Funding

The public healthcare is financed from the state budget, local budgets, social health insurance and other sources. The state and local budgets are mainly sustaining health programmes and investments in buildings, appliances, endowment etc., while the health insurance covers mainly the healthcare services, the drugs reimbursement and the „per capita" wages of the general practitioners. For investments, external loans were obtained, from the *World Bank* and the *European Investment Bank*. Public spending on health has been increasing at a sustainable pace. However, there are potential pressures on expenditures – such as rising

pharmaceutical costs and planned hospital investments – that could reduce Romania's ability to address the health system's other problems.

The administration of the social health insurance is done by the *National Health Insurance House* (NHIH) and by "insurance houses", one in each county and in the municipality of Bucharest, as well as for the own healthcare network of some Ministries. The funds are collected mainly from the employers and the employees, but the insurance covers, without payment: children (up to 18, or up to 26 if they are students), dependant family members, non-professional soldiers, unemployed, poor, retired with low pension, arrested, formerly politically prosecuted etc. For family doctors, the "per capita" payment system prevails; for hospitals a DRG type payment system is in operation. A minimal package is assured, for those who can not prove they are insured or they are in the situations above, mainly in emergencies, epidemic diseases, pregnancy and confinement, as well as in family planning. There is also an optional, voluntary health insurance network, for complementary and supplementary services.

A framework contract, between the NHIH and the organizations of health professionals, employers and trade unions, is negotiated each year.

To combat the excessive consumption, a tax was introduced on tobacco and drinks with high level of alcohol. This tax finances a *National Health Fund*, used mainly for investments in public healthcare infrastructure and for national health programmes.

Though overall health indicators of Romania, including financing, have improved over the last years, there are still regional disparities in health outcomes which are masked by national averages. People in rural areas still have difficulties in accessing health services.

Health spending is still biased toward costly in-patient hospital care. To correct this bias, all public hospitals use now a Diagnosis Related Groups (DRG) reimbursement system, based on a minimal set of patient data.

Resources:

http://www.ms.ro/

http://www.smurd.com/

http://www.casan.ro/

www.amr.ro

www.cmr.ro

3 Strategic eHealth plans and policy measures

3.1 National and regional eHealth policy

Early health information systems

The Romanian Ministry of Health, with the Centre for Health Computing and Statistics (CHCS), began to build a Health Information System, in the early seventies. National databases of healthcare professionals, healthcare units, endowment etc. and computerized national registers for some chronic diseases have been operating since the mid-seventies till now.

CHCS was responsible for all the health statistics and coding (in accordance with WHO, EU etc.), and carried out reporting to the WHO and other organizations. It has helped to coordinate Romanian healthcare area IT policy for several decades and it was restructured in 2006 as a "*National Centre for Organising and Ensuring the Health Information System*" (NCOEHIS), with the same responsibilities.

The impact of the Health Reform

As a result of the Romanian health reform, the pharmacies and the drug distribution were privatized and, after 1999, most of the healthcare units, excepting the hospitals (however, some new private hospitals were set up).

After this reform, the funding process became polycentric. Therefore the previous, pyramidal, unique, reporting and information system in health services administration was replaced by several independent (sometimes pyramidal) systems:

- *The Health Management Information System (HMIS)*, with its components: Ministry of Public Health (MPH), National Centre for Organising and Ensuring the Health Information System, Regional and County Public Health Authorities, etc.;
- *Health Insurance Information Systems (HIIS):* The National Health Insurance System (central, county and offices), Other State Health Insurance Systems (army, transports etc.), Private Health Insurance;
- *Healthcare units information systems:* hospitals, other units with beds, policlinics, dispensaries, ambulance stations, blood harvesting and conservation centres, forensic medicine laboratories, drug warehouses and pharmacies, etc;
- *Information Systems of Health Research and Education*; *Information Systems of other healthcare organizations***:** The College of Physicians, The College of Pharmacists, healthcare professional associations etc; *Other providers*: producers and distributors of medical devices, drugs etc.

The information systems of all of these organizations were developed with appropriate IT projects, often introducing new data flows, and cutting others. The results were duplication of data gathering, alternate definitions and coding for the same concepts, leading to incompatibilities and inconsistencies in data reporting.

eHealth strategies

Starting with 1991 the Ministry of Health, with the Centre for Health Computing and Statistics elaborated several *national health IT strategies*. After 2000 the Ministry of Communications and Information Technology (MCIT – responsible of a greater eGovernment project) intervened. But in the last years these strategies were no more endorsed by the Ministry of Public Health as formal and official documents. Therefore, some new eHealth projects did not observe them.

The most recent eHealth strategy proposed for Romania, elaborated in 2005 with the contribution of all the main stakeholders, was focused on interoperability of the information systems of the Ministry of Public Health (and its components at central, regional and county levels) with those of the public and private health insurance, of the healthcare providers and other stakeholders. A general framework eHealth strategy was proposed first, to be observed by all "local level" health information strategies. It included the following goals among its main provisions: to develop an integrated, unique, national, patient oriented health information system, including an electronic health record; to assure the interoperability of the health information systems and databases existing in Romania, as well as of the projects in progress; to offer real time decision support tools both in the medical, economic and administrative fields; to issue a health card for each person; identifying patients and healthcare providers, and that such patient cards will contain minimum personal and health data, for use in emergencies; to establish permanent data exchange mechanisms and processes among the main actors; to avoid unnecessary duplication or gaps in data collection.

In the National Strategic Framework of the Romanian Government, for the period 2007-2013, the implementing of electronic healthcare services is emphasized as a priority. The Ministry of Public Health (MPH) has a *Strategic Plan for 2008-2010* underlining the necessity of a new, comprehensive, integrated health services information system, with patient monitoring, registers for non-communicable diseases, geografic information system, sites for disseminate information and education etc. But at this moment no formal eHealth strategy or national roadmap are in force.

As the representative of MPH announced in April 2007, efforts are in progress to elaborate a new *National eHealth Strategy* for Romania, with the objectives above, taking into consideration the ongoing eHealth projects and with the help of all main stakeholders (public institutions, professional associations, IT industry). The *National Centre for Organizing and Ensuring the Health Information System* (NCOEHIS) could be a "focal point" for such strategy working group. In this respect, in 2007, in NCOEHIS, a new "*Office for IT strategies and projects*" was organized.

A *Phare* project is envisioned for 2008 at the Ministry of Public Health, to realize a "*Feasibility study for the implementation of an Integrated Health Information System (IHIS)*", in close consultation with all Romanian health stakeholders. The main objective of this new information system should be: the integration of the main Romanian health information systems, a citizen-focused solution in the public health and a patient-focused solution in the curative medicine. In this Phare project a *framework eHealth strategy* will be elaborated too.

eHealth projects

In the years 1996-2000 a *Health Management Information System* project, funded by a World Bank loan, was realized at the level of Ministry of Health, of County Health Authorities and of all healthcare structures from one pilot county (hospitals, ambulatory, GPs, emergency, transfusion etc.). The successful components of this project are planned to be rolled out beginning with 2007 in Bucharest and other 13 counties.

The most important eHealth project in Romania in the last years – started in 2003 and still in progress – was the *Unique Integrated Information System of Social Health Insurances* (SIUI) of Romania, realized by HP and SIVECO Romania, funded by the insurance system. The new information system addresses all hierarchical structure of the *Social Health Insurance System* of Romania: the National House of Health Insurance, the County Houses of Health Insurance, and the medical and pharmaceutical service suppliers. The SIUI has components for finance, accounts, investments, inventory, purchase, payroll, human resources, buildings and

appliances maintenance etc. as well as a planning system with "what if" type simulations. Among the benefits, the elimination of double registered insured persons or double reporting of services, rapid statistical reports, better monitoring and control of the resources, eliminating waiting times etc. are expected.

In 2004 a pilot of SIUI was installed in Constanta County (608000 insured persons, 361 GPs etc.) and in 2006 and 2007 the system was rolled out in other counties.

Another important project, funded by Phare, was the "*Improvement of accountability and transparency in the allocation and use of healthcare resources through implementation of a computerized monitoring system for hospital morbidity and a hospital case based financing system*", realized between 2005 and 2007 and now in operation. The main objectives of the project were: to develop a national system for reporting and monitoring of hospital activity, based on data about individual patients. The system uses international standards of patient classification (coding and grouping systems) that reflect EU and WHO recommendations. It assures a hospital payment system based on the numbers and types of patients (cases) treated, reducing unnecessary hospitalizations and excessive hospital length of stay, and improving the quality of care. The former US DRG assignment, in use since 2000, was replaced with the Australian AR-DRG version 5 classification, and it was implemented gradually, starting with 1 January 2007 in all public hospitals. The new reporting requirements for DRG-related data were incorporated into an updated Minimum Basic Data Set (MBDS). Various training activities were made. The computer systems for DRG data were updated, including advising as to whether hospitals should have access to in-house DRG assignment software, and if so, how it might be done. The appropriate endowment of 431 public hospitals and 42 county health authorities, with workstations, printers, software etc. was realized.

In the last decade, several Hospital Information Systems, Emergency Information Systems, or for ambulatory care, were elaborated and implemented (some of them are presented here at 4.2). Almost all IT applications running now were provided by private Romanian IT industry. Some of the eHealth projects were made in international cooperation, mostly with Italian partners (e.g. "*Near to Needs*" or "*Health Optimum*", presented at 4.2.9 and 4.3 in this report).

Resources:

http://www.worldbank.org.ro/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/ROMANIAEXTN/0,,contentMDK:21382106~pagePK:1497618~piPK:217854~theSitePK:275154,00.html?cid=3001

http://www.cnas.ro/

http://www.infoworld.ro/Home/tabid/53/language/en-GB/Default.aspx

http://www.siveco.ro/

3.2 Investment and reimbursement framework

In 1990, in Romanian healthcare environment a unique investment framework was in act, the state budget allotted to the Ministry of Health. Among the many public health problems, the IT endowment was not a priority. As a result, the public health units, especially the hospitals, found different ways, including donations, to procure IT equipment. The basic software was sometimes copied without license and the specific one was made by nearby small local companies. Even the situation is better now, the endowment of public healthcare units is done mainly from their own budget.

In the years 1992-1994 and 1996-2000 two phases of a *Health Management Information System* project was realized, with a World Bank loan and from the state budget. The main beneficiaries were the Ministry of Health, the County Health Authorities and a small number of pilot healthcare units. More recently, for investments in public health, external loans were obtained, from the World Bank and the European Investment Bank. The *Strategic Plan of MPH for 2008-2010* provides that for investments in health equipment (including IT) 70% of funds will be from the budget of MPH and 30% from local budgets.

In the last ten years, several smaller eHealth projects were funded by *Phare* programme (a pre-accession instrument financed by the European Union to assist the applicant countries of Central and Eastern Europe in their preparations for joining the European Union). The most important was, between 2005 and 2007, that for a „*Computerized monitoring system for hospital morbidity and a hospital case based financing system*", introducing a new DRG based reimbursement system in public hospitals.

In the late nineties the *Unique Integrated Information System of Social Health Insurances* (SIUI) project was set up, funded directly by the National House of Health Insurance and with a sizeable hardware and basic software endowment component. For several reasons, the realization of the project started only in 2003 and is still in progress.

More recently, proposals were made for eHealth projects in the frame of *ICT Policy Support Programme* (patient summary and ePrescription, experience sharing and consensus building in eHealth), funded in 2007-2013 by the European Commission, as well as for *European structural funds*.

Smaller eHealth projects were funded by *FP6 Programme* or by Romanian national R&D programmes (as an example, the VIASAN programme, for research in life and health). Some eHealth research projects were made with the own funding of some universities, or in small scale international cooperation. Also several IT companies financed their own pilot eHealth projects to promote on the market more evolved products.

4 eHealth deployment status

4.1 eHealth infrastructure

4.1.1 Physical networks for eHealth in Romania

The IT endowment in the healthcare area of Romania before 1990 was very poor, with some mainframe or mini-computers in the Ministry of Health and in some greater hospitals, universities or central institutes, and a small number of desktop computers. After 1990 the economic situation was not favourable to invest for the IT in healthcare and it was not a priority for the Ministry of Health. But each healthcare unit find "self-made" solutions for IT procurement upon its possibilities.

The last official figures about the endowment of the Romanian public healthcare units, mainly about hospitals, are from a survey made in 2005. Beyond a national average of 14.75 hospital beds per computer, there were strong disparities among hospitals. Some very small hospitals had in 2005 only several workstations. On the other hand, there were ten hospitals with more than 100 computers each. Bucharest is far beyond the other counties, followed by other four counties, mainly with traditional medical universities (Cluj, Timiş, Bihor, Iaşi), and, after another gap, by all other counties.

The computers were used mainly for administrative and bookkeeping purposes, and only 45% of them for clinical and paraclinical services. The great majority (virtually all) of the hospitals were connected to the web, but only 16% of them declared that have an own Internet site. In the meantime the Internet connectivity all over Romania increased strongly. Also the endowment with PCs and other IT equipment is now improved.

The communications infrastructure in Romania had a booming development, especially in the last ten years, mainly by private investments. Therefore now almost everywhere there are various and good connections to the Internet, at decent prices. In the *Health Management Information System* project, in 1999, an intranet communication solution was provided, connecting the Ministry of Health with the county health authorities and some other central institutions. After a pilot period, the Internet connection was accepted as more convenient, the intranet solution remaining only inside each institution.

In hospitals, many IT services are done by outsourcing. In 2005 only an average of 13% of the hospital personnel were using computers in their daily work. Many physicians are still reluctant to use computers and to accept the use of IT as a part of their medical job. Therefore the problem is not always the lack of computers but the lack of know-how and of the willingness to use computers.

The Ministry of Public Health is supervising in 2007 an eHealth project for Hospital Information Systems, including both clinical and non-clinical applications, in Bucharest and other 13 counties, enabling better cost control and improving health services quality. The systems will be based on *HP* equipment and on *SAP ERP*, *Patient Management*, *Net weaver*, *Payroll*, and other software products.

An interesting history of "computerization" was when the general practitioners, the ambulatory healthcare, the dentists, the pharmacies and some other units were privatized and after 1999 were obligated by the Social Health Insurance Houses to report for the reimbursement of the healthcare services or for the drugs by computerized forms. Nobody cared about the IT endowment or competence, and the result was that every unit found overnight a solution (buying a computer, paying for outsourcing etc.) to fulfil this requirement.

Resources:

http://www.ms.ro/ccssdm/std/start.htm.

4.1.2 Legal and regulatory framework

The main regulatory law in the Romanian healthcare environment is the *Health Reform Law 95/2006*. It requires the Ministry of Public Health to establish an integrated information system for public health management. Other eHealth provisions in the same law, ask for information on communicable diseases, emergency care, community assistance, hospital records, and recognition of national Romanian health insurance cards and other similar foreign cards. There are also appropriate Government Decrees (e.g. for health programmes), Ministry Orders, strategies and others, with eHealth issues.

The eHealth legal and regulatory framework is in close connection with the more general *eGovernment framework*, implying the *Ministry of Communications and Information Technology*, responsible with the implementation of Government Information Systems, as well as with the *Ministry of Interior and Administrative Reform* and *Ministry of Justice*.

To this date, the digital signature is only exceptionally used in Romania, and not in the healthcare environment. The Health-IT product liability was not imposed or controlled by a special regulation.

In all eHealth applications the generally accepted data protection and confidentiality rules are used. The access to the personal health data in eHealth applications is permitted only for entitled persons, upon locally established rules, mainly using passwords.

Under the Law 102/2005, the *National Authority for the Supervision of Personal Data Processing* in Romania came into existence. In 2007 all persons handling personal data in the healthcare area had to declare in a written statement why they are using this data, how they ensure confidentiality and the manner they destroy the records when they are no more necessary. It is expected that gradually the Romanian legislation will be harmonized to the EU Directives concerning other legal aspects too.

A mention can be done to the eHealth professional organizations, among them to the *Romanian Society for Health Informatics*, *HL7 Romania*, organizations of IT developers etc., all of them interested in a clear eHealth legal and regulatory framework and trying to help the legislation process.

Resources:

http://www.guv.ro/engleza/index.php

www.ms.ro

www.mcti.ro

http://www.casan.ro/

http://www.medinfo.umft.ro/rsmi

http://www.dataprotection.ro/index.php?lang=en_GB

4.1.3 Education and training on ICT

All Romanian high schools have computers laboratories, connected to the Internet. There are also, everywhere, many courses to learn basics of ICT, some of them sponsored from the unemployment funds. In 2007 more than 28000 schoolchildren and students will receive from the state budget vouchers of 200 Euro, to facilitate the acquisition of a computer.

In medical and pharmaceutical universities the medical informatics was first introduced as an optional discipline in the Medical University of Timisoara in 1983/1984. In the nineties it was accepted as a regular course in all medical universities and faculties of Romania and in several technical ones. In some universities optional ICT training for healthcare professionals, as well as public courses are organized.

The job profile "Health ICT specialist" is not yet officially recognized in Romania. Jobs equivalent of "Chief Information Officer" are only in some administrative structures, as in Health Insurance Houses. Even the greater hospitals have some ICT specialists, the hospitals use to externalize the more complex ICT activities.

Resources:

http://portal.edu.ro/index.php

http://www.umft.ro/newpage/en/index.htm

http://www.umfcv.ro/en/index.html

http://www.info.umfcluj.ro/english/Presentation/Our%20presentation.htm

http://www.univermed-cdgm.ro/

4.2 eHealth applications and services

4.2.1 Electronic Health Records

Experimental Electronic Medical Records were used in some Romanian hospitals since the late seventies of the last century. In 1985 at the Centre for Health Computing and Statistics an internal "standard" for the contents and coding of such records was understood with the main eHealth developers, and was recommended for future hospital information systems. These recommendations were observed in the following years by the IT companies.

In 2005, only 45% of hospitals had introduced IT procedures in clinical or para-clinical departments. Among these systems, electronic medical records, are generally well integrated with the laboratory, pharmacy, image processing etc.

The idea of a Romanian *Electronic Personal Health Record* (EPHR) – a unique collection of information about the health history of each citizen – arose in the late nineties, but no project was dedicated for. Now, many persons have some Electronic Medical Records in different healthcare units, as well as at the Health Insurance Houses, but no unified access is provided to them, even all of them use a same identifier, a 13 digit ID number given to all Romanian citizens (see 4.2.6), which gives a non-ambiguous identification and may facilitate the consolidation of these data. The necessity of a patient oriented health information system project, based on an EPHR concept, was included in several draft eHealth strategies, but no coherent action was launched till now.

A first opportunity for such system was given by the *Health Evaluation Programme*, started by the Ministry of Public Health in July 2007, collecting health data on *all* Romanian citizens (demographic, lifestyle, clinical and laboratory exams, diagnosis etc.). It is expected, the data collected by this programme will be included gradually, until December 2008, in an integrated,

citizen oriented, public health management information system, with a national EPHR data base connected with family doctors, ambulatory care and hospitals, as well as with the health insurance network and the health data will be consolidated in national registers for some non-communicable diseases and in statistics used for major decisions in healthcare strategy, as well as for reporting, inclusive for EU and WHO. The continuity of medical act, a better evaluation of costs and a more efficient health care is thus targeted. But, among other problems, until this moment, the ICT solution for this information system is not established.

A second opportunity for EPHR is the *Phare* project envisioned for 2008 at the Ministry of Public Health, to realize the feasibility study for the subsequent development and implementation of an *Integrated Health Information System (IHIS)*. For this project, a citizen-focused solution in the public health and a patient-focused solution in the curative medicine was proposed, based on European Standards in electronic identification means, security, confidentiality, data management and message transmission, and non-ambiguous access to Electronic Health Records,.

A valuable experience will be offered by some health information systems projects, ongoing in Romania. Among them the electronic health file (*DESnet*) application, part of the *National Critical Medicine Network* (RNMC) project and portal (made by the Romanian IT company *InfoWorld* with the support of *Alcatel-Lucent* for voice-data-image transmission). DESnet gives the possibility to access the electronic medical file of a patient in conditions of confidentiality and security, through a portal (in situations considered as “critical”) by the family physician or speciality physician, only in presence of the patient and, if it is possible, with his agreement. The application offers: consolidation of health data in EPHR, management and security of data, visualization of health history data on handheld devices (wireless) and a diversity of decision support tools. The application was successfully used as a pilot, in traumatology, mainly in road accidents.

We should also mention, for the Romanian experience in electronic health records, the activity of the *ProRec Romania* society, member of the *European Institute for Health Records (EuroRec)*. Both entities are dedicated to the issues of the electronic health records. ProRec is partner in the *Q-Rec* project - *European Quality Labelling and Certification of Electronic Health Record systems (EHRs)* in the frame of FP6 programme.

Resources:

http://www.eurorec.org/projects/qrec.cfm

http://www.prorec.ro/

http://www.infoworld.ro/dnn/Home/tabid/53/language/en-GB/Default.aspx

http://bur.regione.veneto.it/BurvServices/pubblica/DettaglioDgr.aspx?id=195443

4.2.2 e-Prescription

In Romania, the competent authorities in the field of medical products for human use are the *Ministry of Public Health* and the *National Medicine Agency* (NMA). The law 95/2006 establishes how the prescriptions are made. The *Social Health Insurance Houses* reimburse in part or entirely to the pharmacies the cost of drugs prescribed by the physicians, as it is established in the framework contract.

The ePrescription is seen as a set of at least three types of application, namely: electronic medication records, decision support systems, electronic transmission of prescriptions. Till

now, no national level ePrescription project was proposed or carried on in Romania. Computerized procedures for prescriptions (e.g. transmission of prescriptions) are used mainly in hospitals, between physicians and internal pharmacies, but only for administrative purposes (e.g. consumption, stock management) and not, let us say, for recording medication to control incompatibilities (however it is possible to have some such local IT applications, but they were not rolled out).

The IT applications for pharmacies outside hospitals are made by private companies and used mainly for the stock management or for reimbursements from the Health Insurance.

http://www.anm.ro/en/home.html

4.2.3 Health cards

There are two types of cards that may be used in the healthcare area: *health cards* and *health insurance cards*. Health cards may carry emergency data (such as blood types, pathologies, treatments) or medical records, or may allow access to these data over a secure network. Health insurance cards allow access to healthcare and make management and billing easier.

In Romania discussions and several projects targeted a *unified health card*, including both health and health insurance data. Even the possibility of including this data on the proposed citizen's electronic identity card was identified to be taken into consideration at the appropriate time.

The law 95/2006 and other regulations of the Ministry of Public Health and the National House of Health Insurance mention a *National health insurance card* and a *European health insurance card*.

The *National health insurance card* is an electronic card, identifying patients and healthcare providers, proving that the owner is insured in the social health insurance system of Romania and containing minimum personal and health data, for use in emergencies. It is planned to be issued beginning with the end of 2007. The cost of this card is supported by the health insurance fund. The minimal data on this card or accessible from this card is expected to be: ID number (13 digits) and other identifying data, blood group and Rh, the proof that the social health insurance contribution was paid, some medical services requested in the past and the code of the provider, medical diagnoses implying vital risks, and consent to donate tissues and organs.

The *European health insurance card* is a (non-electronic) document, issued for Romanian citizens staying temporarily, for less than 6 months, abroad in EU countries, and conferring them reimbursement for some medical performance.

A health card was also proposed in 2005 by the OSISS project (*Optimization of financing, production and distribution system in healthcare services for European citizens*), included in the Romanian VIASAN „health andlife" R&D programme. The project is oriented towards control of financing, as well as of the drugs, prosthesis etc. used by the patient.

Resources:

http://www.cnas.ro/?id=206

http://www.cnmp.ro/ceex/comp1/oferta.php?id=604

http://webserv.ipa.ro/osiss/index_en.php

4.2.4 Health portals

In 2002-2005 a national health portal project was carried on by the *Ministry of Communications and Information Technology* (as part of an eGovernment programme), in cooperation with the Ministry of Public Health and with some IT companies. Through this portal internal and international health information would be accessed, as: statistics, legislation, healthcare services and units, emergency, news, information for citizens and authorities on health education and disease prevention, references, links to other Internet connections (including the European Union public health portal), forum etc. The portal was envisioned to be administrated by Ministry of Health and by its subordinated structures, but frequent changes in the management of both of ministries, a relatively low priority for the portal, as well as several administrative barriers stopped the proper updating of this portal.

A partial substitute for the public health portal is done by the sites of the *Ministry of Public Health*, of the *National House of Health Insurance*, of other Insurance Houses, and of the Romanian *National Medicines Agency* containing: projects, legislation, forms, news, statistical data, the official list of drugs, links to some important institutions, as well as to the public health authorities and hospitals etc.

Should be mentioned, in the same direction, also some smaller commercial health portals, administrated by private companies, mainly interested to promote their healthcare products. These portals offer also connection to some on-line healthcare services.

Resources:

http://www.ms.ro/

http://www.casan.ro/

http://www.anm.ro/

http://www.dnm.ro/

http://www.medici-online.ro/

http://www.sanatate.eu/index.php

http://www.romedic.ro/webdirector_medicina/Portaluri_medicale/

4.2.5 Risk management and patient safety

Except some possible local unknown initiatives, there is no statement about ICT systems in place that seek to minimise human errors in medication and to ensure that medication fulfills the “five rights”: right patient, right medication, right time, right dose and right route.

4.2.6 Patient Identifiers

The need to identify a person unambiguously is an important component of the interoperability of health information systems. The *eEurope2005 Action Plan* already supports the development of standards for a common approach to patient identifiers and electronic health record architecture.

In Romania a unique identifier, a 13 digit ID number, containing the gender, date of birth and some other data was introduced gradually, in the seventies and eighties. For more than 20 years it is currently available and defined for practically all Romanian citizens, that is for all patients, physicians, dentists, pharmacists etc. No adverse reactions were remarked in the

Romanian society towards this all encompassing and a bit too transparent ID; therefore it is used now in: passports, ID cards, population databases, for elections, banking, insurance etc. The same ID is used in hospitals, by GPs, and for health insurance cards too. It was proposed also as an identifier in the EU (with the country prefix RO).

The protection of the confidentiality of health data is realized mainly by passwords and by the law, severely punishing the blurting of such data.

4.2.7 Personal wearable and portable communicable systems

In Romania the personal wearable tele-monitoring systems are only at the beginning. The *National Communications Research Institute* (INSCC) from Bucharest is involved in projects aiming to implement a national telemedicine network able to offer valuable tele-medical services, such as tele-monitoring, remote elderly home care etc. This is included in the *Strategic Plan 2008-2010* of the MPH and is being done by using the possibilities offered by the newest telecom technologies and as much as possible from the existing infrastructure.

Beginning on 2001, INSCC has coordinated several National Telemedicine Projects, among them: *Implementation of a Multimedia Platform for Complex Medical Teleservices* (TELMES), and *European Telecenters Networks for Integrated Medical Services* (EUTELMES).

A continuous care of patients is targeted also by the public *Health Evaluation Programme*, started in July 2007and aiming an integrated, citizen oriented, public health management information system and supposing personal wearable tele-monitoring systems too.

Resources:

http://www.ehealthnews.eu/content/view/152/26/

http://www.inscc.ro/index_files/Page316.htm

4.2.8 Other ICT tools assisting prevention, diagnosis, treatment, health monitoring, lifestyle management

A good management of blood and transfusions is an important contribution to the diminishing of the risks of severe diseases, as hepatitis C or AIDS. At the *National Institute of Haematology* from Bucharest, several computerized applications were used beginning with the seventies. In 2007 a new computerized information system was here implemented, complying with the EU quality and security standards for collecting, processing, storing and distributing human blood and blood components. The project was co-funded by *Phare* and the Ministry of Public Health and realized by the Romanian IT company *Romsys*. In a first phase, the solution was implemented in three blood transfusion centres of the Institute, (two in Bucharest and one in Constanta) and is planned to be rolled out, until the end of 2007 in the other blood transfusion centres of the country.

Resources:

http://www.romsys.ro/index.html?&setLanguage=EN

4.2.9 Telemedicine services

The telemedicine has various directions of development in Romania. The more usual ones are: data exchange in emergency situations, consulting and/or giving a second opinion in

remote places, education and training for medical staff and helping the population with medical advice.

The law 95/2006 establishes *Centres for remote medical expertise and coordination*, furnishing, by the call number 112 or other channels, speciality information for emergency teams and/or to the emergency hospitals. At least 600 ambulances are equipped with voice-data-image transmission devices connected to the emergency hospitals.

Several important telemedicine projects are now in progress in Romania. Started in 2001, the *Fundeni Telemedicine Pilot Project* is the first public funded project, under the National Programme *AEROSPATIAL* and aiming the implementation of a complex Telemedicine applications environment. The partners were: *Fundeni Clinical Institute* (the greatest Romanian hospital), the Institute for Spatial Sciences, four other Romanian Hospitals, as well as, from USA, MedITAC (Virginia), University of Maryland and University of Bethesda (Maryland). The applications were in Radiology (*Digital Image Communications in Medicine* DICOM), Anatomo-patology, Dermatology, Medical Education etc.

Since 2001, The *National Communications Research Institute* (INSCC) from Bucharest has coordinated several National Telemedicine Projects, among them: *Implementation of a Multimedia Platform for Complex Medical Teleservices* (TELMES) with two pilot regional tele-centres at Pitesti and Iasi. for tele-radiology, tele-pathology, tele-consulting, tele-diagnosis, tele-monitoring and afterwards the project *European Telecenters Networks for Integrated Medical Services* (EUTELMES).

Telemedica Consulting realized a site for self-control of diabetes with Betachek tests. Some other foreign companies promote telemedical services through sites in Romanian language. There are also some similar smaller telemedicine initiatives.

From January 2007 Romania is partner in the eHealth European interoperability project *"Health Optimum" – Healthcare delivery optimization through telemedicine* – with Italy (coordinator) the participants being: Public health authorities of Regione Veneto, Gobierno de Aragon – Health Department, Region Syddanmark, County of Uppsala, and the County Emergency Clinical Hospital Timisoara; technological and business expertise partners: InfoWorld (Romania), AST (Spain), TeSan (Italy), Health Information Management S.A. (Belgium). The Romanian IT company *InfoWorld* will provide for this project the *Hospital Manager* platform and the *IQPACS* solution for medical images management. The solution will be used in hospitals, both public and private, partners to the project. The services offered by "Health Optimum" are: tele-counselling service for Neurosurgery and Radiology, tele-laboratory service in Homecare and Haematology, virtual referral and tele-counselling for Haematology, Oncology and Nephrology, virtual referral for Cardiology, Plastic Surgery and Endocrinology (Diabetes), tele-care service for Endocrinology (Diabetes).

Resources:

http://www.healthoptimum.info/index.jsp?pagID=430

http://www.infoworld.ro/Home/tabid/53/language/en-GB/Default.aspx

http://www.inscc.ro/

http://www.telemed.ro/

4.3 Interoperability and standards

Interoperability

EU Member States have expressed the need to support actions that cover the development of standards addressing the interoperability of diverse systems and services and to explore in particular the possibilities of open source applications to achieve this objective. One main reason is that within the European Union, patients and health professionals are becoming increasingly mobile, and the cross border circulation of goods and services, among which e-Health services are of growing importance.

A practical step towards interoperability was the *"Near to Needs"* (*telemediciNE via sAtellite to bRidge ITalian and ROmaniaN hEalthcare and EDucational Services*) international pilot project (2001-2007), using the RNMC emergency portal (see 4.2.1) and based on collaboration on eHealth interoperability and professional medical education between Italy (Veneto Region - *Treviso Local Health Authority*) and Romania (Banat Region – *Timisoara County Hospital*, and Muntenia Region - *Euroclinic Hospital* Bucharest). The project is funded by Veneto Region, *Regional Hospital of Treviso*, by the *European Space Agency*, *Banca Italo-Romena* etc. One reason to choose this particular cooperation was that several tens of thousands Romanians live in Veneto Region of Italy and several tens of thousands Italians live now in Banat region of Romania. The rolling out of this project is now in discussion.

Another eHealth interoperability project is the *Health Optimum* – healthcare delivery optimization through telemedicine (see in 4.2.9) – continuing the "*Near to Needs*" project achievements, with the Romanian participation started in January 2007 with Italy (coordinator), Spain, Denmark, Sweden, and Belgium in the consortium.

The European Commission – Information Society and Media Directorate General – organized in 2006 the *eHealth working group* and the *eHealth interoperability expert group*. In both of them Romania is represented, mainly by experts from the Ministry of Public Health and the Ministry of Communication and Information Technology.

In August 2007 the Minister of Public Health signed, on behalf of Romania, the Letter of Intent for the participation in the *eHealth Initiative*, as stated in the *Memorandum of Understanding* signed in April 2007 for the preparation of a successful proposal for a Large Scale Pilot, under the *Competitiveness and Innovation Framework Programme, ICT – Policy Support Programme of the European Commission* (patient summary and ePrescription, experience sharing and consensus building in eHealth), as well as for *European structural funds*.

Standards

The Computing and Health Statistics Centre – become in 2006 the *National Centre for Organising and Ensuring the Health Information System* (NCOEHIS) – was responsible for introducing in the Romanian healthcare environment a set of regulations and standards, mainly for coding. For example, Romania introduced ICD-10 for mortality since 1994 in a shorter form, since 1998 in full form, and since 2000 also for morbidity. In a similar manner other coding proposed by the *World Health Organization* (WHO) was adopted. Other standards were introduced with the DRG systems.

With so many actors in the Romanian healthcare environment, it was clear, even before 1990, that all eHealth application developers should comply with some *standards*. For a first stage it was necessary to ensure the coherence of the statistical data reported at national level, and subsequently to allow the integration of hospital information systems, especially of the patient records, at a national and afterwards international level. Therefore NCOEHIS posted such standards and recommended coding on a web site: http://www.ms.ro/ccssdm/std/start.htm

after a dedicated project (2001-2003), funded by the VIASAN National health-oriented R&D Programme. Afterwards NCOEHIS ensured the updating of this site, as well it certified that some IT applications are compliant to the standards required.

The *Romanian Standards Association*, the only official national standardizing institution, had since 1995 a workgroup for "medical informatics" but its activity was almost absent.

In October 2006 the *HL7 Romania* organization was set up. The mission of HL7 Romania is entirely complementary with that of the parent HL7 organisation, supporting the development, promotion and implementation of HL7 standards in ways which meet the needs of healthcare organisations, health professionals and healthcare software suppliers in Romania. Among the *HL7 Romania* members there are: NCOEHIS, other public institutes, the main medical and technical universities and the most important IT companies interested in eHealth. Besides activities as information or bringing together interested parties, the *HL7 Romania* intends to carry on some pilot projects promoting the HL7 standards.

Resources:

http://www.ms.ro/ccssdm/std/start.htm.

www.hl7.ro

http://www.asro.ro/engleza2005/default_eng.html

5 eHealth research and technology development (RTD) status

5.1 General information on RTD structure

eHealth research and development activities

The research and technology development (RTD) activity in Romania is officially coordinated by the *Ministry of Education, Research and Youth*, through The *National Authority for Scientific Research* mainly by large research programmes. The eHealth issue was not included in these programmes. However, some small eHealth projects were admitted to be financed by the VIASAN ("Life and Health") programme.

The research in health is directed, in a certain extent, by the Romanian *Academy of Medical Sciences* subordinated to the *Ministry of Public Health*, as well as by The Medical Sciences Section of the *Romanian Academy*. Both of them had, in the nineties, *Commissions for medical informatics*, but these are no more active.

The eHealth research began in Romania in early seventies (some papers date even from the sixties). Around 1975 some national databases (physicians, healthcare units, patient registers for chronic diseases) were fully functional, realized "from scratch" at the *Centre for Health Computing and Statistics* (CHCS).

In the same period of time, research in modelling of some biological and epidemiological phenomena, diagnosis support applications and biological signal processing were done. In the eighties issues such as medical health record for hospitals and decision support systems were also targeted. The eHealth research was carried on in CHCS, in some medical universities, in some state IT companies, but mainly by small teams, near a medical unit and (with some exceptions) having access to the computers of a "Computing Centre". These applications were in use only locally and for a short time. No formal RTD structure was organizing this activity. However, CHCS edited periodically a list of the achievements (several hundreds items in the late eighties).

An informal group of specialists organized, each year, beginning with 1977, the MEDINF national medical informatics conferences. This group became in 1990 the *Romanian Society of Medical Informatics* (*SRIM*), affiliated, shortly after, to the international organizations European Federation of Medical Informatics (EFMI) and to the International Medical Informatics Association (IMIA). In the present moment the president of *SRIM* is, in the same time, president of EFMI. *SRIM* is still organizing, on yearly basis, the RO-MEDINF national conferences.

The Medical and Pharmaceutical Universities and Faculties throughout Romania and also some Technical Universities are carrying on research projects in eHealth (mainly fundamental research), Some institutes (e.g. the *National House of Health Insurance*, the *National School of Public Health and Health Services Management*), became in the last years interested in eHealth research too. Also, some smaller associations and initiatives for eHealth conferences arose after 1990 and in a greater number after 2000, representing mainly IT companies interested in this issue. The main focus areas and targets of RTD activities are: EHR applications, home care monitoring, tele-consultation services, and standardisation.

5.2 Research Programmes

No major eHealth research programmes are underway or in preparation. However, in Romania there are a number of eHealth research projects, but they are not organized in programmes and sometimes are not correlated.

5.3 RTD Funding

The funding for eHealth RTD projects is done from the budget of the beneficiary institution (as in case of the National House of Health Insurance), or of the research unit (as sometimes in case of Medical or Technical Universities, or of some IT companies preparing pilot applications). Several small projects are funded by joint venture. A limited number of eHealth projects gained grants from Romanian non-eHealth programmes; an example is the VIASAN ("Life and Health") programme.

Some eHealth projects, including the „*Computerized monitoring system for hospital morbidity and a hospital case based financing system*", introducing a new DRG based reimbursement system in public hospitals, and the future "*Feasibility study for the implementation of an Integrated Health Information System (IHIS)*" were funded by the Phare programme. Other eHealth projects were financed by FP6 programme or by international cooperation.

5.4 Technology transfer & Innovation Support

No initiatives to promote and support technology transfer in the area of eHealth structures and mechanisms for eHealth-related technology transfer were observed in Romania. Some successful eHealth solutions are in progress to be rolled out, but they are isolated initiatives.

In each year five to ten national conferences, dedicated to eHealth, are organized, by *SRIM*, by the *International Data Group* (IDG), by some IT or pharmaceutical companies interested in eHealth, and sometimes by the National Health Insurance House or the Ministry of Public Health. These conferences are conveying good eHealth practices toward potential beneficiaries.

5.5 Industry Strategies and Programmes

The Romanian eHealth is a growing business. Therefore the interest of IT companies in it is increasing. The hardware companies as HP, Fujitsu-Siemens, IBM, as well as the software companies as SAP, Oracle or Microsoft are interested in greater projects, usually in cooperation with a private Romanian eHealth software company. They organize and participate to the conferences, seminars and other information and communication activities.

Because of the lack of a national eHealth strategy, of national eHealth programmes and lack of standards, these companies are often willing to cooperate in some working/expert groups like the *HL7 Romania* association. The constitution of an expert group, to elaborate a new eHealth strategy, with representatives of all stakeholders, was also discussed.

Resources:

http://www.gov.ro/engleza/guvernul/afis-minister.php?idmin=31

http://www.mct.ro/ancs_web/index.php

http://medinfo.umft.ro/rsmi/index.htm

http://www.acad.ro/academia2002/acadrom/pag02.htm

http://www.adsm.ro/

http://www.snspms.ro/index.html/articles?articleID=154&setLanguage=RO