# eHealth

**eHealth**

**new dimension of health care**

eHealth
SLOVAKIA

*Health is the only value recognized by everyone*

Health is one of the most important prerequisites for quality in life and most appreciated worth of our citizens. Therefore, care about health is a shared responsibility between individuals, families, communities, health professionals and all of society.

The focus of the health system, according to new EU paradigm, has switched from health care to citizens' health and management of all health determinants, although health care comprises its significant part.

In terms of the new paradigm, the mission of the health system is to reduce mortality, morbidity, the persistent and temporal burden of disease and thus improve the quality of citizens' lives.

Missions are also relevant Key Performance Indicators for measuring success. In the Slovak Republic, we have chosen the indicator DALYs (Disability Adjusted Life Years) used by WHO. According to recent measurements, we lose more than 800,000 DALYs every year in Slovakia because of premature death and time spent disabled by disease, which is tremendous number.

Fulfilling this mission in Slovakia is accompanied by many challenges such as high indebtedness of the health sector, an increase in the volume of requests for health care provision compared with the growth of available resources, the opening of a gap between the top medical facilities and resources available within the health system financed by public and private sources, insufficient health staff reproduction, replacement of social services by medical services, a breakdown in solidarity between generations, the formation of an EU-wide area of health care provision.

One possible response to existing challenges and fulfilling the mission is an initiative of digitalization and implementation of modern information and communication technologies in the health sector, known as eHealth. The implementation of eHealth in the Slovak Republic, its approach, its main domains, actions already taken and closest planned activities are represented in this brochure.

# Contents

# Introduction to Slovak eHealth Programme

## *EU roots of Slovak eHealth Programme*

The new EU Health Strategy *'Together for Health: A Strategic Approach for the EU 2008-2013'* defines the strategic approach to the core issues in health as well as health in all policies within the EU and also in individual Member States for the years 2008-2013.

Core Values mentioned in White Paper are:

- **Citizens' empowerment.** Healthcare is becoming increasingly patient centered and individualised, with the patient becoming an active subject rather than a mere object of healthcare. Building on the work on the Citizen's Agenda, Community health policy must take citizens' and patients' rights as a key starting point. This includes participation in and influence in decision-making, as well as competences needed for wellbeing, including 'health literacy', in line with the European

Framework of Key Competences for life-long learning e.g. looking at school and web-based programmes.

- **Reducing inequities in health.** Although many Europeans enjoy a longer and healthier life than previous generations, major inequities in health exist between and within Member States and regions, as well as globally.

- **Health policy based on the best scientific evidence.** Scientific evidence should be derived from sound data and information, and relevant research. The Commission is in a unique position to assemble comparable data from the Member States and regions and must answer calls for better information and more transparent policymaking, including a system of indicators covering all levels (national and sub national).

According to the White Paper there are three main challenges concerning EU health systems:

- Firstly, demographic changes including population ageing are changing disease patterns and putting pressure on the sustainability of EU health systems. Supporting healthy ageing means promoting health throughout the lifespan, aiming to prevent health problems and disabilities from an early age, and tackling inequities in health linked to social, economic and environmental factors.
- Secondly, pandemics, major physical and biological incidents and bioterrorism pose potentially major threats to health. Climate change is causing new communicable disease patterns. It is a core part of the Community's role in health to coordinate and respond rapidly to health threats globally and to enhance the EC's and third world countries' capacities to do so.
- Thirdly, recent years have seen a great evolution in healthcare systems as a result in part of the rapid development of new technologies which are revolutionising the way we promote health and predict, prevent and treat illness. These include information and communication technologies, innovation in genomics, biotechnology and nanotechnology.

We believe that the promotion of these values and response to the challenges mentioned can be achieved through eHealth, especially through:

- **The services of National Health Portal**, which will create an environment for the dissemination of 'health literacy' by providing authorized and current medically relevant information for citizens. These services should contribute to reducing inequity among citizens in the area of access to medically relevant information by providing public information, free of charge and for all citizens.
- **The electronic ordering services**, which will reduce geographic disparities and the burden of time of health professionals and patients.
- **The EHR/PHR services**, which will reduce inequities in the quality of health care by providing sufficiently detailed information to health professional (with patient consent) needed for the provision of quality health care.
- **The services of electronic prescription and medication**, which will contribute to reducing inequities in the quality of health care by making available to health professionals all data needed for informed prescription and medication history of the patient.
- **The telemedicine services**, which will reduce geographic disparities and provide economic efficiency of the health system.

eHealth can also provide data basis for the development of national health policies and thereby

contribute to more efficient use of resources in the health system and improving the quality of health care provided to citizens.

### *Relation between Health and eHealth*

Before creating the concept of eHealth, it is necessary to address issues of the Health theme. The key idea of our approach to Health includes movement from the focus on health care provision to the principle of citizens' health in the centre. Citizens, not the patients, are emphasized because the ideal situation is to have fewer patients and thus more healthy citizens.
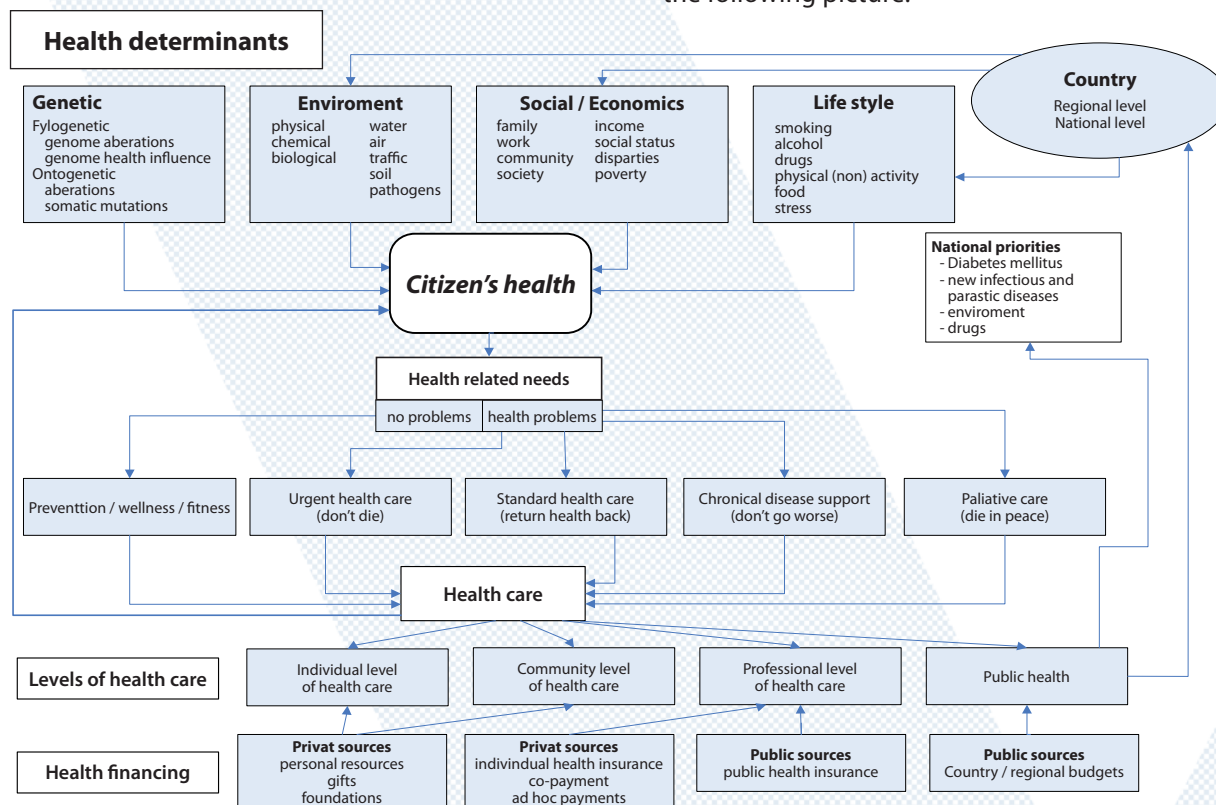
Another important idea of our approach is the recognition of four basic forms of health care, which must be supported also by eHealth. Each of these forms requires a different approach.

Four basic forms of health care are:

- individual health care,
- community health care,
- professional health care,
- public health.

The approach to the Health theme is shown on the following picture.



**Health determinants**

| **Genetic** | **Enviroment** | | **Social / Economics** | | **Life style** |
|---|---|---|---|---|---|
| Fylogenetic<br>  genome aberations<br>  genome health influence<br>Ontogenetic<br>  aberations<br>  somatic mutations | physical<br>chemical<br>biological | water<br>air<br>traffic<br>soil<br>pathogens | family<br>work<br>community<br>society | income<br>social status<br>disparties<br>poverty | smoking<br>alcohol<br>drugs<br>physical (non) activity<br>food<br>stress |

**Country**
Regional level
National level

*Citizen's health*

**National priorities**
- Diabetes mellitus
- new infectious and parastic diseases
- enviroment
- drugs

**Health related needs**

no problems | health problems

| Preventtion / wellness / fitness | Urgent health care (don't die) | Standard health care (return health back) | Chronical disease support (don't go worse) | Paliative care (die in peace) |
|---|---|---|---|---|

**Health care**

**Levels of health care**

| Individual level of health care | Community level of health care | Professional level of health care | Public health |
|---|---|---|---|

**Health financing**

| **Privat sources** personal resources gifts foundations | **Privat sources** indivindual health insurance co-payment ad hoc payments | **Public sources** public health insurance | **Public sources** Country / regional budgets |
|---|---|---|---|

The government of the Slovak Republic, being aware of importance of using ICT in the health sector, declared:

*"The Government will provide legislative and institutional conditions for the implementation of information and communication systems, which will fundamentally improve quality, cost efficiency and availability of services. In this area the Government will support the plan for using the ICT systems in the health sector and gradually implement goals of the National eHealth strategy."*

In accordance with this declaration the Ministry of Health prepared the document '*Strategic objectives of eHealth*', which was approved by Government of the Slovak Republic on 16. July 2008. This document represents the mandate of the eHealth Programme, which has defined the eHealth vision, strategic objectives of eHealth, benefits, basic architecture, basic programme management, budget, priorities and time frame of eHealth implementation in the Slovak Republic.

Firstly, it was necessary to set the vision of the modern health system.

**The vision of the modern health system**

> *Provide superior, modern, available, safe and cost-effective medical services to improve the quality of public health and to achieve growth of citizens' satisfaction with the health system funded from public resources.*

The vision of the modern health system follows the eHealth vision.

**The eHealth vision**

> *Implement modern information and communication technologies to support the improvement of quality and efficiency of medical services, to reduce errors and duplicity of medical services, to minimize the administrative burden of patients and the whole system, to increase citizen satisfaction with the health system funded from public resources. Facilitating the emergence of new forms of medical services and provide all stakeholders with the information relevant for their decision making and monitoring activities on time and in the required quality.*

Implementing the eHealth vision will support both the implementation of the vision of the modern health system and the implementation of programme declaration of the Slovak government. It will contribute to the fulfilment of the citizens' expectations in the area of health care, to the improvement of the health system efficiency as well as to the enhancement of medical services availability.

The eHealth vision will be fulfilled by achieving four strategic objectives.

**The strategic objectives of eHealth**

> 1. *Creation of legislative and regulatory framework for eHealth.*
> 2. *Creation of a secure infrastructure for implementing the vision and mission of eHealth.*
> 3. *Implementation of ICT to support the processes and services of a health system funded from public resources.*
> 4. *Support the rise of new processes and forms of health care and medical services.*

### Programme management

Achieving strategic objectives of eHealth will be realized through the eHealth Programme. The form of the programme was proposed, because eHealth is dealing with a lot of dependent application domains, which will be implemented through several dozen projects.

A programme of such magnitude and importance must be managed according to a defined framework for programme management. The programme will be broken down into separate but dependent projects integrated in different domains. Project management framework will also be designed.

Framework for programme management will be created based on OGC methodology MSP; framework for project management will be created based on OGC methodology PRINCE2.

Programme and project management will enable:

- validation and continuous updating of the programme objectives and priorities,
- timing and sequence of solutions,
- compliance with the financial framework,
- achievement of desired objectives,
- preserve the quality of individual solutions and subsystems built units,
- compliance with the requirements of external environment.

### Solution development approach

An approach to eHealth solutions development is based on RUP methodology. This means that in the early stages of the eHealth Programme and the needs of all stakeholders are identified. In Slovak eHealth Programme there were identified more than 600 health related needs. After that follows the identification of the requirements on the architecture, infrastructure and applications. In Slovak eHealth Programme there were identified more than 800 functional and technical requirements.

In the next step the candidate architecture is chosen. In Slovak eHealth Programme the decision was based on 20 steps. Needs, requirements, and candidate architecture constitute the basis for eHealth tenders.

For the implementation stage there were set several milestones: Architecture & Design document, creation of an Alpha version (prototyping), the creation of Beta version, Pilot and Roll-out.

In all development stages there is Security as the number one requirement, according to processing of sensitive medical data.

### Programme benefits

Achieving the strategic objectives of eHealth will contribute to the satisfaction of all participants in the health system. A summary of main benefits is given below.

**Citizens will profit by:**

- higher quality of provided health care,
- ability to communicate electronically within the health system,

- overview of provided medical services and costs,
- continuous availability of patients' health records to authorized entities, confidentiality and integrity of these health records and protection against their loss,
- shortening the administrative delay of treatments,
- reducing duplicities in examinations,
- improved quality of the health services by reducing diagnostic and therapeutic errors, by improving diagnostic processes and by monitoring the whole therapeutic process,
- available data for decision making about their health or for choosing a health care provider.

**The health system will be more effective through:**

- lower costs for administrative activities,
- a higher level of targeted disease prevention,
- lower costs of health care by removing the duplicities in treatments, fictive treatments and wrong prescriptions,
- lower secondary costs of health care due to the reduction of errors in diagnostic, treatments and prescriptions,
- lowering the rate of corruption in the health system.

**Health care providers will profit by:**

- their ICT systems, which will be able to

connect to the core registers and use them effectively,
- lower costs of administrative activities connected with health care,
- the defined standards for an electronic identifier, frames for creating and storing the records, forms for communication with the other subjects in health system,
- different ICT systems (finance, management, clinical, drug logistics, laboratory, radiological) will be fully interoperable at the hospital level and will be capable of communicating with their external environment in a defined format,
- communication with the other subjects in the health system in a secure electronic form,
- significantly automated prescriptions.

**Healthcare insurance companies will profit by:**

- lower costs on provided health care through removing treatment duplicities, reducing the mistakes in treatment and shortening the time necessary for carrying out medical services,

- lower costs of administrative activities,
- defined electronic identifiers for patient and for health care providers,
- data for near on-line monitoring of provided medical services,
- communication with health care providers in a secured electronic form and thus being more effective.

### *Time frame of the Programme*

The time frame for the first part of the eHealth Programme is planned for 2013, with perspective for the second part of the Programme by 2018. The first part of the eHealth Programme is divided in 3 implementation phases (with new versions of eHealth services for each phase).

*A timetable for the first phase is shown in the following table.*

| ID | Processes and activities | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|----|--------------------------|------|------|------|------|------|------|
| 1 | **Starting up Programme** | ▓ | | | | | |
| 2 | **Initiating Programme** | | ▓ | ▓ | | | |
| 2.1 | Establishing the infrastructure and programe organisational structure | | ▓ | ▓ | | | |
| 2.2 | Developing the architecture and models | | ▓ | | | | |
| 2.3 | Creating feasibility studies for each phase | | ▓ | ▓ | | | |
| 3 | **First phase** | | | ▓ | ▓ | | |
| 3.1 | Creating a National project for 1. priority area | | ▓ | | | | |
| 3.2 | Procuring for 1. priority area | | | ▓ | | | |
| 3.3 | Realising projects of 1. priority area | | | ▓ | ▓ | | |
| 3.4 | Realising early benefits of the first phase | | | ▓ | | | |
| 4 | **Second phase** | | | ▓ | ▓ | ▓ | |
| 4.1 | Creating a National project for 2. priority area | | | ▓ | ▓ | | |
| 4.2 | Procuring for 2. priority area | | | ▓ | | | |
| 4.3 | Realising projects of 2. priority area | | | | ▓ | ▓ | |
| 4.4 | Realising early benefits of the second phase | | | | | ▓ | |
| 5 | **Third phase** | | | | ▓ | ▓ | ▓ |
| 5.1 | Realising early benefits of the third phase | | | | | ▓ | |
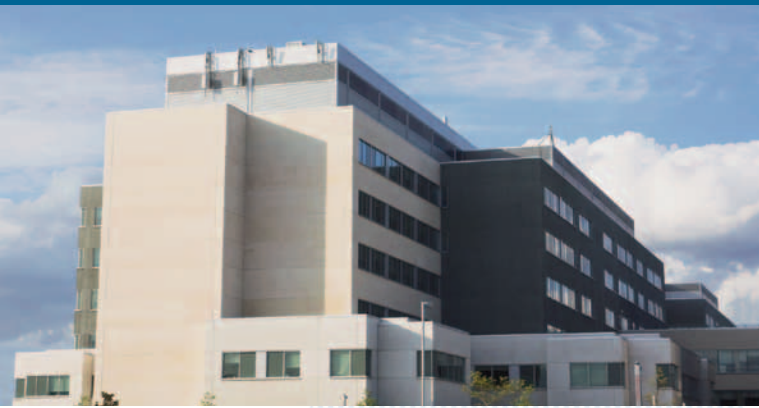
*Key attributes of the future eHealth solution*

- **Citizens and their health are first** – the solution supports every function improvement of health care for citizens through direct service to the citizen or through indirect service by improving the quality, effectiveness and safety of the health system.

- **Security** – the solution ensures a high level of confidentiality, availability and integrity of data, systems and services with particular emphasis on the protection of personal data.

- **Accountability** – the solution enables the recording and evaluating of all functional and security relevant events in the system and working with the system and provides citizens with information concerning access to their personal data.

- **Scalability** – the architecture of the solution is designed to be able to cope with the growing number of users, requests and new eHealth services in the future.

- **User friendly environment** – application interfaces are designed to have a uniform appearance, to be easy to learn how to use them, enable intuitive work and minimize the risk of mistakes at work.

- **Productivity** – the solution helps increase user productivity in the certain area.

- **Consistency** – the solution is designed in accordance with the requirements of legislation, international and national norms and standards and with the architecture of eGovernment.

- **Interoperability with EU** – the solution is designed in accordance with EU requirements for eHealth and it can be connected with the solutions of other Member States.

# Slovak eHealth Programme

**sD - strongly depends on**
**D - depends on**
**mD - small dependance**
**R - receives requirements from**

**Example 1:** National legislation strongly depends on EU legislation

**Example 2:** National legislation receives requirements form PKI infrastructure (example: how to long-time archive revocations of certificates)

Building blocks of National eHealth Programme

| ID | Building block | 1 National legislation | 2 EU legislation | 3 National standards | 4 International standards | 5 Architecture framework | 6 Cert. / acreditation / HTA | 7 Network level of HIN | 8 HIN management | 9 HIN management | 10 PKI infrastructure | 11 Data registers | 12 EHR infrastructure | 13 EDS infrastructure | 14 National Health Portal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | National legislation | ■ | sD | R | mD | R | R | R | R | R | R | R | R | R | R |
| 2 | EU legislation | R | ■ |  | R |  |  |  |  |  |  |  |  |  |  |
| 3 | National standards | sD | D | ■ | sD | R |  | R |  |  | R | R | R | R |  |
| 4 | International standards | R | sD |  | ■ |  |  |  |  |  |  |  |  |  |  |
| 5 | Architecture framework |  | mD | sD | D | ■ |  | R | R | R | R | R | R | R | R |
| 6 | Certification / acreditation / HTA | sD | mD | D | mD | D | ■ |  |  |  |  | R | R |  |  |
| 7 | Network level of HIN | mD | mD | D | mD | sD |  | ■ | R | R | R | R | R | R | R |
| 8 | HIN management | mD | mD | mD | D | sD |  | sD | ■ | R | R | R | R | R | R |
| 9 | HIN - data storage | mD | mD | D | mD | sD | R | sD | mD | ■ | D | R | R | R | R |
| 10 | PKI infrastructure | sD | mD | sD | D | D | R | mD | mD | R | ■ |  | R | R | R |
| 11 | Data registers (GP, patiens, drugs) | sD | mD | sD | mD | mD |  |  |  | sD |  | ■ |  | R | R |
| 12 | EHR infrastructure | mD | mD | D | D | sD |  | sD | D | D | sD | D | ■ | D | D |
| 13 | EDS infrastructure | mD | mD | D | D | sD |  |  | D | D | sD | D | D | ■ | D |
| 14 | National Health Portal | mD | mD | mD | mD | D |  | D | D | D | D | mD | mD | mD | ■ |
| 15 | Switch Point (EU - Slovakia) | mD | sD | mD | mD | mD |  | D | mD |  |  |  |  | mD |  |
| 16 | HPC | D | mD | D | mD | sD |  |  |  |  | sD | D |  |  |  |
| 17 | HIC | D | D | D | D | D |  |  |  |  | sD | D |  | R |  |
| 18 | ePrescription infrastructure | mD | mD | mD | D | sD |  | D | D | sD | D | sD | D |  | sD |
| 19 | eReferrals infrastructure | mD | mD | mD |  | sD |  | D | D | mD | D | D | mD |  | sD |
| 20 | Middleware | D |  | mD | mD | D |  | mD |  | mD | D | D | D | D | mD |
| 21 | IS for GPs | D | mD | mD | mD | R | D | mD |  | mD | mD | mD | D | mD | R |
| 22 | IS for Pharmacies / Drugstores | D | mD | mD | mD | R | D | mD |  | mD | mD | mD | D | mD | R |
| 23 | Laboratory IS | D | mD | mD | mD | R | D | mD |  | mD | mD | mD | D | mD | R |
| 24 | PACS | D | mD | mD | D | R | D | D |  | sD | mD | mD | D |  | R |
| 25 | Hospital's IS | D | mD | mD | mD | R | D | D |  | D | mD | mD | D | D | R |
| 26 | IS for blood donors | D | mD | mD | mD | D |  | mD |  | D |  | sD | mD | mD | mD |
| 27 | Integrated 112 | D | D | mD | D | mD |  | mD |  |  |  | mD | D | sD | mD |
| 28 | IS for urgent medicine | D | mD | mD | mD | mD |  | mD |  |  |  | D |  | sD |  |
| 29 | eRefferals | D |  | mD | mD | D | D | sD | D | D |  | mD |  |  | sD |
| 30 | ePrescription | sD | mD | D | D | D | D | sD | mD | D | D | D | mD |  | sD |
| 31 | Public health IS | mD | mD |  | mD | mD |  | D |  | mD |  | mD |  |  | D |
| 32 | Monitoring health care | D | mD | mD | mD | mD |  | sD |  | D |  | mD |  |  | mD |
| 33 | Portal integration of applications | mD |  |  | mD | sD |  | mD |  | D | D | D |  |  | sD |
| 34 | Call centre for eHealth | mD |  | mD | mD | D |  | D |  | mD |  | D |  |  | mD |
| 35 | Telemedicine | D | mD | mD | D | D | D | sD | mD | D | mD | D | D |  | D |
| 36 | IT support for EBM | mD |  | mD | D | mD |  |  |  |  |  |  | mD |  | D |
| 37 | IT support for DRG | mD |  | mD | mD | mD |  |  |  |  |  |  | mD |  | D |
| 38 | EU patient mobility | mD | sD | D | sD | mD |  | mD |  | D |  | sD |  | mD | mD |
| 39 | eLearning |  |  | mD | mD | mD |  | mD |  |  |  |  |  |  | D |
| 40 | IT support for advanced medicine | D | mD | mD | D | D | D | D |  | sD | D | D |  | mD | D |
| 41 | eHealth R&D | D | D | D | D | D | mD |  |  | mD | mD | mD | mD | mD | mD |
| 42 | Token's re-usability | sD | mD | D | mD | sD |  | mD |  |  | sD |  |  | sD | sD |
| 43 | eGovernent / eHealth integration | sD |  | D | mD | D |  | D | mD | R | D | D | mD | mD |  |
| 44 | Profesionals & Public acceptation | sD |  | D |  | sD |  | mD |  |  | D | mD | D | D | D |
| 45 | IS of State Health related Depart. | mD |  | D | mD | mD |  | mD | mD | mD |  | mD |  |  |  |

Dependency matrix (columns 15–45):

| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Switch Point | HPC | HIC | ePrescription infrastructure | eReferrals infrastructure | Middleware | IS for GPs | IS for Pharmacies | Laboratory IS | PACS | Hospital's IS | IS for blood donors | Integrated 112 | IS for urgent medicine | eRefferals | ePrescription | Public health IS | Monitoring health care | Portal integration of appl. | Call centre for eHealth | Telemedicina | IT support for EBM | IT support for DRG | EU patient mobility | eLearning | IT support for adv. medicine | eHealth R&D | Token's re-usability | eGovernment / eHealth integr. | Profesionals/Public accept. | IS of State Health rel. Dpt.. |
| R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |  | R |
|  | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |  | R |
| R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | D |  | R |
| R | R | R | R |  | R | R | R | R | R | R |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| R |  |  | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |  | R | R |  |  | R | R | R | R |  |  | D |  | R |
| R |  |  | R | R | R | R | R | R | R | R | R | R | R | R | R | R |  |  | R | R |  |  | R | R | R |  |  |  |  |  | R |
| R | R | R | R | R |  | R | R | R | R | R | R |  | R | R | R | R |  |  | R | R |  |  | R |  | R | R |  |  | D |  | R |
|  | R | R | R | R | R | R | R | R | R | R | R |  | R | R | R |  |  |  | R |  |  |  | R |  | R |  |  | sD | sD |  |  |
| R | R | R | R | R |  | R | R | R | R | R | R | R | R |  | R | R | R |  |  | R | R |  |  | D |  | R |  | D | D |  | R |
|  | D | D | mD | mD | R | R | R | R | R | R | R | R |  |  | R |  | R | R | R |  |  |  | R |  | R | R | D | D |  |  |
|  | D | sD |  |  | R |  |  |  |  |  | R | D | D |  | D |  |  |  | R |  |  |  | R |  | R | R | D | D |  |  |
| R | R | R | D | D | D | R | R | R | R | R | R | R | R | D | D | D |  | D | mD | mD | R | R | R | R | R | R | D | D | R |
|  |  |  |  |  | D |  |  |  |  | R |  | R |  |  |  |  |  |  |  |  |  |  | sD |  |  |  |  |  |  |  |
|  |  |  | R | R |  | R | R | R |  | R |  |  |  |  | R |  |  |  |  |  |  |  |  |  |  |  | sD | sD |  |  |
|  |  |  |  |  |  | R | R |  |  | R |  | R | R | R |  |  |  |  |  |  |  |  |  |  |  |  | sD | sD | R |  |
|  | sD | D |  |  | D | R | R |  |  | R |  |  |  | R |  |  | R | D |  |  |  |  | R |  |  |  | D | D |  |  |
|  | sD |  | mD |  | D | R | R | R |  | R |  |  |  |  |  |  |  | D |  |  |  |  |  |  |  |  | D | D |  |  |
| D | sD | D | D | D |  | sD | sD | sD | D | sD | D | mD | mD | mD | sD | mD | sD | sD | mD | mD | R | R | D |  | mD | R | mD | sD | R |
| D | D | D | mD | D | mD |  | mD | mD | mD | mD |  |  |  | D | D | R | R | R | R | R | R | R | R |  | R |  | mD | mD | R |
| D | D | D | mD | D | mD | mD |  |  |  | mD |  |  |  |  | R |  | R | R | R | R |  | R |  | R |  | mD | mD |  |  |
| mD | mD |  |  | D | mD | R |  |  |  | R |  |  |  | D |  | R | R | R | R | R | R | R | R |  | R |  | mD |  |  |
| D | mD |  |  |  | mD | R |  |  |  | R |  |  |  | D |  | R | R | R |  | D |  |  | R |  | R |  |  | mD |  |
| D | sD | D | D | mD | D | R | R | R | R |  | mD | R | R | R | D | R | D | R | R | D |  |  | R |  | R | R | mD |  | R |
|  | D | D |  |  | mD | R |  |  |  | R |  | sD |  | R |  | R | R | R |  |  |  |  | R |  |  |  | D |  | R |
|  | mD | D |  |  | mD |  |  |  |  | D | R |  | D |  |  | R | R |  |  | D |  |  | R |  | R |  | mD | D | R |
|  | D |  |  |  | mD |  |  |  |  | sD | D | sD |  |  |  | R | R |  |  | mD |  |  |  |  | mD | mD |  |  |  |
| mD | mD | D |  |  | mD | sD |  | sD | sD | sD |  |  |  |  |  | R | R |  |  | mD |  | R | R |  | R |  | mD | mD | R |
| mD | sD | mD | sD |  | mD | sD | sD | sD |  | sD |  |  | R |  | R | R | D | R | R | R | R | R | R |  |  | sD | mD | R |
| mD |  |  |  | mD | D | mD | mD | mD | D | mD | mD |  | mD | D |  | sD | D |  |  | mD |  |  | sD | R |
| mD | D | D | mD | mD | D | D | D | D |  | sD | D | D | D | mD | D | R |  | D | mD | D |  | R |  | R | R |  | mD | R | R |
| mD | D | D | mD | mD | D | R | R | R | R | D | D | D | mD | R | D |  | R |  |  | mD |  |  | R |  | R |  | D | D | R |
| R |  |  |  |  | mD | D | D | mD |  | D | R |  |  | D |  | R | mD | mD | R |  | mD |  | D |  | mD |  |  | D | R |
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|  |  |  |  |  | mD | D |  |  |  | D |  |  |  |  | sD |  | R | D |  | R |  |  |  | mD | D | mD |  |  |
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| D | mD | D | mD | D | D | D | D | D | D | D |  |  | mD | D | R | R | D |  | R | R | R |  | R |  | D | mD | D | R |
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|  |  |  | mD |  | mD | R | R | R | R | R |  |  | R |  |  | R | R |  | R | R |  |  |  | D | mD | mD | D |
|  | mD | mD | mD | mD |  | R | R | R | R | R | R | R | R | R | R | R |  | R | R | R | R | R | R | R |  | R |
|  | D | sD | mD | D |  |  |  | D | D | D | mD | D |  |  | D |  | D |  | D |  |  | D |  |  | R | R |
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|  | mD | sD | D |  | mD | mD |  | mD | D | D | D | mD | sD | sD | mD | sD |  | D | mD | D |  | mD | sD |
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# National Health Portal Domain

***Concept of National Health Portal***

The Concept of the National Health Portal as the entry point to eHealth is based on the following goals:

- To grant authorized, complete and up-to-date health and health related information for users (healthcare systems, healthcare providers, drugs, examinations, therapy, etc.).

- To assure a platform and Single Point of Access for national eHealth services.

- To contribute to the decrease of mortality, morbidity, permanent and temporary health consequences with the support of national health programs and the support of change in citizens bearing to their health.

National Health Portal will be oriented to four main target user groups – Slovak citizens, Euro citizens, health professionals and to all other users. Based on these four target groups the Portal pages are segmented to domains (a large area of target group interests, described by word or standard word combinations), sub domains (smooth domain segmentation), or sub domain hierarchy in the form of an hierarchical menu and to subjects (specific subjects of the target group's interest).

Each page of Portal either provides information or describes services.

There are three types of information that will be provided by Portal:

- Report – theme elaborated by a specific author of a group of authors. Report will be subject to authorization rights.

- Item - relatively independent functional entity within the chapter with one functional aim (e.g. table, database, video, list,

sentence with confirmation, procedure, description, scheme including its description, etc)

- Mem – information entity indivisible without information content abuse (e.g. chart, movie scene, line or column in the table, item in catalogue, quote, quotation, formula, definition or noun). The memo is an elementary entity to be included in the register / index.

National Health Portal describes three key types of Services:

- Service – provision of one or more services related to one theme.

- Activity – relatively independent functional entity within the service provision with a single aim (e.g. completing the form, sending the form, receipt of the confirmation about sending, result generation, launching video or animation). Activity has its own reserved box. Activity is an elementary entity to be included in the register / index.

- Elementary entity (component, dialog box, common control) – indivisible object displayed in the box with linked methods and attributes.

### *Candidate interfaces for National Health Portal*

1. Hierarchical system of menu and pages
2. Map of portal
3. Search function based on keywords

4. Register of key memos and activities with references
5. Map of Slovak Republic, including geographic health information system
6. Avatar linked to SNOMED CT
7. Lifecycle stages and life situations of the citizens
8. Case tree for problems solving
9. Interface for blind people
10. Item selection handled by scanned biometrical data

### *Key Services of National Health Portal*

**eHealth information** – a set of services, which provides relevant medical information to citizens, health professionals and other entities.

**eWarning** – the service, which provides accurate, relevant and timely information on serious health threats (for example chemical spills, leakage of radioactive substances, natural disasters).

**eLearning** – a set of services, which enables self education in different areas of health topics for citizens and health professionals.

**eLibrary** – a set of services, which provides library services of Slovak Medical Library to health professionals and citizens.

**eHealth forum** – a service, which allows citizens and health professionals to actively express and share their opinions on the current eHealth documents and various eHealth issues.

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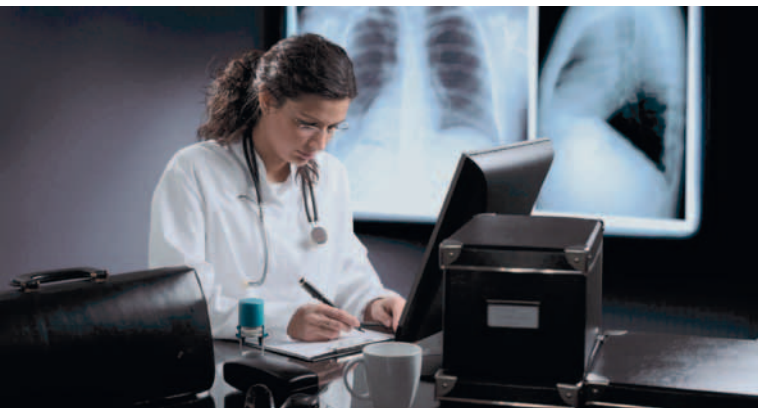
# Citizen Health eBook Domain

## Concept of Citizen Health eBook

The objective of Citizen Health eBook is to provide citizens and health care providers with a summary of medical information that is relevant in the diagnostic process, determining the therapeutic plan, and providing therapy and rehabilitation.

Citizen Health eBook does not replace medical records of health care providers (primary medical documentation). Instead it encompasses an extraction from the medical records (secondary medical documentation), a summary of significant, medically relevant information from medical records of health care providers, health insurance databases, or information from other sources. The Citizen Health eBook will also include links to electronic medical records of health care providers (EHR level).

The owner of Citizen Health eBook is a citizen, who determines the extent of the presented information for each type of health practitioner, made available through the consent of the management. Information in Citizen Health eBook will be stored in a secure format to prevent identification and misuse. It will be impossible to get access to the information without the consent of the owner even with the direct receipt of the stored records by another person. The citizen enters into the system providing Citizen Health eBook immediately at birth. A citizen can leave the system, when he refuses permission to access information in Citizen Health eBook. This departure from the system enables re-entry into the system without loss of relevant health information. This is very important during the treatment of serious medical conditions and diseases, when a patient's value system has been changed and the provision of better health care with relevant information becomes more important than potential risks associated with the disclosure of electronic medical records.

Information from Citizen Health eBook will be stored by National Health Information Center, which performs in the role of National operator for eHealth. It will be possible for the citizens to obtain Citizen Health eBook on removable media (for example USB flash drive) or get access to Citizen Health eBook through National Health Portal. The National Health Information Center will be the administrator for all services related with Citizen Health eBook.

Relevant data from the Citizen Health eBook will be automatically transferred to the specialized medical registers. Entry into the infectious diagnosis will generate demand for automatic transmission of report to the epidemiological information system. Data from electronic vaccination card will be collected by Public Health Authority of the Slovak Republic for regular monitoring of population vaccination. Selected data will pass also to the register of deaths (for example data from the autopsy findings). Basic data about deaths will be automatically sent to the mortality monitoring system.

Citizen Health eBook will be structured in separated pages, where each page is a minimal functional unit, over which the patient gives his consent to access data.

### Candidate pages for Citizen Health eBook

1. Demographic data
2. Personal account from insurance
3. Emergency data set
4. Patient summary (epSOS compliant)
5. Vaccinations
6. Allergies
7. History
8. Diagnostic summary
9. Physiological measurements
10. Medication summary
11. Implants, prostheses and medical devices
12. Dental records
13. Laboratory tests results
14. Genealogy
15. Pregnancy page
16. Blood donor page
17. Genetic factors

18. Image documentation
19. Master patient index

*Key services of Citizen Health eBook*

**Patient health record** – a set of services, which enables the safe collection, processing, storage and disclosure of structured patient medical records in electronic form.

**Emergency data set** – a set of services, which enables the collection, processing, storage and rapid delivery of life-saving patient data in emergency situations.

**Personal account of the insured** – a service, which provides relevant data concerning health insurance, such as assigned healthcare, prescribed drugs and medical devices.

**eGenomics** – a set of services, which supports healthcare delivery by providing information about genetic screening, genetically determined predispositions and genetic risk assessment, providing access to the reference genome databases and studying the entire life cycle of genetic information.

**PACS** – a set of services, which enables management of the whole life cycle of images, like collection, storage, archiving, transmission and delivery to authorized beneficiaries.

# Allocation Domain

### Concept of Allocation

The objective of Allocation services is to provide citizens and health care providers effective management of time and resources related to the provision of health care. They will cover the full cycle of patient's trek within the health care system.



The cycle begins with the emergence of citizen's healthcare need, which must be solved through the professional level of health care. It will be possible to view lists of health care providers (according to expertise and geographic criteria) through the National Health Portal together with their calendars. Citizens can log to their accounts and select free time slots on the provider's calendar. Prior to visiting the provider, they get reminders of the visit. Another kind of reminder will be generated on the ground of vaccination data. Citizens will be able to review and modify booked terms and monitor waiting lists for complex interventions.

Citizens continue by visiting the physician of first contact. Physicians can send citizens to a specialist or he can expedite his samples for laboratory tests. Through the National Health Portal physicians will see specialists' calendars and choose the most appropriate according to specialization, urgency

of examination and location. Physicians will also monitor the status of patient samples through the National Health Portal.

### *Services of Allocation domain*

**eBooking** – a service, which allows citizens to choose the date of visit to a physician for the first contact through the National Health Portal.

**eReferral** – a service, which allows physicians of the first contact to redirect patients to the specialist (including sending relevant documents in electronic form).

**eWaiting list** – a service, which enables management of electronic waiting lists to provide relevant information about their current status through the National Health Portal.

**eReminder** – a service, which provides electronic alert (via email or SMS) on the ground of impending visits to the  healthcare provider.

**eVaccination** – a set of services, which enables the management of individual immunizations as well as data collection in order to review the status of the immunizations of the population (including trends derived from it for the purposes of resource management).

**eLaboratory** – set of services, which enables automation of ordering laboratory tests, management of laboratory samples and reporting of results.

**eCalendar** – a service, which allows management of electronic calendars by healthcare providers and provides central statistical evidence.

# Prescription Domain

### Concept of Prescription

The objective of Prescription services is to:

- provide relevant information to citizens concerning drugs, medical devices, dietary food and other pharmaceutical products of health care.

- provide relevant, authorized information for health care professional required in the prescribing process, including drug interactions and patient medication history,

- allow the implementation of prescriptions in electronic form,

- provide an anonymous database of scientific research, drug and allocation management, statistics.

Problematic drug interactions is a very important issue in this area. Therefore there will be provided a tool for physicians to assess the extent of risks in the use of multiple interactions of drugs, especially by older patient.

### *Services of Prescription domain*

**ePrescription** – a set of services, which enables prescribing of medicine and medical devices electronically by a healthcare professional and provides centralized prescription data for the further processing.

**eDispensation** – a set of services, which allows retrieving prescriptions electronically and enables centralized information reporting the dispensed medicine and medical devices.

**eMedication** – a set of services, which provides a collection, processing and disclosure of relevant medication information.

**ePharmacy** – a set of services, which allows all services of the pharmacy without physical visit.

**eStatistics** – a set of services, which allows to Ministry of Health and health insurance companies data mining from prescription data and improve drug policy.

# Telemedicine Domain

### Concept of Telemedicine

As was mentioned in the EU document demographic changes including population ageing are changing disease patterns and pressure on the sustainability of EU health systems. There are also other challenges in Slovakia such as the emigration of doctors and nurses to other EU countries, the growing requirements of healthcare from all citizens, new forms of treatment, but the health budget is not growing in accordance.

So telemedicine services are required for the improvement of efficiency and quality of some forms of examination and treatment, quality of life for disease-burdened and elderly people. Telemedicine service is potentially a strong synergy of social and health services. Through telemedicine services we understand other services, when some members' healthcare activity team is only logically not physically active.

### Services of Telemedicine domain

**Tele-consilium** – a service, which enables to organize consilium of doctors, although some members of the group are physically distant, using the video conference system with high resolution for this purpose.

**Tele-monitoring** – a service, which provides the monitoring of vital signs and parameters of the patient remote from a healthcare professional, the collection of data and their transmissions to healthcare professional, or even an automatic response to the current state of the measured parameters and vital signs.

**Tele-care** – a service, which enables remote delivery of professional health care or support services for individual health care.

**Tele-consulting** – a service, which allows remote evaluation of pictorial information concerning the health.
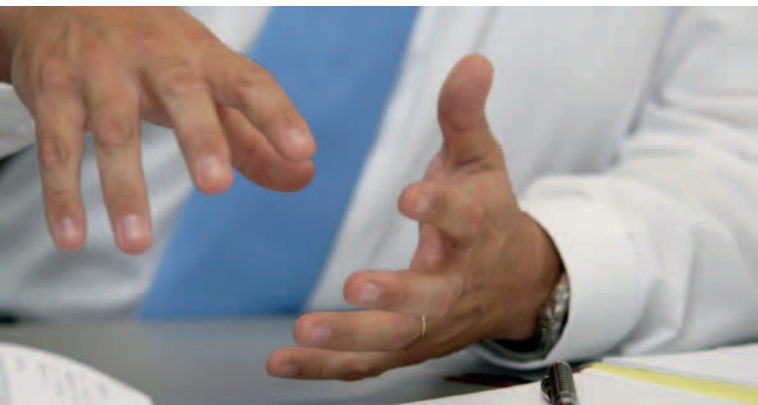
# What was done in 2009

The year 2009 was the first full year of Slovak eHealth Programme. There is a lot to be done under the Programme and in 2009 some key steps were taken, which contribute towards implementing eHealth services.

### Establishment of programme management

For effective management of Slovak eHealth Programme, the Programme Office was created as a temporary structure within the National Health Information Centre. Space and necessary infrastructure has been allocated, organizational structure with described roles and responsibilities, was created and programme management standards were introduced.

### Conducted feasibility studies

**Feasibility study of eHealth projects** – the study aims to identify opportunities for developing electronic services of the Operational Programme Information Society on the overall architecture of eGovernment in the health sector.

**Feasibility study of eHealth Architecture and Programme management** – the study aims to develop the proposal for the architectural framework and select the candidate of architecture for Slovak eHealth. The second part of the study is devoted to the issues of programme management.

**Feasibility study for the first stage** – the study aims to evaluate the possibility of implementation of eHealth services and other related eHealth components in projects of the first stage of Slovak eHealth Programme.

**Feasibility study for the second stage** – the study aims to evaluate the possibility of implementation of eHealth services and other related eHealth components in projects of the second stage of Slovak eHealth Programme.

*Ongoing projects of the first stage*

**Legislative project** – the project aims to analyze and propose changes to legislation in the Slovak Republic in order to implement eHealth services. At the end of 2009 the project was in its second half.

**Single reference data base project** – the project aims to integrate different data sources within the health sector.  At the end of 2009 the project was in its first third stage.

**National Health Portal project** – the project aims to bring the first version of services defined in the National Health Portal domain. At the end of 2009 the project was in the inception phase.

**Citizen Health eBook project** – the project aims to bring the first version of services defined in Citizen Health eBook domain. At the end of 2009 the project was in the inception phase.

**Allocation project** – the project aims to bring the first version of services defined in the Allocation domain.  At the end of 2009 the project was in the inception phase.

**Prescription project** – the project aims to bring the first version of services defined in the prescription domain. At the end of 2009 the project was in the inception phase.
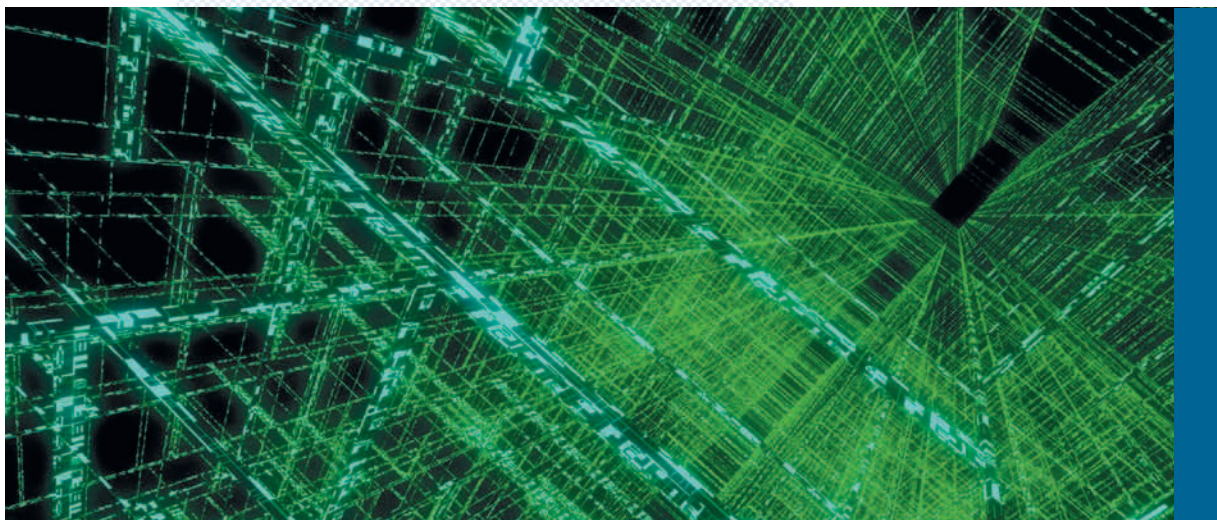
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