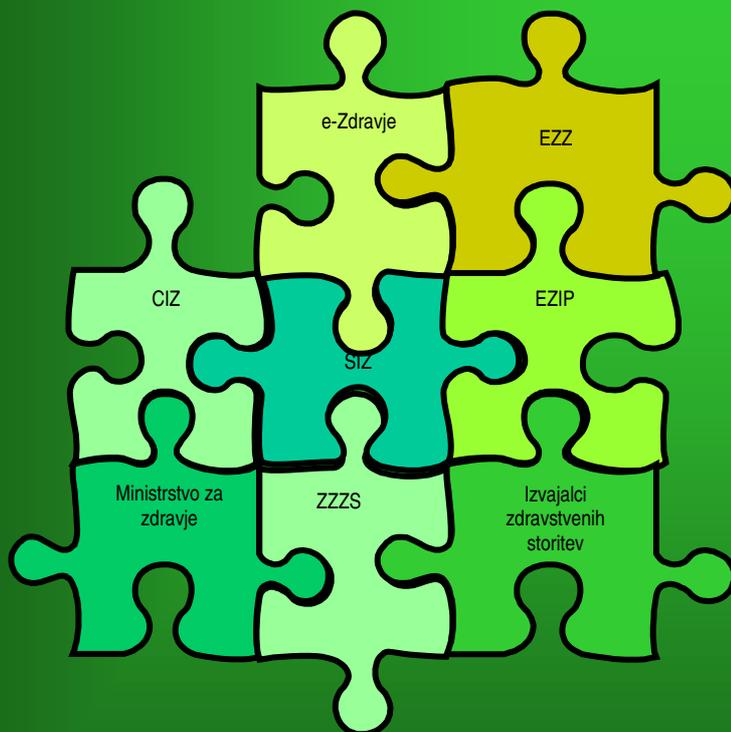




REPUBLIC OF SLOVENIA  
Ministry of Health

*e-Zdravje<sup>2010</sup>*  
*Information Technology Implementation*  
*Strategy in the Health Care*  
*System of Slovenia 2005-2010*



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REPUBLIC OF SLOVENIJA
MINISTRY OF HEALTH
Central Health Informatics Project Unit
Štefanova 5, 1000 Ljubljana, Slovenija
Tel.: 01-478 6001
Fax: 01-478 60 58

# e-Zdravje

## Information Technology Implementation Strategy in the Health Care System of Slovenia

*Editor*  
**Drago Kodele**

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## Summary

Health care is of extreme strategic and national importance. It affects welfare, economic development and employment. Health care informatics is the field that can bring the highest added value to the health system. To this end the document e-Zdravje<sup>2010</sup> (or e-Health<sup>2010</sup>) was prepared as the strategic plan for the implementing IT in the health care system in Slovenia for the period 2005 – 2010. Following expert deliberation the document will serve as the basis for the adoption of the action plan to accelerate the implementation of e-tools in the Slovenian health care sector. The document e-Zdravje<sup>2010</sup>, known also as the national e-Health plan, will be submitted to the European commission by the end of 2005. The focus of the national plan or strategy is on e-Health and covers information systems and services, which when combined with organisational changes and the development of new skills can contribute to the development of the health care sector, improvements in access to care and quality of services, efficiency and productivity. E-Health solutions or technologies support the progress in medical research, better management and the diffusion of knowledge in the medical field, and enables to achieve evidence-based medicine. The solutions (technologies) are intended for all stakeholders in health care: they ensure the patients with the right information in the appropriate form, they provide access for medical professionals to patients' medical records in the electronic form, which are integrated in terms of time and health system levels, and provide managers organisational and business data.

The strategic plan takes into account professional and business challenges of modern European health systems, such as: rising demand for health care services due to demographic changes, increasing expectations of patients, management of huge amounts of health information, the need to provide the best health care services under limited budgetary (public) conditions, etc. The Slovenian strategic plan also follows the EU guidelines laid down in the document "Communication on e-Health - making healthcare better for European citizens: An action plan for a European e-Health Area" (COM(2004)356, (30 Apr. 2004)). The Slovenian strategic plan builds on the previous achievements and existing conditions in the field of information systems in the Slovenian health care sector and proposes possible solutions to rectify the deficiencies noted over time.

In the recent years Slovenia has successfully implemented the first steps of information technology in the health care system by introducing the basic computer technology and computer exchange of information, defining the standards, establishing data bases and implementing the health insurance card system. The latter enabled Slovenia to achieve high recognition in Europe and our experiences are being examined by other states that are about to engage themselves in a similar

card projects. One of the latest achievements worth highlighting was the definition and introduction of the system of reporting data on inpatients on the basis of Diagnosis Related Groups (DRGs). Alongside with the establishment of the inpatient reporting data system, various other applications were developed in health care, such as the electronic discharge letter, data monitoring system on risk factors for cardiovascular diseases, implementation of the pilot project on digitalised radiology by introducing PACS, connecting health service providers with laboratories, applications for covering emergency medical service in the control centre and on site, etc. While developing these tools, a substantial knowledge pool was accumulated and is mainly concentrated at the Health Insurance Institute of Slovenia and at the suppliers' site who have developed information services for the health providers.

Nevertheless, despite the early basic IT implementation in health care organisations in Slovenia, we still have not established an interoperable information system in the health sector. Numerous health care information systems were developed internally or for the needs of public health institutions and were mainly intended to satisfy their own local requirements, and thus were not interoperable.

There are a few major deficiencies in information system in the Slovenian health care sector which this strategic plan aims to eliminate, and these are:

1. The development of health care informatics was not co-ordinated along with the national strategy. The main obstacles to the development of health care informatics were a lack of an IS national strategy and dispersed functions of health care informatics without common grounds;
2. In Slovenia, administrative and technical operations in health care are largely supported by information technology; however, on the other hand, there is a very weak usage of informatics to support the work of health care professionals and staff working with patients and users also in preventive services;
3. There are very few technological and thematic electronic connections for the exchange of professional health care data between the providers of health care at various levels and between institutions; therefore the data exchange between the primary and secondary level, and even between providers on the primary level, is still largely carried out in paper form;
4. The stakeholders in health care are not sufficiently aware of the importance and possibilities of health care informatics and thus, in these circles, informatics is inappropriately evaluated. The total expenditure for informatics is below 1% of the annual

- total health care budget (the European average is 2.5–3%). Moreover, those funds are dispersed since they also cover the costs of health care services;
5. With the high level of health care, we are faced with the ever increasing gap between the need for information and the possibilities offered by informatics and the actual equipment and accepted working methods. The present methods of reporting and storing data can even endanger the safety of the patient as well as the confidentiality of the data and even present a risk in the management of data;
  6. In recent years, Slovenia has not taken an active role in Europe with its national health care informatics projects but was on occasion involved in joint-European development projects. We have not taken an active part in forming the European policy on health care informatics at the European Commission and have made very little use of the available European development funds;
  7. Medical devices used in hospitals are not entered within a basic uniform framework or data base on medical devices;
  8. Slovenian hospitals have not yet determined the essential list of medicines (drugs) and related orphan medicinal products that are used for appropriate and undisturbed treatment using medicinal products. Within this framework there are many unregistered drugs which have long been used in daily medical practice.

The vision for the implementation of information technology in the health care system laid down in the strategic plan is to have:

- an efficient, flexible and modern health care informatics that would support achieving the strategic goals of the Slovenian health care system and thus meet the needs and interests of the citizens, health experts, management of health care organisations and health care system authorities,
- an integration of local information systems that would enable citizens and medical experts to overcome administrative and organisational limitations in accessing information and to achieve direct communication without time or organisational barriers.

This vision is to be implemented through four strategic objectives:

- Increase the active role and responsibility of citizens in preserving their health, and so better inform them and providing them with the best possible care,

- to enable health professionals a safe and reliable access to key information in electronic medical records and other databases needed in their daily work through efficient electronic communication, improved training and knowledge management,
- to facilitate the planning and management of health care organisations and the health care system as a whole on the basis of quality and trustworthy data whether economic, administrative or clinical,
- to improve accessibility of health care services to those groups of patients who would otherwise be excluded for different reasons, such as for example disability, old age, etc.

The strategic goals of this plan are:

- to introduce the basic information infrastructure and determine the basic range of health and social data for the establishment and management of electronic medical records of patients, and to setting up a collection of basic data / collecting basic data for electronic medical records at the national level until the end of 2007,
- to unite the health and social information systems under The strategic plan will be included in the formation of a broader strategic plan for the health care system of Slovenia. total information system at the national level with the stress on the establishment of a single health care information portal (EZIP) which will enable safe and reliable exchange of information for all stakeholders; provide electronic services and inform in a unified (standardised) and transparent manner and interoperability with comparable EU systems until the end of 2010,
- to introduce e-business as the common practice in the Slovenian health care system until the end of 2010.

Initial kick-off tasks were defined to provide a solid starting point for carrying out the health care informatics strategy, These tasks take into account the present infrastructure, the advantages and disadvantages of the so far existing practices, the development and available resources and needs of the citizen-patient and the health care system as well as the EU guidelines on health care informatics. Theses initial kick-off tasks are:

- to establish bodies for planning, co-ordination, management and control (enforcement) of the development and application of health care informatics: Council for Health Care Informatics, Centre for Health Care Informatics and Committee for Health Care Informatics Standards,

- to upgrade the basic information infrastructure in health care for safe and transparent exchanges of information between patients, health care service providers and payers,
- to establish safety and technological standards for safe communication, management and storing medical data. In addition, these tasks encompass:
  - setting up of the public key infrastructure (PKI) for the identification and authentication of users;
  - setting up minimum standards and range of technologies that should ensure interoperability and safe communication also when public communication networks are used (Internet);
  - setting up standards and range of technologies for safe access, management and storage of medical data;
  - setting up organisational standards for safeguarding the information systems;
  - setting up the process of certification and verification of health care service providers.
- to prepare an operative plan for the development of applications on the basis of the highest professional and cost effectiveness in the shortest period of time all by taking into account the following priorities:
  - patient electronic medical records (EMR),
  - e-prescription for drugs and national database on drugs (medicines),
  - electronic records of medical devices,
  - e-order forms and e-supply order for drugs (medicines),
  - further development of the health insurance card system,
  - national waiting lists,
  - to extend the functionality of e-DRGs (Diagnosis Related Groups),
  - to design and implement the methods of exchanging information between health care service providers and to supplement the contents of data exchanged / update the content of the data exchanged between the providers and payers of health services,
  - to design and gradually introduce the national health care portal,
  - to introduce the national database of projects in the field of e-Health;

- to regulate the legislative bases for introducing e-Health in due time;
- to reallocate resources from health care programs and services and transfer or reallocate them for informatics for the purposes of carrying out joint projects and applications and for co-financing the systematic upgrading of the basic information infrastructure in health care; to ensure a budget so as to cover the costs of management, planning and building of the information infrastructure in health care; to actively acquire funds from the European resources,
- to actively participate in the European activities in the field of e-Health,
- to carry out a promotion campaign so as to raise awareness on the role and feasibilities of e-Health and to mobilise additional financial resources and investments for the development and support of concrete activities;
- to introduce motivational schemes for special achievements in the field of health care informatics.

the grounds for quality and professional work with patients, fast and safe management of medical information, further development of the health care system and its equal and competitive position in Europe. This strategic plan is the core document of the Ministry of Health in the Republic of Slovenia for encouraging and implementing information technology in health care in Slovenia in the period 2005 - 2010. The strategy binds, and represents a challenge for, all the stakeholders in the health care system: the Ministry of Health as the owner of the strategy, health professionals, health care organizations, private health care service providers, payers of health care services and other health care institutions.

## Introduction

Similarly to all European health care systems, Slovenia is also faced with professional and business economic challenges. When designing the information technology implementation strategy, these challenges were taken into account :

- rising demand for health services due to demographic changes due an ageing population;
  - the increasing expectations of individuals (users), who are well informed on the latest medical treatment techniques, and thus demand a higher level of health care services.
- Owing to the fast development of communication technologies, information on new

treatments is easily available not only to the providers but also to the users of health services;

- ❑ increased mobility of population and health professionals within and beyond the borders of the European Union;
- ❑ the need to reduce the morbidity rate;
- ❑ efficient risk management and elimination of the consequences of health disasters;
- ❑ the difficulties in matching investment in technology with investment in the complex organizational changes needed to exploit its potential;
- ❑ management of a huge amount of health information that need to be securely stored and easily and securely accessible in a timely manner whenever needed in order to ensure an efficient operation of the system;
- ❑ the need to ensure the best health care services within the limited public (budgetary) resources;
- ❑ the need for increased cost-effectiveness and safety at work.

The Slovenian citizen expects the conservation of solidarity, better access, new programs, greater possibility of choices, (better possibility for being proactively involved in decisions related to their own health), better responsiveness on the part of health providers, improve the quality of care and increased participation in the decision-making process related to their health conditions (medical treatments).

On the wider European level, e-Health, where information and services systems come together, is one of the fundamental tools that contribute to the development of the health sector, better access to care, improve the quality of services as well as general efficiency and productivity. When combined with organizational changes and the development of new skills, e-Health can help to deliver better care.

The health care system is an information intensive sector which increasingly depends on information and communication technologies. These technologies are supporting progress in medical research, better management and diffusion of medical knowledge, and also help achieve evidence-based medicine. E-Health covers a very wide range of applications of information and communication technologies in the health care system. E-Health tools enable the aggregation, analysis and storage of data in all its forms, access to the latest scientific findings and the collaboration among many different organisations and health professionals, and it also provides a ground for individuals to take a more active and responsible role in their treatment by letting them

access to their own medical data. These tools are commonly referred to as e-Health tools and thus help:

- the patients (users) of health care services by providing them information tailored to their need. This type of information would be available through health care portals, e-mail consultations with health care providers, data on the patient's medical condition provided in the electronic medical records, and systems of remote monitoring of certain bodily functions such as pulse, blood pressure, blood sugar, breathing parameters etc.;
- the health providers to access to the patients' electronic medical records which integrate time and health system levels in order to facilitate the scheduling of surgeries (e-appointments etc.) and render administrative work more efficient and faster, including easier access to professional sources (medical e-cards) and distance learning, and by enabling them to link and communicate with other health professionals and stakeholders (teleconsultation);
- the different levels of management and managers of health care system responsible for the efficient operation of the system by enabling the exchange of organisational and business information between health care organisations;
- the health care system as a whole by facilitating the exchange of information among the different stakeholders in the health care system.

## EU Guidelines

The EU guidelines are outlined in the framework document Communication on e-Health - making healthcare better for European citizens: An action plan for a European e-Health Area, COM(2004)356, (30 Apr. 2004). It covers three target areas:

1. Develop common components and appropriate framework for e-Health;
2. Pilot projects to accelerate the implementation of e-Health;
3. Exchange best practices and monitor progress.

OR:

1. how to address common challenges and reacte the right framework to support e-Health;
2. pilot actions to jump start the delivery of e-Health;
3. sharing best practices and measuring progress.

Specific issues or tasks for Member States and the Commission are laid down in the Action Plan; these, in turn, are listed in terms of areas and time periods:

#### Issue 1: Addressing common challenges

In 2003 European Health Ministers signed the Ministerial Declaration<sup>1</sup> and expressed their e-Health leadership. This Declaration binds every Member state to prepare a national or regional roadmap for e-Health by the end of 2005. The roadmap should define the introduction of e-Health systems, targets for interoperability and the use of electronic medical records, and address issues of reimbursement of health care services.

By mid-2005, the Commission should produce a summary of European best practices as guidance for Member States.

By the end of 2006, Member States, in collaboration with the European Commission, should identify a common approach to patient personal identification number (or patient identifiers). Moreover, Member States, in collaboration with the European Commission, should identify and outline interoperability standards for health data messages and electronic medical records, taking into account best practices (e.g. experience in introducing the European Health Insurance Card) and relevant standardisation efforts (citizen identification etc.).

During the period 2004-2008, Member States should support deployment of health information networks for e-Health based on fixed and wireless broadband and mobile infrastructures and Grid technologies.

By the end of 2007, Member States should adopt conformity testing and accreditation schemes for following successful best practices.

By the end of 2006, a collaborative approach should be undertaken among Member States to supporting and boosting investment in e-Health.

By the end of 2009, the European Commission, in collaboration with Member States, should undertake activities to:

- Set a baseline for a standardised European qualification for e-Health services in clinical and administrative settings,
- Provide framework for greater legal certainty of e-Health products and services liability within the context of existing product liability legislation,

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<sup>1</sup> eHealth 2003, Ministerial Declaration, Brussels, 22 May 2003

[http://europa.eu.int/information\\_society/europe/ehealth/conference/2003/index\\_en.htm](http://europa.eu.int/information_society/europe/ehealth/conference/2003/index_en.htm).

- Improve information for patients, health insurance schemes and health care providers regarding the rules applying to the covering of the costs of e-Health services,
- Promote e-Health with a view to reducing occupational accidents and illness as well as supporting preventive actions in the face of the emergence of new workplace risks.

#### Issue 2: Pilot actions: accelerating beneficial implementation

By the end of 2005, a national information portal should be set up to enable medical professionals and users access to patient data.

By the end of 2005, through information and communication technologies tools there will be a strengthening or early warning, detection, and surveillance of health threats and workplace health risks..

By the end of 2008, the majority of all European health organisations and health regions (countries, districts etc.) should be able to provide online health services such as teleconsultation (e. g. second medical opinion), e-prescription, e-referral, e-documents, e-forms, telecare, etc.

Finally, issue 2 also covers the promotion of the use of cards in the health care sector and introduction of the electronic European health insurance card by the end of 2008.

#### Issue 3: Working together and monitoring practice

In 2004, the European e-Health forum should be established to support the Commission. It should involve all stakeholders, including at the national and regional levels as well as representatives of managements of health care institutions. Its task should be to follow up the various roadmaps and inform the Commission thereof, and to identify further actions for the development of e-Health by including a strong focus on users and access for all to e-Health. The work of the e-Health forum will also be closely associated with the implementation of the Community Public Health Program.

During the period 2004-2008, Member States with the support of the European Commission will organise special events such as conferences in order to disseminate best practices.

In parallel, by the end of 2005, the European Commission, with contributions from Member States, should establish an effective way of disseminating best practices.

During the period 2004-2010, every two years, the European Commission will publish a study on the state of the art in deployment, examples of best practices, and the associated benefits of e-Health.

By the start of 2005, Member States, in collaboration with the European Commission, should agree on the common approach to benchmarking in order to assess the quantitative (including economic) and qualitative impacts of e-Health.

The eEurope Advisory Group and e-Health Working Group composed of national representatives were established at the beginning of 2005 with the aim to provide a more efficient implementation, co-ordination and promotion of the e-Health action plan.

### **Assessment of the present situation in Slovenia**

In the period 1992-2002, under the leadership and sponsorship of the National Health Insurance Institute, Slovenia successfully implemented the first steps of information technology implementation in the health care system with the introduction of basic computer technology and computer exchange of information, definition of standards, setting up of databases and introduction of the health insurance card system. Although the infrastructure was introduced for the entire health care sector, its applications were developed mainly to satisfy the needs of the health insurance and partly also for the needs of those involved in health care statistics. The health insurance card system has provided reliable patient and medical professional identification at all levels of the health system and simplified the procedures related to health insurance. Within this system, the 250 largest health care locations are connected to the self-service terminal network. This enabled us to achieve high recognition in Europe and our experiences are used by other states for similar card projects.

Although the appropriate conditions were provided, relatively few applications have been made in the health professionals' work. This field demands collaboration of different professions in which the Ministry of Health should act as the main co-ordinator. Unfortunately, in the past, the Ministry of Health was poorly equipped with information technology facilities, and also lacked its own information systems solutions and information technologies experts. In the decision-making processes, it therefore uses largely the data collected at the Institute of Public Health of the Republic of Slovenia and Health Insurance Institute of Slovenia.

The main achievements in the past years were the applications in Slovenian hospitals and outpatient services and now already have the form of electronic medical records on patients. Health data that are collected and processed include:

- working and final diagnoses classified according to the MKB 10 classification,
- inpatient procedures classified according to ICD10 AM,
- used drugs (medicines) according to the common Slovenian code system of registered drugs,
- databases of insured persons covered by compulsory and voluntary health insurance,
- databases of persons liable to pay compulsory insurance contributions,
- a database of health care service providers,
- registers of selected general practitioners,
- national codes related to the calculation of the costs of health care services.

Moreover, all hospitals collect data on the anamnesis and clinical status, and prepare a summary of treatment usually in the form of free text or sometimes in structured (formatted) records. In the field of nursing care, it is important to monitor the diagnoses of nursing care, the plan of medical care, interventions, and categories of patients according to the complexity of procedures and activities in medical care, results of medical care as well as accidents in health care institutions and at home.

In addition to basic health data (diagnosis, medicinal products), we also collect data for outpatient services in a uniform way; these data include risk factors for cardiovascular diseases, preventive gynaecologic screening and examinations. An increasing number of applications support monitoring of patients with chronic diseases.

Many providers already use electronic waiting lists. Data for hip surgeries is collected also at the national level.

Information technology support is in place in most laboratories that exchange data with the information systems in hospitals or outpatient services, so that the results of laboratory tests are incorporated in the electronic medical records.

The project of exchange of discharge letters carried out by Prorec Slovenia (a Slovenian member of Prorec) in collaboration with three major software houses, resulted in developing a solution that enables exchange of electronic discharge letters written in accordance to the HL7 standard. As soon as the appropriate infrastructure for safe exchange of data is provided, hospitals will be able

to send electronic discharge letters to all selected practitioners regardless of the application they use.

The solution for microbiological laboratories enables the practitioners to order the examinations access to their patients' test results via the Internet. There are also several other cases of good practices in the field of health care informatics.

The Health Sector Management Project was the central project related to the development of health care informatics in the period 2002-2004. Since informatics significantly affects the achievement of the goals of the health care system, two (out of four) components of the project were dedicated to the development and implementation of the single information system and to the establishment of appropriate national institutions for healthcare informatics. The main result of those components was a defined and implemented system of reporting data on inpatient treatments for DRGs, which, among other things, supports the goals of an accurate and transparent calculation of costs for hospitals.

From the point of view of informatics, the system of reporting data on inpatient treatments brought several positive steps forward in the field of healthcare informatics in Slovenia:

- ❑ the same definitions of data from the set of DRGs are used both by the Institute of Public Health of the Republic of Slovenia for compiling hospital statistics and by the Health Insurance Institute of Slovenia for calculating costs of services,
- ❑ all acute hospitals in Slovenia were given web confirmation and access to a secure and fast communication network of the Government Centre for Informatics for the needs of reporting,
- ❑ modern technology for formatting or describing XML data was introduced.

Other results of the informatics components of the project was the analysis of the current state of IT equipment in Slovenian hospitals and the proposal to raise the level of IT infrastructure in Slovenian hospitals as well as to harmonise or adjust the functions of national health care informatics stated in the proposals to establish three national bodies:

- ❑ Council for Health Care Informatics,
- ❑ Committee for Health Care Informatics standards, and
- ❑ Centre for Health Care Informatics.

With the exception of e-DRGs the products of the project have not been dealt with and adopted by the professional public or applied in practice nor was the proposed organisational scheme introduced. The Medical Centre (KC) has introduced an integrated information network which

should enable direct exchange of data in digital form between all the units of the KC Ljubljana institute as well as with all other health care institutions in Slovenia.

The General Hospital of Izola realised the project of digitalisation of radiology with the introduction of the first Picture Archiving and Communication System (PACS) in Slovenia and is thus the first establishment in Slovenia with a portion of its medical data stored in digital form. Digital pictures can be viewed or downloaded. Safeguarding of personal data is ensured through secure data transfer. A similar system was subsequently introduced at the Golnik Hospital and the two establishments can thus exchange radiological data in the digital form. Similarly, early stages of storing pictures in digital form can also be found in other health care establishments in Slovenia.

Nevertheless, despite the early basic IT implementation in health care organisations in Slovenia, we still have not established an interoperable information system in the health sector. Numerous health care information systems were developed internally or for the needs of public health institutions and were mainly intended to satisfy their own local requirements, and thus were not interoperable.

### **Vision and strategic orientation in the IT implementation of the health care system**

In the future, e-Health will represent the key basis for the development of health care at the highest levels of quality and efficiency. Knowledge management with information support, diagnosis systems, distance (remote) medical treatment, optimised administration, communication among patients, health professionals and institutions, telemedicine etc. can, if working as in unified manner, improve the quality of care and efficiency of the health care system.

Electronic medical records will have the central position in e-Health and the key applications will only function if electronic storage and access to patients medical records are provided. Moreover, those applications will function as a whole provided the data of personal electronic medical records are accessible to relevant applications, with all statutory provisions taken into account.

Within e-Health, ICT are used mainly to facilitate the basic processes of work with patients and also to improve the communication among individuals and organisations within the health care system, to support the logistic and financial administrative processes, and also scientific research.

In order to support those processes it is of key importance to provide a system which enables a secure, timely and reliable access to infrastructure and a system of organisational and technological standards regulating data, servers and technology. The result of such unification of infrastructure and standards is the ICT architecture for the entire health care sector.

## The vision

The vision for the implementation of information technology in the health care system laid down in the strategic plan is to have:

- an efficient, flexible and modern health care informatics that would support achieving the strategic goals of the Slovenian health care system and thus meet the needs and interests of the citizens, health experts, management of health care organisations and health care system authorities,
- an integration of local information systems that would enable citizens and medical experts to overcome administrative and organisational limitations in accessing information and to achieve direct communication without time or organisational barriers.

The vision is to achieve an efficient, flexible and modern health care informatics program that would support the achieving of the strategic goals of the Slovenian health care system in order to meet the needs and interests of the citizens, medical experts, health care organisation management and health care system authorities.

Moreover, the vision is to integrate local information systems that would enable citizens and medical experts to overcome administrative and organisational limitations in accessing information and to achieve direct communication without time or organisational barriers.

In Slovenia, information technology implementation in the health care system with the strategy in the field of e-Health must be based on the development strategy for an integrated health care system, i.e. national program on health care, with clearly defined content and priorities. The health care system must be revised so as to include the strategy and vision of information technology implementation and introduction of e-Health in the documents.

The Republic of Slovenia will, like the European Union, clearly define in its action plan on e-Health the importance of e-Health solutions and their key role in the future development of the health care system. Common orientations should be pursued and preconditions provided for appropriate solutions for mobility of patients and health professionals, improved control and protection from health hazards and improved access to health information, especially in maintaining and promoting good health.

In the development of information solutions, the existing standards should be upgraded in order to support professional work and decision-making of health and associated professionals at all levels.

The key task is to establish a national strategic body for the development of health care informatics, a Council for Informatics, as mentioned earlier, which will operate within the Ministry of Health and carry out the following tasks:

- to form the development strategy for an integrated health care informatics system;
- to co-ordinate the development of new projects and continue with those already in place;
- to plan and co-ordinate the introduction of common information and communication infrastructure;
- to co-ordinate the formation and adoption of standards;
- to determine the criteria and standards for safeguarding and ensuring quality of information in health care information systems;
- to plan and co-ordinate pilot projects;
- to monitor, promote and disseminate best practices;
- to form the standards of e-Health for health service providers and to ensure the realisation of the strategy.

### **Strategic guidelines**

Health care informatics will:

- ❑ Increase the active role and responsibility of citizens in preserving their health, and so better inform them and providing them with the best possible care,
- ❑ to enable health professionals a safe and reliable access to key information in electronic medical records and other databases needed in their daily work through efficient electronic communication, improved training and knowledge management,
- ❑ to facilitate the planning and management of health care organisations and the health care system as a whole on the basis of quality and trustworthy data whether economic, administrative or clinical,
- ❑ to improve accessibility of health care services to those groups of patients who would otherwise be excluded for different reasons, such as for example disability, old age, etc.
- ❑ glej stran 8 - increase the active role and responsibility of citizens in preserving health, better informing processes and faster access to the best possible medical care;

- ❑ extend equal access to medical services to the elderly and disabled persons;
- ❑ enable health experts secure and reliable access to key information in electronic medical records and other data bases which they need in daily work through efficient electronic communication;
- ❑ facilitate health care managers and health care authorities to effectively plan and manage their institutions and/or the health care system as a whole on the basis of quality and trustworthy business and professional data practices.

### **Better informing and a more active role of citizens in their treatment**

The use of personal electronic medical records will contribute to a more active role of the citizen in preserving health in the process of health treatment.

The main strategic goals are:

- ❑ to improve access to medical records,
- ❑ to ensure the safety of medical records,
- ❑ to enable mobility of the patient and access to health care beyond national borders,
- ❑ to reduce mistakes and increase the availability of ICT,
- ❑ to improve access to comprehensive health information for patients and health professionals,
- ❑ to improve efficiency of health care processes,
- ❑ to increase the satisfaction of final users,
- ❑ to integrate the health care and social sectors through health treatment and home care.

Patient-tailored systems, which enable distant (remote) control of certain bodily functions, reduce inpatient treatment and thus ensure more patient-friendly health care.

Teleconsultation enables medical treatment of certain diseases at home or in a local, nearby hospital facilities and thus improves accessibility of health care services, especially to those living in remote areas or persons with special needs.

The development of modern ICT solutions enables the citizens:

- ❑ to spend less time with administrative procedures;

- ❑ to receive efficient, uninterrupted medical treatment through the information system that enables collaboration among professionals treating common patients;
- ❑ access to the latest data on health care providers;
- ❑ Internet access to information (on diseases, medicinal products, procedures) and instructions on access to more appropriate treatment, regardless of the inquiry;
- ❑ secure management of patients medical records;
- ❑ distance medical treatment - telemedicine.

### **Faster access to information required by health professionals**

The use of e-Health tools and services can improve the quality of health care services. These tools and services provide important information and enable easier access to examples of good health practices, specialists' advice and outcomes of medical treatment.

E-Health tools enable timely and easy access to electronic medical records of the patient on the spot, support the use of non-invasive diagnostic procedures, ensure the exchange of laboratory results, provide access to knowledge bases, etc.

E-Health tools are intended for medical practitioners and other health care workers engaged in the medical treatment processes of an individual patient.

They can support medical treatments in many ways:

- ❑ by providing health professionals access to health data and to logistic and administrative information related to patients regardless of time and place,
- ❑ by enabling communication between medical workers, professionals and beyond organisational boundaries,
- ❑ by enabling integrated ranges of protocols in accordance with medical treatment,
- ❑ by storing data in accordance with statutory provisions,
- ❑ by supporting decision-making processes with a system of reminders,
- ❑ by providing logistic support and taking in account certain aspects such as requests for and planning of tests and examinations.

### **Easier management of the health care system as a whole**

E-Health systems link individual providers and levels of health care services thus enhancing the efficiency of the health care system. Access to appropriate and reliable (clinical and administrative) data in the health care system will facilitate the efficient management of public health.

The integration of professional and business data and automated data acquisition from electronic medical systems will reduce the volume of administrative work in the preparation of various analyses and statistical reports and improve the quality and applicability of results. All this will contribute to the spreading of good health and medical practices and the elimination of ineffective and inappropriate medical treatment.

### **Strategic goals for the IT implementation of the health care system**

Integration and standardisation are of key importance in avoiding ambiguous registration and exchange of data between health care service providers and health care institutions. Those norms and standards refer both to data as such and to the exchange of data between the users and, at the same time, provide the basis for further information technology implementation in the health care sector.

1. to introduce the basic information infrastructure and definition of the basic range of data for the establishment and storage of electronic medical records on patients and to introduce the collection of basic data for electronic medical records at the national level, including the introduction of safe and standardised communication with unambiguous identification, authentication and authorisation of persons entering the system by end-2007;
2. to unify information systems in an integrated information system at the national level laying stress on the establishment of a single health care information portal , which will enable the safe and reliable exchange of information for all stakeholders in the health care system; to provide electronic services and informing in a single (standardised) and transparent manner and to achieve interoperability with comparable EU systems by end-2010,
3. to introduce e-business as a common practice in the Slovenian health care sector by end-2010.

## Kick-off tasks

As a solid starting point in carrying out the health care informatics strategy, the initial targeted tasks have been defined taking into account the infrastructure already in place, the advantages and disadvantages of previous practices and developments, and the available resources and needs of the citizen (i.e. patient) and the health care system as well as the EU's directives in the field of health care informatics.

Those tasks are:

1. to compile inventories of realised solutions and ongoing projects; to discuss the final report on the RUSZV project with the professional public (holder: Ministry of Health, realisation: by July 2006); to review other major ongoing projects: reports by project holders: Ministry of Health, Institute of Public Health of the Republic of Slovenia, Health Insurance Institute of Slovenia, the chamber and health care service providers (by the end of December 2006); to examine the situation, identify good practices and analyse the reasons for failure of certain projects (Council for Health Care Informatics, by end 2006).
2. to establish the following bodies outlined in the RUSZV project in the field of health care informatics after appropriate prior revision is carried out regarding their roles, functions and responsibilities:
  - Council for Health Care Informatics (Council)
  - Centre for Health Care Informatics (CIZ)
  - Committee for Health Care Informatics Standards (OZIS)
  - national inter-ministerial working group on e-Health or strategic council for health care informatics functioning at the state level

This structure can ensure unified national policy, planning and harmonised development of informatics. A Project Unit of the Centre for Health Care Informatics is to be established at the Ministry of Health likely comprising 3-5 persons with the staff gradually increasing in view of the work program. In terms of function the Project Unit will replace CIZ pending the decision on the establishment of the latter. In its work the Project Unit should make maximum use of the existing infrastructure and knowledge available in the Health Insurance Institute of Slovenia, the Institute of Public Health of the Republic of Slovenia, chambers and the Slovenian association for informatics in medicine. The resources for the functioning of the Council, OZIS and CIZ include: infrastructure of the Health Insurance Institute of Slovenia, appropriations for health care informatics received by the Institute of Public

Health of the Republic of Slovenia and budgetary appropriations provided by the Ministry of Health. A portion of the start-up costs is covered from the unused funds of the RUSZV project. Decision of the Ministry of Health to establish OZIS by the end of 2006; to establish development groups for individual fields of health care (primary health care, hospitals, pharmacies, health insurance companies and communication between them): Ministry of Health, gradually until 2006. The funds for the operating of those groups are to be provided on the basis of the annual plan by the economic operators related to the functioning of the groups.

3. to prepare the Slovenian e-Health operational plan (roadmap) which will define the role of certain operators in the health care system in the context of the e-Health project and concrete measurable goals, provisional goals, milestones and methods of reporting. A working group of interested operators is to be established to that end which will immediately begin carrying out concrete tasks: Ministry of Health in co-operation with the bodies referred to under point 2 above by May 2006;
4. to upgrade the basic information infrastructure in health care for the safe and transparent exchange of information between patients, health care service providers and payers. The infrastructure should enable safe access to the World Wide Web as well as to the private network of the health care sector to all health care service providers and other stakeholders in the health care system. State-of-the-art and infrastructure (self-service terminal network) in Slovenia have already reached the level which, with adequate investments into organisation and appropriate measures, enables the requisite communication channels such as Eth.,IP/MPLS, XDSL, certified attestations, legislation in the field of e-business, privacy etc. For communication between specialised services (emergency medical service, rescue service, disaster relief services), the Tetra digital network is used (permanent task);
5. to introduce Public Key Infrastructure (PKI) for unambiguous identification, authentication and authorisation of persons entering the system. PKI is a precondition for applications in health care which require personal identification and responsibility of the user, e.g. in case of health care service providers when they access and make changes to medical data or in the case of health insurance users who access their medical records or health care services through portals. The new health insurance card represents the identification of health care workers and users. Start-up funds are to be provided by the Health Insurance Institute of Slovenia from the compulsory health insurance funds for 2006 and 2007 with the support of the Ministry of Health and the Ministry of Finance.

6. The priorities in the field of development of applications according to the criteria of best professional results and cost-effectiveness in shortest time:
- to define and introduce electronic medical records in accordance with the basic scheme of electronic medical records laid down at the state level and integrated into the daily work of medical and allied professionals with patients, taking into account the standards in force: ISO/CEN 13606 and ISO/CEN 21549, HL7 v.3, OpenEhr;
  - to design and introduce e-prescription and e-order forms for medicinal products and medical devices as well as a national data base of medicinal products which will include all medicinal products used for medical treatment of patients: registered, unregistered and those registered according to the centralised authorisation procedure;
  - official national database of medical devices with classification;
  - to further develop the health insurance card system as the identification of health care workers and users of health care services;
  - to design and implement national waiting periods;
  - to design and implement data exchange between various health care service providers on the one side, and exchange between them and the Health Insurance Institute of Slovenia on the other side, to serve the needs of appointed medical practitioners and medical commissions and at the same time, to review and standardise the existing records in the IS of health care establishments and relate the data to the patient;
  - to extend the functionality and use of e-groups of comparable cases,
  - to design and gradually introduce the national health care portal (access by patients through the web to the general and personal information in the field of medicine and health care services);
  - on-line health services supporting telehealth.

The operational plan is to be prepared by the CIZ Project Unit and adopted by the Council for Health Care Informatics by end 2006;

7. to update the 2000 Healthcare Databases Act to take account of the introduction of e-Health. Amendments are to be prepared by the Ministry of Health in co-operation with the Institute of Public Health of the Republic of Slovenia by June 2006;

8. to pool the part of appropriations allocated for informatics from the present prices of health care services for joint projects and for the co-financing of the systematic upgrading of the basic information infrastructure referred to under point 3 above and development of applications referred to under point 4 above, in a co-ordinated manner through the structure referred to under point 2 above, in the framework of the Ministry of Health. The Ministry of Health will, in co-operation with the partners, formalise the program of financing joint-projects unified in the form of an action plan before the 2006 Agreement procedure is initiated so that this arrangement can start to be carried out already in 2006;
9. to provide budgetary appropriations for the systematic upgrading of the basic information infrastructure; to actively acquire additional development funds for promoting information technology implementation in health care from other national and European resources (structural funds, appropriated funds for broadband networks, cohesion fund etc.): the permanent task of the Ministry of Health and partners in the health care system; to co-ordinate the activities in the field of acquiring European funds in the framework of the interministerial working group on e-Health: within two years, the amount of appropriated funds for the health care informatics (together from the funds referred to under points 2, 5, 8 and 9 above) should be provided at levels comparable to those prevalent in the EU;
10. to participate actively in the European activities in the field of e-Health (preparation of the strategy by end June 2006); systematic participation at important European events and harmonisation projects in the field of e-Health: Health eEurope, Health ERA, European Health Forum, EHTEL HCA Group, EPIST, eTEN, e-Health Impact, 2006 e-Health Ministerial Conference; to appoint the national co-ordinator for those activities, to appoint representatives in the European bodies, to disseminate information in the territory of Slovenia, to harmonise work with the bodies referred to under point 2 above; to appoint a co-ordinator at the Ministry of Health and to prepare the roadmap by the end of 2006;
11. to carry out a promotional campaign on the model of similar campaigns in England, Norway, Ireland, Austria, Canada etc. in order to raise awareness of the role and possibilities of e-Health and to mobilise additional financial resources and investments into development and support of concrete activities; the campaign should be sufficiently supported by the Ministry of Health and other line ministries; The Ministry of Health is to prepare the campaign by the end of 2006; the campaign will be carried out on a permanent basis;

12. to introduce motivational schemes for special achievements in the field of health care informatics; to prepare the bases for gradual introduction of the system of certifying good practices in the field of health care informatics: Ministry of Health by the end of 2006.

### **Monitoring and control**

In order to monitor the realisation of the strategy, mechanisms will be put in place which will enable periodical evaluation of developments in the field of e-Health at different levels, from the level of individual health care service providers to the level of the implementation of the strategy as a whole. Moreover, developments in the field of e-Health in Slovenia will be monitored in comparison with other EU states. Finally, end-user satisfaction regarding information solutions in the field of e-Health will be evaluated.

Appropriate procedures and manners of informing and reporting on the achieved results and comparisons will be provided for all the areas subject to monitoring. Monitoring and control will be carried out by the Ministry of Health and SIZ (Slovenian Health Informatics Council).

### **Financial evaluation**

The anticipated financial parameters for initial tasks (for 2006 and 2007) are as follows: SIT 560 million (EUR 2.33 million) will be pooled in 2006. An increase of 50% on annual level is provided for following years.

In the coming years, a gradual increase in the share of appropriations for health care informatics is envisaged at the national level by pooling the funds from the prices of health care services. The 2010 projection is to raise SIT 2 billion (EUR 8.35 million) in that way.

The funds for regular upgrading and maintenance of information equipment are to be provided by the founders of health care institutions.

## Abbreviations and Terms

Abbreviation	Description
ADSL	<b>Asymmetric Digital Subscriber Line</b> , communication technology enabling fast data transfer over copper cables
CEN	<b>Comité Européen de Normalisation</b> , European Standardisation Committee
CIZ	National body as foreseen by the project RUSZV
EHR	<b>Electronic Health Record</b> , elektronic (digital) health record
eRegion	Regional organization on Informatics. eRegion is extending over several european Countries
eSPP	Elektronic (Computerised) treatment of SPP (see explanation of SPP)
EU	<b>European Union</b>
EZIP	<b>Enotni Zdravstveno Informacijski Portal</b> , Unified Public Health Information Portal
EZZ	<b>Elektronic Health Record</b> , slovenian abbreviation for EHR
HL7	<b>Health Level 7</b> , Standard for digital exchange of clinical, financial and administrative data in Health Care. Developed and used mostly in USA
IJK	Infrastruktura Javnih Ključev - <b>Public Key Infrastructure (PKI)</b>
IS	<b>Information System</b>
ISDN	<b>Integrated Services Digital Network</b> , predecessor of ADSL, is enabling the transmission of digital data over copper phone cables
IVZ in IVZ RS	<b>Inštitut za varovanje zdravja</b> - Institute of Public Health of Republic of Slovenia
KZZ	<b>Kartica Zdravstvenega Zavarovanja</b> , Health Insurance Card
MZ in MZ RS	<b>Ministry of Health</b>
Open EHR	Open Source Code for <b>EHR</b>
OZIS	<b>Odbor za Zdravstveno Informacijske Standarde</b> , National Health Informatics Standards Board
OZZ	<b>abbreviation for Compulsory Health Insurance</b> , (Slovenian: Obvezno Zdravstveno Zavarovanje)
PACS	<b>Picture Archiving and Communication System</b> , sistem za archiving and digital picture transmission
PKI	<b>Public Key Infrastructure (abbreviation)</b>
RUSZV	<b>Development of Health Management System, (Razvoj upravljanja sistema zdravstvenega varstva)</b> , project of Ministry of Health, financed by World Bank, finished 2004
SIZ	<b>Abbreviation for Council for Information Technology in Health Care Sector, Svet za Informatiko v Zdravstvu</b>
SPP	<b>Skupine Primerljivih Primerov, Diagnostic Related Groups</b> , groups of hospital related treatments, as defined on the basis of mutually comparable diagnoses, interventions and costs
TC	<b>Technical Committee</b> , foreseen as part of OZIS, also workgroup
TETRA	<b>TErrestrial Trunked RAdio</b> , defined by ETSI (European Telecommunication Standards Institute).
WAN	Communication Network covering larger geographical area.
XML	<b>EXtensible Markup Language</b> , simple but very flexible text format
ZZZS	<b>National Health Insurance Institute</b> , Zavod za Zdravstveno Zavarovanje Slovenije

**Organizational structure:**

