eHealth strategy and implementation activities in Poland

Report in the framework of the eHealth ERA project

Authors: Mariusz Duplaga, Jagiellonian University Medical College
Mikołaj Leszczuk, AGH Science and Technology University of Krakow
Alicja Wirska, CITTRU, Jagiellonian University
Adam Kozierkiewicz, Jagiellonian University Medical College
Wojciech Trąbka, Jagiellonian University Medical College

January 2007

eHealth ERA
Towards the Establishment of a
European e-Health Research Area
FP6-2005-IST-015854
http://www.ehealth-era.org
era@empirica.com

About *eHealth ERA* and this report

This report is the outcome of research in the context of the eHealth ERA project (Towards the Establishment of a European Research Area). The project is implemented by empirica GmbH (co-ordinating partner, Germany), STAKES (Finland), CITTRU (Poland), ISC III (Spain), CNR (Italy) as well as EPSRC and Imperial College (United Kingdom), based on a Coordination Action contract with the European Commission.

The European Commission, Directorate General Information Society and Media, supports this project to contribute towards greater transparency across Member States and other participating countries on eHealth strategies as well as innovation-oriented research and technology development (RTD) initiatives, including the coordination of Member States' eHealth strategy formulation and implementation. Thereby the project aims at fostering the establishment of an effective European Research and innovation Area (ERA) in eHealth. All project results are available on the internet and can be accessed at the *eHealth ERA* website: www.ehealth-era.org.

The status of activities described is generally August 2006.

Legal Notice

Acknowledgements

This report was prepared by Centre of Innovation, Technology Transfer and University Development, Jagiellonian University with support from the eHealth ERA team. This report reflects solely the views of its authors, and possible inaccuracies of information are their responsibility.

eHealth ERA would like to thank Adam Koprowski, National Centre of Health Information System, Waldemar Skawiński, previously with the National Centre of Health Information System and Agnieszka Konkel, Department of Informatization, Ministry of Interior and Administraiton for providing valuable comments and suggestions for the draft report.

Contact

For further information about this country report or the eHealth ERA project, please contact:

CITTRU, Jagiellonian University Czapskich Str. 4, 31-110 Kraków, Poland Mariusz Duplaga mmduplag@cyf-kr.edu.pl	***eHealth ERA*** c/o empirica GmbH Oxfordstr. 2, 53111 Bonn, Germany Fax: (49-228) 98530-12 era@empirica.com

Rights Restrictions

Table of contents

Country Report: *Poland*

1 Executive Summary

Poland was the greatest country in terms of population and area from 10 new member states which joined European Union in May 2004. Through last 16 years the process of economy transformation was consequently maintained by consecutive Polish governments. However, it seems that reforms in healthcare were lagging behind the mainstream of economic changes. The unclear status of financing of healthcare providers resulted in the cautious investment strategies related to the development of IT infrastructure in healthcare domain. The pressure on the use of electronic data for the purposes of the reimbursement from health funds resulted in the search for effective information tools in early 2000-ies. There were also the initiatives co-ordinated on the national scale by the Ministry of Health which positively influenced the growth of health IT market and promotion of broader introduction of information technologies to healthcare institutions. The activities financed by the World Bank Project led to development of origins of hospital information systems in considerable number of Polish hospitals.

Even if considerable shift to the use of information technologies in Polish healthcare was seen in last years, there are still many neglected areas. The e-health development strategies defined in Polish Ministry of Health in last few years still need broader promotion and acceptance. Evidently, the attempts to reform the system of healthcare provision and financing push aside the domain of e-health implementation. There are also other general factors negatively influencing e-health progress in Poland, apart from the weak financial status of many public healthcare institutions, there is an issue of unclear legal status of e-health services, no plans for their inclusion in reimbursements schemes offered by national insurance organisation or relatively low Internet penetration in Polish society.

On the other hand, Polish citizens expect the provision of high quality medical services within the obligatory insurance scheme. The number of patients with chronic conditions requiring repetitive interactions from healthcare system grows steadily. The number of elderly people in the community shows also increasing trends. The progress towards development of information society has its impact on the accessibility of other electronic services like e-government or e-learning. All these circumstances obviously favour the search for new forms of care delivery and e-health may be a response to all these challenges.

On the national level, the area of healthcare information system development and eHealth-related activities was addresses in the policy document “The Strategy of Development of Health in Poland for years 2007-2013” approved by the Council of Minister on June 21, 2006. These issues were also covered by internal policy documents prepared within the Ministry of Health: “Poland – e-Health Strategy for 2004-2006” (December 2004) and “Strategy of information infrastructure development in health care and introduction of the European Health Insurance Card” (March 2005).

2 Basic facts

Poland is the largest from 10 countries which joined European Union in May 2004. Its population is above 38 milion people, and an area 312 685 square kilometres. During the last 16 years the process of economy transformation started with radical reforms in early nineties was continued with diversified intensity. However, the economy was growing quite steadily through this period. The macroeconomic changes resulted also in unfavourable phenomena from which high unemployment rate is one of the greatest problem. It seems also that rapid transformation of economy was not followed by changes of the health care system and its first reform took place just 10 year from shift to market economy.

3 Healthcare System Overview

3.1 Basic facts & features of the healthcare system

The main decision making level for health care policy

Nowadays, the organization and activities of Polish health care system result from rules described in the Universal Health Insurance Act issued in 1997 and amended in next years. This basic principles include universal and mandatory participation, social solidarity, self-government and independence of health care funds, and finally the state guarantee of insurance security.

The Ministry of Health holds the responsibility for designating general health care strategies.. The responsibilities of the Ministry of Health were redefined in Health Care Institutions Act issued in 1991. The Ministry became responsible for health policy, training, research and specialized facilities. Furthermore, regional authorities became responsible for organization and financing tertiary care, and local authorities became responsible for primary and secondary care. [6]

The main role of the National Health Fund is the provision of health services to citizens. Contracting of the services and interactions with health care providers were moved to 17 autonomous health funds in 1999. In 2003 the National Health Fund (www.nfz.gov.pl) with central office situated in Warsaw and local offices in all voivoidships was established and it took over the functions of regional funds. Most of regional branches of the Fund have also their local offices situated outside the capitals of voivodships.

The National Health Fund (Narodowy Fundusz Zdrowia, NFZ) is the institution responsible for provision of health care services to citizens. It finances health care services and assures reimbursement of medicines using resources allocated to it.

The entire population is covered by the insurance system. It guarantees equal access to health care services. Non-standard services may require co-payment. Persons entitled to free health care services in Poland (beneficiaries) include those covered by the general health insurance (on the compulsory or voluntary basis) or uninsured Polish nationals resident in the territory of Poland who meet income criteria set out in the Art. 8 of the Law of 12 March 2004 on social assistance. The rules of provision of health care services to beneficiares were covered by in the Law of 27 August 2004 on health care services financed from public funds (Official Journal 04.210.2135 with later amendments). Beneficiaries are entitled to free health care services in case they receive these services from health care providers that have contracted provision of health services with the National Health Fund. A person entitled to health care may obtain primary health care and dental care directly in the provider. The patient is supposed to have a referral from a physician working within the primary health care in order to obtain specialist out-patient care. A referral from any physician is necessary for admission to hospital. In case of emergency, insured person may turn for care directly to a specialist, to a hospital or receive rescue services. [7]

Main healthcare service delivery systems

Public and non-public health care providers who have contracts with the National Health Fund are obliged to provide health care services within the general health insurance system. Health care providers include: practising physicians, public and non-public health care facilities like hospitals and surgeries (individual, individual specialist, group surgeries). Health care providers are obliged to provide services in shortest possible time. The lists of patients waiting for treatment should be made available by health care providers. In case of a emergency e.g. injury, intoxication, life threat or childbirth the admission is instantaneous.

The whole population is covered with primary health care and its organisation is assured by local authorities. Primary care facilities are based on the concept of family medicine. From 1990s this type of health care services provision was promoted strongly and currently, the model of primary care as a first line contact point for patients prevails. [6]

Primary health care is based on the examination and consultation by a general practitioner. The physician may also refer the patient for diagnostic tests in order to confirm the initial diagnosis and to confirm the need for the referral to a specialist or to a hospital. If out-patient specialist treatment is needed, a referral from a doctor who practises within health care system is required. No referral is required for patients who needs care within following specialities: obstetrics, dentistry, dermatology, oncology, ophthalmology, psychiatry or who suffer from tuberculosis, HIV infection. The addictions treatment is also available directly for the patients. Also in case of a sudden illness, accident, injury, intoxication or life threat a patient receives necessary medical benefits without a referral.

A beneficiary of the insurance system is provided with medicines on the basis of a prescription issued by a doctor who practises within the health care system or a doctor who does not practise within this system, but was authorized by the National Health Fund to issue prescriptions.[7]

Total expenditures on health care in Poland expressed as % of gros domestic product were equal 4.9% in 1990 and 6.5% in 2003. Total health expenditures per capita in US$ PPP were estimated on the level of US$ 296 in 1990 and US$ 744 in 2003. Proportion of public expenditures on health as % of total expenditures on health was estimated on the level of 91.7% in 1990 and dropped in next years to remain on the level of 69.9% in 2003 according to statistics issued in OECD Health Data 2005 in October 2005.

The estimation of an accurate proportions between participation of public and private providers in health care services provision may be quite difficult. However, some recent estimation indicate that more than 95% of inpatient health services is still provided by public health care institutions. [12]

3.2 National level health goals

National Health Programme (Narodowy Program Zdrowia NPZ) is conducted in Poland from the year 1990. Its first edition was accepted by Polish Government in 1990. It was prepared on basis of the strategy issued by World Health Organisation with the aim of inclusion in pro-health activities of all governmental institutions and whole society. The main focus was put on activities which could decrease unfavourable trends in morbidity and mortality seen in Polish population. The next editions of the National Health Program were adjusted to changing socioeconomic environment in Poland. The version of the Programme valid until the end of the year 2005 was prepared by Coordinating Team in cooperation with Department of Health Programs of the Office of Systemic Transformations in Health Care being part of the Ministry of Health.

The main chapters of the Program covered:

1/ Health and influencing factors

2/ Health promotion (the main concept was the health promotion which would enable better health control to citizens, improvement of health through making appropriate choices supporting wellbeing, development of publich health policies, creation of the life and work environment supporting health preservation, inclusion of the whole society in activities for health improvement and new perspectives in health care system objectives)

3/ Health public policy (the promotion of health improving activities was assigned to be undertaken by the whole nation and not only governmental institutions)

4/ Objectives of the National Health Programme (one superior goal was set: improvement of health status and related quality of life among citizens. Three main strategies to achieve this should include: modification of the lifestyle in the population, creation of the life and work environments supporting health and decreasing differences in health status and access to health care services among citizens).

The document addressed the most important health threats in Poland including: unhealthy lifestyles (low level of physical activity in population; inappropriate diet; smoking habit, excessive alcohol consumption; the use of psychoactive agents), threats related to social conditions and environmental risks.

Furthermore, key medical problems addressed in National Health Program were :
- newborns mortality
- cardiovascular diseases (leading cause of morbidity and mortality)
- malignancies (second cause of deaths)
- accidents and poisonings
- disesae of respiratory system and gastrointestinal tract
- psychiatric disease
- infectious diseases
- occupational diseases
- disability (the number of disabled persons in Poland is estimated on the level of 4,8 mln)

The strategic objective of the Programme was the improvement of life quality in population through:

1/ support of conditions and promotion of knowledge and ability of maintaing healthy lifestyle as well as undertaking activities improving own health in society

2/ development of environments (place of life, workplace) having positive impact on health status

3/ decrease of disparities in health status and access to health care services

The list of operational objectives is long and comprises such areas like increase of physical activity in population, the improvement of dietary regimens and quality of food, decrease of smoking habits, decrease and change of alcohol consumption style, the eradication of the use of psychoactive agents, increase of effectiveness of health-related education in the society as well as the intensity of health promotion activities, promotion of mental health and prevention of psychogenic disorders and decrese of exposure to harmful factors in place of living and work. Furthemore decrease of the number of accidents, increase in efficiency of emergency intervention in life-threatening conditions and better access to primary health care services were also underlined. Early diagnosis and active care offered to patients with high risk of ischaemic heart diseases and treatment of common forms of malignant neoplasms were also emphasized.

In the end of year 2005, the "Preliminary Framework Project of National Health Program for 2006-2015" became also available.

The document "National Health Plan for years 2004-2013" is complementatary to "National Health Programme" and focuses mainly on the medical aspects of improving health status of the citizens. "National Health Programme" covers all issues influencing health, e.g. socioeconomic and environmental factors. Priority objectives covered in "National Health Plan for years 2004-2013" are related to main factors responsible for mortality in Polish population: cardiovascular disease, malignant neoplasms, accidents and poisonings, respiratory and gastrointestinal disorders. [6]

There are many focused national health-related programmes carried out every year. The co-ordination role within these programmes is held by the Ministry of Health. The examples of the programmes carried out in previous years addressed following medical problems [6]:
1. Vaccinations
2. Screening tests for neoplasms

3. Screening tests in newborns.
4. Self-sufficiency of Poland in the area of safe blood, its elements and derivatives supply
5. Antiretroviral therapy for patients infected with HIV.
6. National program of fight with neoplastic diseases.
7. National program of prevention and treatment of cardiovascular disease continued through the years 2003-2005
8. National program of antibiotics protection
9. Prevention of prematurity and low birth weigth and their consequencies.
10. Psychiatric health care.

4 Strategic eHealth Plans/Policy Measures

4.1 National-regional eHealth policy

Ministries involved in or influencing national eHealth policy.

The involvment of the specific ministries in the activities related to e-health policy changed with tranformation of competencies within ministries. Generally, the main role in shaping e-health policy in Poland was on the side of the Ministry of Health, the Ministry of Infrastructure, then the Ministry of Interior and Administration and the Ministry of Science and Information Society Technologies, currently the Ministry of Science and Higher Education.

The activities of the Ministry of Health were focused on the development of e-health objectives and implementation plans as well as the response to European level initiatives related to e-health development. The Centre of Health Information Systems is a specialised institution acting under the supervision of the Ministry of Health, focused on the harmonisation of the healthcare system in Poland with recommendation issued by European Commission, including eHealth domain. The objectives of the Centre cover:

- maintanence of the System of Health Information used for monitoring of the Polish population health status, modelling of health-related processes, early identification of epidemiological threats and bioterrorism emergencies as well as management support
- activities aiming semantic, technical, organisational, legal and social interoperability between information systems used in healthcare
- linking the System of Health Information with central national and insurance registers as well as introduction o fcomon patients identifiers
- development of electronic patient records and introduction of health insurance card
- support for telemedicine in the area of standardisation, coordination and interoperability of the systems used in Poland and in the context of transborder cooperation
- establishment of Health Portal in Poland as element of European Health Portal.

The Ministry of Science and Information Society Technologies until November 2005 was responsible for the coordination of policies on science and informatisation (support for IT education, promotion of eGovernment development and enabling access to all public serivces through Internet), the coordination of the implementation of information technologies to public administration and infrastructure development on national level for provision of electronic services (including e-health). From November 2005 the responsibility of coordination of the policy on informatization, support for IT education, promotion of e-government, enabling access to all public services in Poland was shifted to the Ministry of Interior and Administration.

The Ministry of Education and Science (currently Ministry of Science and Higher Education) became responsible for coordination of policies on sciences, development of IT infrastructure for science, defining National Framework Programme and support for research programmes (with topic including e-health).

It should be also underlined that the Ministry of Interior and Administration is involved in the drafting of the National Plan for Informatisation, which coveres the domain of e-health and will be presented to the Council of Ministers. Development of the IT infrastructure is currently within the competencies of the Ministry responsible for transportation and construction.

eHealth strategic documents

In September 2004 the Ministry of Health prepared document: "Poland – e-Health Strategy for 2004-2006" . It was accepted as internal document within this Ministry and it was not accepted as official policy by the Council of Ministers. The document "Poland – e-Health Strategy for 2004-2006" became practically available for broader audience in the December 2004

Furthermore, in March 2005 the document "Strategy of information infrastructure development in health care and introduction of the European Health Insurance Card" was prepared as the supportive information for the Minister of Health. The issue of telemedicine and e-health was also included in the national programme of reforms which was accepted by the Government in December 2005.

Generally, the Ministry of Health was responsible for drafting documents focusing on the policies of e-health development. The roadmaps/strategies developed by the Ministry of Health becomes usually the chapter of wider documents focused on development of information society in Poland. The task of the coordination of the activities in this area conducted by consecutive ministries was initially undertaken by Ministry of Infrastructure, and then (from 2003) it was the responsibility of the Ministry of Scientific Research and Information Society Technologies until November 2005. From this moment, the considerable part of its competencies were shifted to the Ministry of Interior and Administration.

The precise "implementation chain" for eHealth policy was not defined. From practical point of view, a following sequence remains the most probable in this context: Government - Ministry of Health – Centres/Organization related to Ministry – Regional/Local Health Care Authorities. The model of "implementation chain" does not seem to be fully operational and generally depends more on the type of activity than on the predefined sequence.

Main strategic targets in the national eHealth roadmap

Main strategic targets of the national e-health strategy as anticipated in relevant documents are as follows:

- Development of information technology infrastructure in healthcare institutions (interoperability of IT solutions in healthcare facilities, introduction of the system of electronic communication between healthcare facilities, the system ZOZMAIL, program "Internet in every healthcare institution")

- Central data bases and registers for health care system (implementation of the system of healthcare services registration, development of the Register of Healthcare Providers and Medical Rescu Unit, the Register of Pharmacies, Central Register of Professions and Medical Specialities, Central Data Base of Medical Products, coordination of implementations and integration of data bases and registers)

- Access to information in healthcare (development of the central healthcare portal, development of electronic communication in healthcare, development of the monitoring system of waiting lists, development of the concept of electronic patient registration in healthcare facilities, development of electronic health advisor)

- Availability of telemedicine services (development of the environment supporting telemedical services, preparation of legal regulations enabling development of telemedicine)

- Health-related education and promotion (development of training program for health professional in computer skills, "Internet-based health-related education" for children and teens, dissemination of the action "Schools promoting health")

- Safety and security of medical data (preparation of regulations on electronic medical record, introduction of European Health Insurance Card, audit of information systems in healthcare facilities)

The activities focused on the implementation of the eHealth related objectives were conducted to some extent before the moment when the document "Poland – e-Health Strategy for 2004-2006" became available. However, approximate starting date for more coordinated activities could be December 2004.

The strategy included in the document indicated the continuation of relevant activities in the years 2004-2006. Action plan assumed considerable progress in many activities throughout 2005. However, the timetable of the process of achieving designated goals was not defined in detailed way. Precise measure of the progress were also lacking.

As accurate measures of the progress in eHealth roadmap implementation are not available and as the document mentioned earlier on the eHealth strategy in the years 2004-2006 remained internal document to the Ministry of Health, the assessment of the implementation of the strategy is hardly possible. Some elements of the eHealth strategy as defined in relevant document may be visible (implementation of the ZOZMAIL system, development of central databases e.g. Register of Health Care Providers). Other areas seem to be neglected. The example may be the issue of interoperability between IT solution in health care facilities. Some information on the progress toward goals established in eHealth roadmap documents may be found in reports monitoring the status of activities performed in the range of Strategy for Development of Information Infrastructure in Poland – ePoland for years 2004-2006. [13]

There are no plans of extension of eHealth policies to the field of social care, which would be annouced to broader audience.

Dissemination activities had limited scope. Consecutive topics included in the strategy document or whole strategy were presented and discussed during the meetings for experts, healthcare policy makers or healthcare managers. The information about the coordination of dissemination activities was not clearly visible. The distribution of the information about e-health strategy to healthcare professionals was carried out predominantly during focused workshops and meetings. No systemic dissemination activities addressed to general public were identified. No means which would be focused on the general public to obtain opinions on eHealth policies and plans were developed.

Recent important step in definition of eHealth-related priorities was preparation of the "The Strategy of Development of Health in Poland for years 2007-2013". The Document was prepared by the Centre of Health Information Systems on behalf of the Polish Ministry of Health. The Strategy was accepted by the Councel of Ministers on June 21, 2005. The context of eHealth related activities was covered in the operational objective 2.2 titled: "Reduction of information deficiencies in the domain of formation of health politics".

The Strategy emphasizes the importance of monitoring of activities undertaken by health services providers (accessability of health services, economic and social barriers limiting access to services) for development of efficient health policies. The process of changes in healthcare systems should be monitored continuously in order to track the impact on quality and availability of the health services to patients. The main sources of data related to organisation and resources of healthcare in Poland are registers and databases containing information supplied by health services providers. The system of information collection should be improved through introduction of IT systems where needed as well as standardisation and integration of existing applications. These activities are supposed to bring following results: - eradication of the deficiencies in information accessability for bodies making decisions in healthcare (government, local authorities), introduction of the information order in healthcare, ensuring reliability of available data and improving the quality of public information on the organisation and resources of healthcare system. The extent and methodology od health-related data collection will remain in agreement with EU Directive 1400/97.

The specific tasks conducted in the context of eHealth area enlisted in "The Strategy of Development of Health in Poland for years 2007-2013" will encompass:

1/ Development of the system of health information with the aim of the analysis of the level of demanded health services

2/ Promotion of the access to health-related and services provision information to citizens (repositories of health contents, national health portal)

3/ Development and implementation of the information system supporting managment in hospitals and other health facilities

4/ Development of information system on medication orders and consumption

4.2 Investment and Reimbursement framework

There is no special reimbursement scheme for the implementation of eHealth systems and applications. There are a few services, e.g. tele-ECG which were reimbursed for some time within the contracts with regional health funds previously. Depending on the scope and type of e-health services, some implementation were financed according to information given below.

The initiatives and project related in broad sense to the whole domain of the use of information technologies in health care were funded from such sources as World Bank, PHARE Programme and Structural Funds.

Within the World Bank Project part of hospitals could obtain hardware and network infrastructure as well as specific modules of hospital information system (ADT, pharmacy). The project was completed in early 2000-ies. Currently, no special financing mechanism in the context of IT infrastructure in healthcare is available.

Telemonitoring services like tele-ECG were transiently covered by the reimbursement scheme. Telemedical-type transmission between providers, e.g. teleconsultation for patients selected for cardiac surgery, were developed and carried out on the basis of agreements between involved healthcare providers.

The main mechanims of reimbursement for existing ehealth applications are based on bilateral agreement and cooperation between providers.

The access to IT infrastructure for healthcare providers interested in e-health services carried out in the framework of institutional cooperation could be to some extent in some regions supported by local authorities or focused grants/projects from other sources, like structural funds.

Currently, a part of Structural Funds may be used for support of project related to the development of IT infrastructure in healthcare facilities or on broader regional eHealth initiatives. Recently, within the Priority VII Bulding and Development of Information Society within the Operational Programme "Innovative Economy" the project "Electronic Platform Gathering, Analysis and Enabling the Accessability to Electronic Resources about Health Care Services" was approved for funding. Other projects accepted within this Programme realted to e-health domain included: "Electronic platform of telemedical consultation" (Ministry of Health, Centre of Health Information Systems) and "Development of National Network of Telemedicine Centres in the area of Prevention and Management of Cardiovascular Disease" (Institute of Cardiology, Anin).

5 eHealth deployment status

5.1 eHealth infrastructure

5.1.1 Physical networks

Poland was included in the network infrastructure within GEANT programme. The network based on fiberoptic connections is developed by academic environment. Connections between the greatest cities were developed on the basis of existing

metropolitan area networks. University hospitals have usually access to metropolitan area networks.

Broadband fiberoptic infrastructure was also developed by companies. Several telecommunication providers, from which Polish Telecom is still main player on the market, offer access to networking infrastructure. Currently, many health care providers obtain the access to Internet with aDSL technology. The bandwidth and types of physical network used by particular health care facilities are highly diversified. [4]

No dedicated healthcare network is available in Poland. Some health care institutions maintaining the cooperation in specific areas may use VPN-based communication through available physical networks. Recently, the broadband network based on fiberoptic connections was developed in Kujawsko-Pomorskie Voivodship; it became also the basis for telemedicine network including several healthcare providers in this voivodship.

In a few existing implementations of eHealth services, fiberoptic infrastructure was used. For demonstration or educational purposes the connections based on the ISDN links were also used.

The penetration of Internet access in Polish companies reaches 98% (according to EuroSTAT survey from the year 2005). The access of households according to the same survey is on the level of 30%. The main aspect of e-health services commonly explored by health care community is still access to information resources (both for health professionals and patients).

Teleconsultation/second opinion services were implemented in some regions between providers representing such specialities like oncology, cardiology, pulmonlogy. Furthermore, telemonitoring services based on the Internet were offered to patients with specific long-term conditions, e.g. arterial hypertension, bronchial asthma within pilot projects.

The plans for development of eHealth network seem to remain in the conceptual phase only.

Some results of the studies focused on the delivery of care based on eHealth application to patients with specific medical conditions are also available.

The activities conducted within Telemedicine Network in Kujawsko-Pomorskie Voivodship seem to develop with success. The statement delivered during conferences talks delived by the representatives of the Network indicate positive results from the public-private partnership concept included in the development of the Telemedicine Network in this Voivodship.

5.1.2 Legal and regulatory framework

There is national legislation in the country addressing the following issues: data protection, telecommunications (with regard to data protection and confidentiality), digital signatures and Health-IT product liability.

These acts were enlisted below

- The Polish Act on Personal Data Protection of 29 August 1997, amended 2004. English version available at http://www.giodo.gov.pl/data/filemanager_en/61.doc
- Act on provision of services by electronic means of 18 July 2002. English version available at http://www.itu.int/osg/spu/spam/legislation/Ustawa%20SUDE-eng_ver.pdf Telecommunication Act (LXXII) of 1992 which installed major regulatory changes
- Act on Electronic Signatures of 18 September 2001. English version available at http://stegny.vimk.pl/cryptogr/esigact.php
- Act on Medical Devices of 20 April 2004, amended in 2005 Electronic Signature Act, May 2001

Currently, no specific legal framework for e-health domain available.

The relevant national bodies and authorities that are responsible for overseeing the development and enforcement of the legal and regulatory requirement in above mentioned areas include:

- General Inspector for the Protection of Personal Data,
- Office of Telecommunications and Post Regulation
- Office of The Committee For European Integration
- Office for Competition and Consumer Protection

The harmonisation process between national legislation and EU-level legislation in the areas of interest (Data Protection Directive, Recommendation on the protection of medical data, Directive on Community framework for electronic signatures, Directive on Privacy and electronic communication, eCommerce Directive) was carried out through act enlisted below:

- The Polish Act on Personal Data Protection of the 29 August 1997, amended 2004
- Act on Electronic Signatures of 18 September 2001
- Telecommunication law, adopted in July 2004, came into force on 3 September 2004
- Act on Providing Services by Electronic Means, adopted on 18 July 2002
- Act on Protection of Certain Services Provided by Electronic Means, adopted on 5 July 2002
- Act on Electronic Payment Instruments, adopted on 12 September 2002

Before May 2004 changes in the Polish legal system were connected to the process of preparation to joining the European Union; after May 2004 they are driven by the prospects of further integration and harmonization of our law regulations.

5.1.3 Education and training on ICT

Most activities related to the promotion of the acquisition of general ICT skills are focused on younger generation or specific professional groups. Non-profit organisations promote computer literacy. The education programme based on the idea of computer-literacy driving licence is was developed.

Curricula of educational programmes for future health professionals (physicians, nurses) include development of basic ICT skills. Medical publishing houses and Internet portals for health professionals promote development of ICT skills by physician, also through short-term training and courses.

National or regional programmes promoting ICT skills which would be specifically addressed to health care administrative and support staff were not identified. The curricula of post-graduate education for health care managers include topic related to health information systems.

The speciality of medical engineer is available. Some Universities offer also speciality of medical physicists. No equivalent for "Healthcare Chief Information Officer" is available through accreditation programmes. Educational programmes covering the domain of health informatics may be found in the curricula available in the universities with public health faculties

5.2 eHealth applications & services

5.2.1 Electronic Health Records

Some standardisation activities related to Electronic Health Record were performed as preparatory work within World Bank Project when specifications for IT providers offering their software for ADT and pharmacy modules were defined. There is no common EHR architecture available in a regional or national level for the country.

EHR is regulated with appropriate decree, which accepts keeping electronic patient record only if hard copies of the record are “produced temporarily”. There are plans to allow for keeping of patient record only in electronic form. Data concerning prescription and episodes of health care (mailny for reimbursement purposes) are regulated by ministerial decrees.

The program of development of IT infrastructure in hospital care run by the Ministry of Health resulted also in setting a form of technical documentation, the criteria for admission-discharge transfer and hospital pharmacy modules. The project was financed within the World Bank Project and was carried out in the years 2000-2002.

The uniform structure of EHR is usually available on the level of specific health IT providers which offer systems for inpatient and out-patient care. However, the use of specific products by health providers is distributed in the uneven way in the regional scale. There is no common structure of EHR which would allow the exchange of data between systems offered by different IT providers.

There are communication standards (XML) for data reported for reimbursement purposes (including patient identifies and basic medical data like diagnosis and procedures). No other interoperability standards were established so far.

There is also no architecture for lifelong Electronic Health Record available in this moment in Poland. No conformity testing or accreditation procedures for eHealth systems and applications were identified so far.

There are several problem-focused registers maintained currently in Poland: Polish Registry of Congenital Malformations (covered by ORPHANET), Polish Registry of Acute Coronary Syndromes, National Registry of Neoplams as well as the POLTRANSPLANT, system conducted by Polish Transplant Coordinating Centre.

5.2.2 e-Prescription

No specific initiative in this area were defined so far. It seems that main obstacles in implementation of e-prescription application comes from legal barriers. However, in the plans revealed by the National Health Fund provision of electronic prescribing could be one of key functions of health care information system exploring the use of health chip cards.

5.2.3 Health Cards

The Register of Health Services was developed in Silesia Voivodship in years 1999-2001. The system was based on the use of electronic health insurance card which was used as identification card for citizens as well as for professionals. Main partners involved in this project were regional branch of Health Insurance Fund, healthcare providers and IT provider. The system is operational now from several years.

5.2.4 Health Portals

Many health-related portals are present on the market in Poland. Types of available portals include portals for citizens, portals for patients and portals for professionals. The main content categories available within these portals are yellow pages, general health information, disease specific information, information on services, content for healthcare professionals.

Official portals of Ministry of Health, the National Health Fund and other governmental organisation offer some basic health-related contents.

The plans of development of main governmental portal "Gateway to Poland" encompasses also appropriate place for health care aspects.

Information on regional health care providers and services is usually avaialable in regional or local portals maintained by voivodship or municipal authorities.

Commercial initiatives are focused on the patients or citizens as target audience for health-related contents and some simple services, e.g. professional advice on common medical problems but with no liability included in the service. There are also specific portals prepared for health professional communities based usually on the infrastructure and resources developed by main medical publishing houses.

Some portals offer general advice on health-related problems to their users, a few portals contain also telemonitoring options for patients with chronic conditions

Main actors active in the field of health-related portal are health care providers, companies focused on development of Internet based services for health professionals or patients, professional associations and patients societies.

The examples of portals focusing on main user categories are given below:

- Portals for professionals: www.esculap.pl; www.clinika.pl; www.mp.pl
- Portals for patients: www.przychodnia.pl, www.emedica.pl; www.alergen.info.pl
- Portals for citizens: www.mediweb.pl; www.zdrowie.com.pl

5.2.5 Risk Management and Patient Safety

National Centre for Health Information Systems developed Internet-based registration system for monitoring of consumers' accidents (System for Monitoring of Consumers' Accidents)

5.2.6 Patient Identifiers

No specific programme on patients identifiers found.

5.2.7 Personal Wearable and portable communicable systems

No specific initiatives on personal wearable systems identified.

The Institute of Cardiology in Anin offers the services based on the wireless transmission of ECG tracings monitored with Holter device to dedicated monitoring centre.

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

Several applications focused on the telemonitoring functionality addressed to the patients with chronic conditions. Internet-based system was developed for patients with arterial hypertension in the form of the electronic diary in Łódź [http://www.lodzkie.pl/dziennikc/]

The programme of Polish Network of Severe Asthma was initially started as common project of the Ministry of Health and Polish Committee for Scientific Research and carried out by several University centres focused on asthma care in Poland. The main functionalities included in the system (http://www.astma.med.pl) used by the centres participating in the project included Internet-based telemonitoring for chronic condition with elements of Web-based disease-specific patient record available to health professionals taking care of a patient with severe asthma. The system is available from the end of 2003, however the scope of implementation is limited and the inititiative should still be treated as pilot.

The Institute of Physiology and Pathology of Hearing in Kajetany developed several programes offering telemedical services. The service which won a considerable number of international and national awards enables the telediagnosis of hearing, visual acuity, tinnitus and speaking impairment (the series of applications: "I can see", "I can hear",

"Tinnitus", "I can speak" available under the addressesŁ [http://www.telezdrowie.pl], [http://www.telewelfare.com]=. The Institute maintains also regular consultations on-line and during videoteleconference sessions.

Finally, the cluster of e-services developed for the patients with cardiological conditions by the Institute of Cardiology in Anin. One of the functionalities includes transmission of the ECG tracings or results of Holter ECG monitoring to the Centre with application of mobile phone.

5.2.9 Telemedicine services

There are several location throughout the country were telemedical implementation were made including second opinion/teleconsultation services between healthcare providers or systems for patient testing on distance.

The examples of such initiatives include:

- Krakow Centre of Telemedicine [http://www.telemedicine.krakow.pl]
- Telemedicine Network in Kujawsko-Pomorskie Voivodship [http://www.kpsi.pl]
- Telemedical activities of the Institute of Physiology and Pathology of Hearing in Kajetany [http:// http://www.mcsm.pl]
- Telemedical activities maintained by the Institute of Cardiology in Anin [http://tekomed.ikard.pl]
- Telemedicine Wielkopolska – The platform of modern medical communication (http://www.man.poznan.pl/~telemed/) developed in Poznan

The scope of the activities is quite diversified as well as the level of sustainability achieved. Quite popular form of telemedical services is delivery of second opinion through telecommunication links between medical centre remaining in different referential levels. The use of telemedicine scenario for patients selection to surgery, especially in the area of cardiac surgery for patients in whom angiography was made, is another popular scenario. The specialities predominant in adaptation of telemedical services for care delivery are cardiology, respiratory medicine and oncology.

5.3 Interoperability and standards

5.3.1 Technical Interoperability

The Ministerial regulations were issued in the area of

- physician prescriptions,
- national statistical research program,
- data collected and transferred to the national health fund (suspended till June 01, 2006)
- The main aspects covered within these decrees included: data architecture (data elements and their relations), formats (only in part), coding systems (ICD-10, ICD-9-CM Procedures)
- communication standards (XML).
- The issue of electronic signature was approached on the basis of dedicated law and regulations. The aspect of application provision was also addressed (electronic invoice).
- European standards (EN) are gradually translated and adopted.

The plans for future include:

- the decree on medical documentation- it should be updated before June 30th, 2006 with special provisions related to electronic documentation, applying electronic signature and storage of electronic documentation (without hard copies)

- the decree on prescriptions encompassing the use of electronic signature and storage of electronic documentation (without hard copies)

Decision-making bodies in the domain of the use of healthcare coding and classification systems

There is no single body playing a role of decision-maker in relation to the use of coding and classification schemes.
Coding schemes are developed and maintained by various institutions. If necessary they are regulated by introduction of appropriate provisions. This happened in case of decrees on:

- national statistical research program (ICD-10, ICD-9-CM)
- data collected and transferred to the national insurance fund (ICD-10, ICD-9-CM)
- coding scheme issued by the Ministry for health care facilities
- drug registration (ATP).

There is a plan to apply EN 1068/2005 – the registration body would be the Centre for Health Information Systems.

General standards used for data security were implemented also in health ICT applications.

The first legal regulations related to the use of standards in health ICT applications were issued in the year 2000 (in case of prescriptions).

General trend and future plans are not clear in the area of the adoption and implementation of technical health ICTS standards in Poland.

5.3.2 Semantic Interoperability

Coding and classification systems used in health ICT applications on the national level

ICD-10 Classification was issued by the Foundation of Public Health in 1994, then updated in 2000. It is used in obligatory way in all healthcare facilities dealing with reimbursement and statistical reporting.

ICD-9-CM Classification issued by the Foundation of Public Health in 1995, updated in 1999. it is widely used in hospitals.

Coding scheme proposed by the Ministry for health infrastructure and healthcare facilities, was issued by the Centre of Health Information Systems in 2000, and updated in 2004. It is used for all registered (licensed) healthcare providers.

Registers of medicine – there are three competing private systems, only one of them, based on EAN 13 scheme is official (covers newly registered and re-registered medicines), launched by the Agency for Drug Registration in 2003.

SNOMED – the version issued by Centre of Health Information Systems in 2001 was based on the version 1984. Only a few examples of the usage available.

CPT-4 – National Physicians Chambers plans to issue it in 2006.

Universal Catalogue of Products (Services) – issued by the National Health Fund in 2003, widely used by all providers contracting services.

6 eHealth RTD status

6.1 General information on RTD structure

The main organisation in the area of RTD policy setting is the Ministry of Education and Science. [8][10] Key players participating in RTD activities are universities, research institutes and to some extent commercial organisations.

The priorities defined in National Research Programme issued in 2005 include [11]:

- health with specific areas: ageing processes, neoplasms, molecular biology and biotechnologies, the influence of environment on health status, transplantology, innovative and generic medicines, materials and equipments supporting diagnostics and therapy

- environment: environment management, the impact of economy on climate changes, biological diversity, otpimum development of urban areas and regions, optimum approaches to the use of natural resources, recycling

- agriculture and food: food supporting health, biological progress in agriculture, veterinary protection of public health,

- state and society

- security (management in crisis in state, system of early warning, security of information systems in cyberspace)

- new materials and technologies: multifunctionl nanomaterials and nanosystems, advanced electronic and optoelectronic materials and systems, highly processed chemical compounds and materials with complex properties, industrial technologies and biotechnologies

- information technologies: development of teleinformatic infrastructure, methods and tools for development of software supporting progress of information society, intelligent systems of diagnosis and therapy as well as systems of medical information exchange through Internet and mobile platforms

- energy and resources

- transportation infrastructure

6.2 Research Programmes

The main priorities included in the national framework program which could be relevant to e-health domain cover following areas: ICT applications, health informatics/eHealth, bioinformatics, genomics, proteomics, GRIDS, nanotechnologies, microdevices, new materials (incl. biomaterials). [11]

6.3 National RTD Funding

Ministry of Education and Science (previously Ministry of Scientific Research and Information Society Technologies) is the main national source of funding in the area of scientific research.[10],[11] No predetermined level of financing is defined for this research in the e-health domain. Total funding depends on the number of successful projects passing through the assessment process from specific area.

6.4 Technology transfer & Innovation Support

There are several regional level centres and units focused on technology transfer in advanced technologies, covering also the area of e-health. Activities focused on technology transfer are also integrated in scope of work of Centres of Technology Transfer, Centres of Advanced Technologies and Centres of Excellence established in last years throughout all the country. The issue of technology transfer in ehealth was also the topic of some international project, f.g. PRO-ACCESS (5FP). [14]

Examples of the institutions acting on regional or national scale and focusing on e-health and telemedicine area:

- Krakow Centre of Telemedicine [http://www.telemedycyna.krakow.pl/kctm.php?p=1&m=0#/]
- Centre of Innovation, Technology Transfer and University Development, at Jagiellonian University, Krakow, Poland [http://www.cittru.uj.edu.pl]
- Centre of Advanced Technology "Akcent-Malopolska" [http://www.cittru.uj.edu.pl/akcent.html]
- Silesian Centre of Advanced Technologies [http://www.nauka.pwr.wroc.pl/dczt/]
- Polish Telemedicine Society [http:// http://www.amwaw.edu.pl/pttm/]

The important activities related to the e-health domain growth are held by the Centre of Health Information Systems [www.csioz.gov.pl] which acts as specialised body at the Ministry of Health. The Centre is involved in essential initiatives adding to development of e-health environment. These initiatives include development of registers for healthcare, promotion of standards in medical informatics and building the vision of e-health growth in Poland.

No structurized approach is available so far in the area of eHealth-related technology transfer. Activities in this area performed on the basis of spontaneous interest of some environments and institutions or within specific national/international projects. [14]l

Support actions to promote eHealth-related innovation on the national or international scale includes conferences, seminars, working/expert groups, information and communication activities. The events of this types with links to relevant websites were enlisted below:

- Conferences Telemedicine 2006, 2007 organised under the auspices of Centre of Health Information Systems [http://www.telemedicine.edu.pl]
- 1st, 2nd, 3rd International Conference on Telemedicine & Multimedia Communication (the last edition: October 21-23, 2005 [http://www.ichs.pl/32596.dhtml])
- Int. Workshop on E-health in Common Europe, December 2004 [http://www.pro-access.org/conference3/index.html]
- 1st and 2nd Int. Conf. on E-health in Common Europe (June 2003 [http://www.pro-access.org/conference/index.html], March 2004 [http://www.pro-access.org/conference2/index.html]

The key promotional activities in the eHealth-oriented innovation are carried out by associations and academia-related environments; they encompass mainly conferences and workshops.

6.5 Industry Strategies and Programmes

There are no national-ownership companies which would be specifically active in the field of eHealth and related RTD.

7 References

1. Centre of Advanced Technologies "AKCENT-Malopolska" [http://www.cittru.uj.edu.pl/akcent.html]
2. Centre of Innovation, Technology Transfer and University Development [http://www.cittru.uj.edu.pl]
3. Dolnośląskie Center of Advanced Technologies [http://www.nauka.pwr.wroc.pl/dczt/]
4. eContent in Poland. 2004 [http://www.content-village.org/articles.asp?id=331]
5. Health Care Systems in Transition - Poland. 1999. [http://www.euro.who.int/observatory/hits/]
6. Information available on the Ministry of Health website [http://www.mz.gov.pl]
7. Information available on the National Health Fund website [http://www.nfz.gov.pl]
8. Information available on the website of previous Ministry of Scientific Research and Information Society Technologies [http://www.mnii.gov.pl]
9. Krakow Centre of Telemedicine [http://www.telemedycyna.krakow.pl/kctm.php?p=1&m=0#/
10. Ministry of Education and Science website: http://www.mein.gov.pl
11. National Research Framework Programme at Ministry of Education and Science Website (Document in Polish) [http://www.mnii.gov.pl/mein/_gAllery/12/53/12535.pdf]
12. OECD Health Data 2005 [http://www.oecd.org/document/16/0,2340,en_2649_37407_2085200_1_1_1_37407,00.html]
13. Report: Monitoring the status of activities within Strategy for Development of Information Infrastructure in Poland – ePoland for years 2004-2006 [http://www.mnii.gov.pl]
14. The PRO-ACCESS project website [http://www.pro-access.org]