

Analysis Of The Current Situation In The Lithuanian eHealth Sector

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Institutional Capacities Of Lithuanian Health Sector Organisations

The Lithuanian health sector is currently subject to a restructuring process to improve and optimise the quality, efficiency and accessibility of the services provided, in order to better meet the needs of citizens. The sector has inherited an extensive hospital infrastructure, the number of beds per inhabitant exceeds the EU average, and the quality of the facilities and of the organisation of the system fails to meet EU quality requirements. Healthcare services have significantly improved during recent years, nonetheless their provision is still characterised by fragmentation, there is a lack of coordination among the various healthcare institutions, and there are hardly any mechanisms in place to ensure the continuity of healthcare.

The main directives of the ongoing restructuring of the sector are:

- The decentralisation of primary (outpatient) care;
- The formation of family medical practice institutions;
- An increase in the contribution and authority of the municipalities in the sector;
- A decrease in the number of beds maintained by hospitals;
- An emphasis on preventive medicine.

The main deficiencies of the healthcare system are:

- Disproportionately high share of inpatient services
- Too high a concentration of provider institutions in the biggest cities of Lithuania, with a resulting lack of medical specialists in rural areas;
- Hospitals in some cases fail to provide the wide range of services required, thus not ensuring adequate care or quality of services;
- There is insufficient care for elderly people;
- There is a breakdown in the continuity of care, especially in relation to institutional cooperation;
- Facilities and equipment are not of adequate condition.

The Ministry of Health of Lithuania has declared **efficient** and **high-quality primary healthcare** as a necessary precondition for an effective and efficient healthcare system and to ensure the timely diagnosis and curing of diseases.

Implicit to the role of the General Practitioner as the gatekeeper into the healthcare system and to the potential to reduce morbidity and mortality by supporting this level of care, is the proximity of the GP to the patient, the inherent continuity-of-care nature of GP practice, the fact that the majority of patient contacts with care are at primary level, the important role of preventive medicine and lifestyle consultation, and thereby **the role that**

the GP can play as a coordinator of specialist and diagnostic service provision/consumption.

The short term goals (up to the year 2005) of the Lithuanian Health Program for the period 1997 to 2010, obligate the development of the services of primary health care, the establishment of GP offices and their partitioning into groups, while **paying special attention to primary healthcare in rural areas**: Strategy of Development and Modernisation of Network of General Practitioners, by order of the Minister of Health, No V-805, 2003/12/31. This strategy was prepared on a basis of a Long-term State Development Strategy (Seimas Resolution No.IX-1187, 2002/11/12), priorities of healthcare, and a Strategy of Restructuring of Health Care Institutions (Government Resolution No.335 2003/03/18).

The Measure of the Single Programming Document of Lithuania 2004-2006 'Restructuring and Upgrading of Healthcare Institutions', also foresees activities of development and modernisation of GP offices. Apart from supporting healthcare reform and the development of a high-quality healthcare system, this strategy determines directions for further development of the health care system in order to improve accessibility of health care services in rural areas.

During recent years, the number of GPs has been increasing at a fast pace: from 248 licensed GPs in 1997, to 2285 GPs in 2002. Despite that, GP institutions in rural and remote areas are not developed enough, so it is difficult **to assure equal accessibility of healthcare services**. Modern ICT and an appropriate Electronic Health Information Services Infrastructure (EHSI) will ensure the efficient exchange (sharing) of information between healthcare professionals, institutions and patients, and the availability of consultations and healthcare services of higher quality. The rational development and modernisation of outpatient healthcare institutions and their incorporation into a national network of electronic health recording and web-services accessibility will not only improve the quality of healthcare but also attract investments and create new workplaces.

The following priorities can thus be identified:

- To provide support to primary care providers;
- To support and optimise the workflow of providers across institutions and levels of care;
- To support the lifelong continuity of care;
- To ensure accessibility to quality-assured healthcare services for all citizens of Lithuania, regardless of their socioeconomic status or geographical location.

In 2000, the Vilnius Territorial Patient Fund (VTPF) carried out a study to investigate public opinion on the healthcare system in the Vilnius region. The investigation showed that 1) the public felt there is inadequate organisation within healthcare institutions, 2) the public is dissatisfied with the provider-to-patient communication quality and vice versa, 3) there was a perceived lack of information on which the patient can make a decision regarding treatment options. In October 2003, a public opinion survey in Lithuania showed that 47% of respondents indicated services related with healthcare would be better accessible via the Internet. The general opinion was that there should be more information about health, on alternative treatments, and on the options for providers and healthcare services.

Institutional Readiness For Health ICT Assimilation

Healthcare professionals in Lithuania have an overall adequate level of computer literacy, recent graduates, especially, are able to apply information and communication technologies (ICT). A lack of computer literacy and IT training is observed at the lower training levels of the system, as is the case with nursing personnel. However, the situation in this area is improving

fast. For instance, patient registration is already computerised. In most cases, the management staff of hospitals and clinics has access to the Internet, but very few doctors have computers in their work places and as a result do not have access to third party medical information. The importance of the maintenance, communication and sharing of medical information is well understood by the management of healthcare institutions, however there is a lack of willingness and commitment to the preparation of the laws and regulations necessary to provide institutional support for this task.

Many physicians (59%) do not currently use electronic means to obtain third party medical information and to communicate with colleagues locally and abroad. The doctors who collect information on their profession and specialty (such as the latest treatment techniques, information on diseases and drugs, etc) often do not make it available to their colleagues, either because they are not willing to do so, or because they do not have the means. This situation is notable in cases where there is a need to obtain health and health care information on patients who have been examined and treated in several provider institutions, where there is difficulty in obtaining the data required and it is often necessary to make repeated and time-consuming enquiries in order to obtain detailed and accurate data. Healthcare institutions are often not interested in exchanging information, either because they consider it confidential, or because sharing it will compromise their competitiveness. In any case, this is one important obstacle to overcome for the successful introduction of the concept of the shared electronic health record into the system. Other obstacles are encountered in the need to protect the privacy and security of information exchanged electronically, and the need to authenticate the person requesting and possessing the information. On the practical side of things, the results of physical and laboratory examinations are stored in a form not suitable for electronic transfer and are physically located in different places, thus the search for availability is a complex and time consuming process.

Providers Workflow And Volume Of Encounters – Transactions

The Lithuanian Health Information Centre (LHIC)¹ reports that during the year 2003, the healthcare system recorded 22.9 million encounters² of citizens with physicians. Out of those, 14.7 million were citizens' encounters with primary level physicians, 7.4 million were citizens' visits to secondary and tertiary level physicians, and 0.8 million were ambulance medical service cases.

At primary care level, as a result of 21.2 million encounters at ambulatory care centres and policlinics, there were 15.9 million laboratory investigations generated, and 2.2 million radiology investigations. During the year, 811.3 thousand hospitalisations occurred on secondary and tertiary level. During in-patient treatment, there were 12.0 million laboratory tests generated, and 0.9 million radiology investigations. The number of sickness cases registered was 5.0 million. 2.8 million of those were registered for the first time. 1.0 million were long-term observation cases, and nearly 1 million were home visits. The mean number of encounters for a single patient and the same health issue was 3 times. With regard to the number of prescriptions, during 2003, physicians issued 9.0 million prescriptions for subsidised drugs. The total number of prescriptions is three times the subsidised prescriptions.

Figure 1 depicts the workflow of providers and Table 1 the amount of transactions generated per annum, month and day as a result of those encounters that constitute the workflow. The data in Table 1 provides an estimation of the volume of data the EHSI has to handle currently, the demand for communication frequency, and the volume of information to be handled. Information is currently manually collected from paper based records and sent to (or verified with) the healthcare system monitoring institutions: the State Patient Fund (SPF), the State Social Insurance Fund (SSIF), the State Public Health Service (SPHS), and the Lithuanian

¹ Health Statistics of Lithuania 2003 (<http://www.lsic.lt/data/la2003.pdf>). Publication in 2004, by Lithuanian Health Information Centre (<http://www.lsic.lt/html/en/lhic.htm>), State Public Health Service, Lithuanian Ministry of Health.

² Taken into account: visits to physicians at policlinics (consultation and ambulatory care), also visits to medical points, and visits of physicians to patient home, also ambulance medical services and urgent consultations.

Health Information Centre (LHIC). Table 2 lists the number of healthcare provider institutions and individuals.

Table 1. Number of events registered at healthcare institutions per annum, per month and per day estimated

Events Registered	Per Annum	Per Month	Per Day
Births	29,765	2,480	113
PHC encounters	22,910,700	1,909,225	86,783
Emergency	780,700	65,058	2,957
GP, PC, Ambu.	14,695,500	1,224,625	55,665
Referred to SHC (Specialist)	7,434,500	619,542	28,161
Epicrisis from SHC SP	7,434,500	619,542	28,161
Hospitalised	811,300	67,608	3,073
Epicrisis from Hospitalisation	811,300	67,608	3,073
Lab test at PHC level	15,896,417	1,324,701	60,214
Results from PHC lab	15,896,417	1,324,701	60,214
Radiology at PHC level	2,180,201	181,683	8,258
Results from PHC Radiology	2,180,201	181,683	8,258
Lab test at SHC level	12,007,240	1,000,603	45,482
Results from SHC lab	12,007,240	1,000,603	45,482
Radiology at SHC level	892,430	74,369	3,380
Results from SHC radiology	892,430	74,369	3,380
Prescriptions	25,000,000	2,083,333	94,697
Sickness leave certification	1,787,686	148,974	6,772
Total Transactions	120,737,827	10,061,486	457,340

Prescriptions are executed through a pharmacy network of about 1.000 pharmacies and 3.700 pharmacists. The main objective of the State Drugs Control Office (SDCO) is to control pharmaceutical activity in order to ensure the quality, efficacy and safety of medicines available in Lithuania, and to pursue the National Medicines Policy Program. The SDCO is accountable to the Ministry of Health - the director of the SDCO is appointed by the Minister of Health. The SDCO maintains a website³ which provides an online list of medicines available in Lithuania. The list of international brand names in current circulation has 2000 entries. Listed are also branded products of medicines that must be prescribed with 3.733 entries, and 1.228 entries for non-prescribed medicines; in total 4.961 branded products. There is also a list of branded medicinal products in Excel format with 8.358 entries.

Regarding information on medicinal products, an SKS-Vaistai electronic ordering system is used by 690 pharmacies and 1.300 chemists in Lithuania. Information about available drugs and medical goods in Lithuania is provided and continually updated by 52 suppliers through that system. In the SLS-Vaistai system there are 7.500 titles of drugs and medical goods, 4.500 titles are currently in distribution. Annotations of 2.500 drugs are included in the system. The system also provides information on the base price of subsidised drugs, documents from the MoH, the Department of Pharmacy (DP) and the State Drugs Control Office (SDCO). The system includes a sub-module for the registration of subsidised prescriptions.

³ State Drugs Control Office, http://www.vvkt.lt/frameset.html?vaistu_info.html

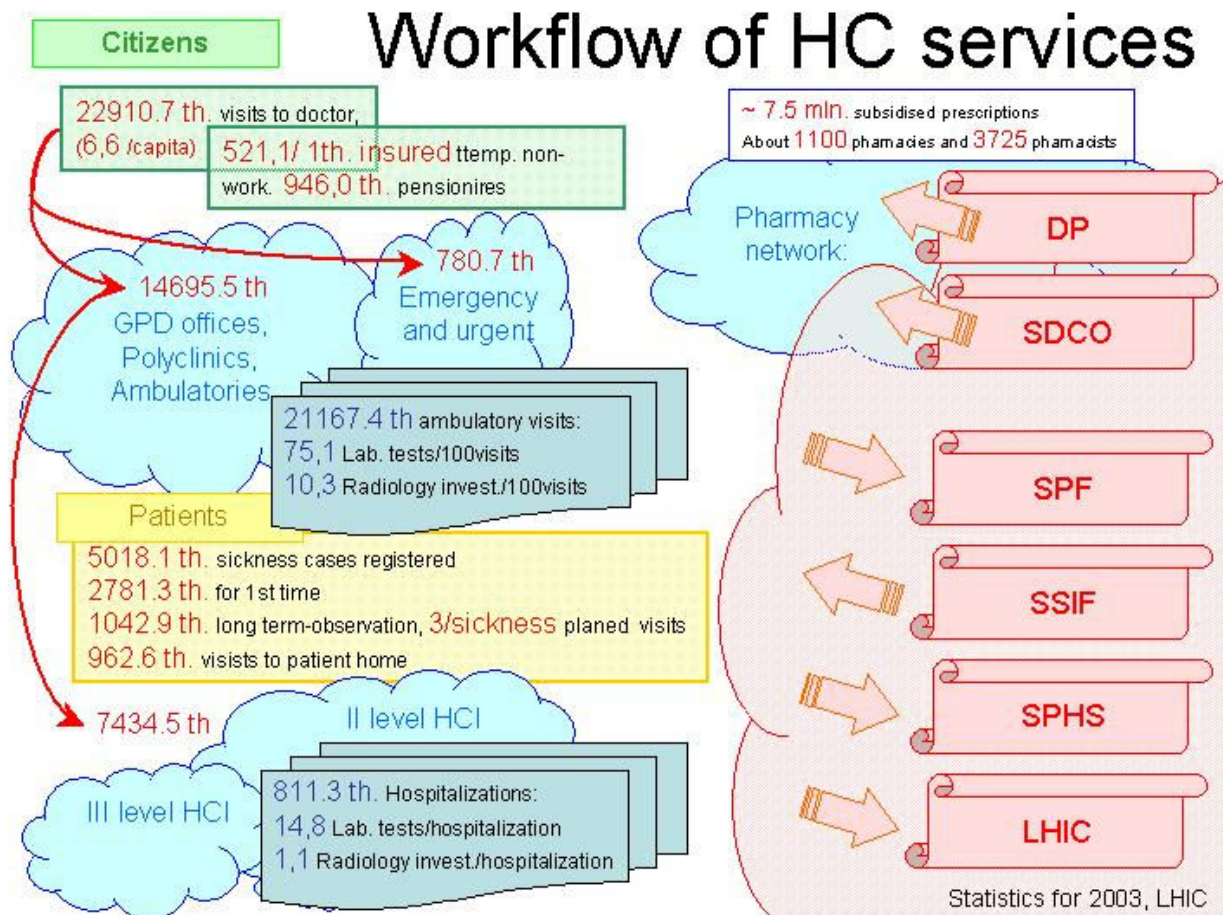


Figure 1. Providers' workflow and volume of encounters/transactions in the Lithuanian healthcare system during 2003. The main part of citizens physicians encounters is served on primary healthcare providers (General Practice Doctors (GPD) offices, polyclinics, ambulatories) level, if the serious health problem is discovered then citizen becomes a patient and enters into Healthcare Institutions (HCI) of secondary and tertiary level. Administrating institutions those as Department of Pharmacy (DP) and the State Drugs Control Office (SDCO) provides healthcare providers with up-to-date information on medicines; State Social Insurance Fund (SSIF) notifies citizens' insurance status. The others institutions as State Patient Fund (SPF), State Public Health Service (SPHS), and the Lithuanian Health Information Center (LHIC) are information compiling and analyzing institutions.

Table 2. Healthcare providers - institutions and individuals

District	Citizens	GPs	Specialists	Total Physicians	Total Physicians (other source)	Nurses	Hospital Beds
Klaipeda	486,685	385	1,092	1,477	1,477	3,866	4,714
Kaunas	880,967	696	2,710	3,406	3,406	6,649	8,536
Siauliai	544,260	430	757	1,187	1,187	3,651	3,920
Panevezys	478,474	378	811	1,189	1,189	3,500	3,475
Vilnius	1,033,757	817	3,339	4,156	4,156	7,567	9,910
Extrapol. Total	3,424,143	2,707	8,708	11,415	11,415	25,233	30,555
Total	3,430,600	2,707	8,708	11,415	13,682	25,233	31,031

District	Hospitals	GP Offices	Medical points	Ambulatory	Primary HC centers, polyclinics, Family medicine, Diagnostic centers	Private HC providers	Pharmacies	Pharmacists
Klaipeda	27	105		31	37		156	529
Kaunas	29	176		52	96		290	958
Siauliai	21	102		37	43		175	592
Panevezys	21	91		45	24		132	521
Vilnius	54	306		39	60	31	347	1,125
Extrapol. Total	152	780	0	204	260	31	1100	3725
Total	181	750	906	190	225	504	1,100	3,725

Analysis Of Data Volumes Generated At Healthcare Institutions

Estimation Of Data Volumes Generated In Text Form

The typical medical documents circulating in the healthcare system are: referrals, extracts from medical documents, statistical reporting forms to the SPF and prescriptions. In the data volume estimation shown in Table 3, the following are taken into account: referrals (form F028a-1a), epicrisis (form F027a), ambulatory services reports (form F025a-LK), in-patient services reports (form F066a-LK), prescriptions of non-subsidised and subsidised drugs, text form results from laboratory tests.

Estimation Of Data Volumes Generated From Radiological Imaging

The typical data amounts generated during radiological examination have been estimated by the NHS in the U.K. It has been estimated that Chest Radiography (CR) examinations generate (mean to max per examination) 12 to 24 MB of data per examination, Computer Tomography (CT) 25 to 60 MB per examination, and Magnetic Resonance Imaging (MRI) 40 to 100 MB per examination.

Digital radiology hardware and software systems vendors provide generalised average proportions of CR/CT/MRI examinations. Vendors assume from practice that radiological imaging workflow consists of 22% of CT examinations when average data generated is 26 MB per examination, 8% of MRI examinations when 52 MB per examination, and 69 % of CR when 17 MB of data per examination is generated. The same vendors provide estimates of amounts of digital radiology data which are based on equal averages regarding CR/CT/MRI examinations. In case of lossless compression of images figures of 45 MB up to 150 MB per examination are provided.

Estimates of data amounts generated in the Radiology centre of the Santariskes clinics of the Vilnius University hospital are also provided by Lithuanian radiology experts. These estimates show that at Santariskes clinics there is 30 MB of data generated per CT examination (or

600MB per day), 38 MB per MBI examination (or 380 MB per day), 24 MB per digital fluorography examination (or 384 MB per day), and 15 MB per digital angiography examination (or 300 MB per day).

U.S. experts in medical informatics estimate the average amount of generated data per hospital per year as 7 Terabytes. This estimate includes all digital data generated at hospital imaging (X-ray, chest fluorography, mammograms, CT, MRI, sonograms), visible light endoscope and microscope images, video and sound records of angiograms, heart echoscopy, heart sound, lung sound, and signals: EEG, EKG, EMG; text and numerical data.

The Lithuanian society of radiologists has estimated the overall number of imaging systems needed to achieve an equal mean level with EU countries. Lithuania requires the operation of about 240 universal radiology units (only 151 units are currently in operation), 520 radiographic units (340 in operation), 33 angiography systems (9 in operation), 35 nuclear medicine systems (6 in operation), 16 radiotherapy systems (7 in operation), 57 computer tomography systems (25 in operation), 14 magnetic resonance imaging systems (3 in operation).

Considering practical estimations of data amounts generated from radiology imaging, and an estimate of a future increase by about 40% of the number of imaging systems in the Lithuanian healthcare system, an average estimate of about 75 MB of data generated per examination is reached. Furthermore, demands on network bandwidth and on data storage can be estimated when distributed resources of imaging data at hospitals will be connected to the EHSI system of Lithuania. The estimated volume of digital images data generated only from radiology departments of the 181 hospital of Lithuania is about 70 TB per year, given that the estimated mean radiological examination generates 75 MB of data and there are 0.9 million examinations per year. The volume of data generated per hospital per year in Lithuania is only 0.4 TB, compared to the US 7 TB per hospital. This is due to the fact that the volume takes account of only data volumes generated by X-ray, CT and MRI imaging systems which are lacking in Lithuania.

Table 3. Summary of data volumes generated at healthcare institutions

	Volume*/doc	Per Annum	Per Month	Per Day
Volume from Encounters				
Volume from Referrals F028a-1a (1600 characters)	1,6	11.895.200	991.267	45.058
Volume from Epicrisis F027a (2700 characters)	2,7	20.073.150	1.672.763	76.035
Volume from Ambulatory reports F025a-LK (1900 characters)	1,9	27.921.450	2.326.788	105.763
Volume from In-patient reports F066a-LK (1500 characters)	1,5	1.216.950	101.413	4.610
Volume from Prescriptions (460 characters)	0,5	14.928.200	1.244.017	56.546
Volume from lab	0,5	6.011.568	500.964	22.771
Sub-total Volume of data generated in documents, (kB)		82.046.518	6.837.210	310.782
Volume from radiology, (GB)	0,075	67.096	5.591	254
Total Volume, (GB)		67.178	5.598	254

* - in kBytes, only radiology line in Gbytes

Remark: Volume of data in radiology per examination is estimated as now-a-days Lithuanian mean of (X-Ray, chest fluorography, CT, MRI) and increased 2 times.

The Legislative System Concerning Medical Services And Related Information

Special attention must be paid to the issues of the ownership of diagnostic information, and information sharing on a public protected network. Dealing with these issues requires special attention, since there is a need to avoid the risk of devising bureaucracy which would cause the eHealth services development process to stagnate. The main components are:

- Medical information must be treated as private and confidential;
- There is currently no Lithuanian legislation on the electronic maintenance and processing of private and confidential information. However, personal health and healthcare data are protected by the following: the Law on the Rights of Patients and Compensation of the Damage to their Health, the Law of Juridical Protection of Personal Data, and the Civil Code of Lithuania.
- Naturally, some rules on medical information management are described in the Law of the Health System and the Law on Health Care Institutions, where it is stated that personal health information must be collected, maintained and exchanged between health care institutions. It is also explicitly stated that medical information must be provided to other health care providers as comprehensive as is adequate to achieve their aim.

Diagnostic data are also protected as private and confidential information since they describe a person's health status and identify the person. The ownership of diagnostic information is not clear and must be contested in a court of law. Some hospitals, particularly the larger ones, are against the exchange of diagnostic information. This is justified as due to the inadequate financing system in the health care sector, as well as due to a reluctance to share medical know-how. It appears that the problem is in the definition of the level of protection needed on medical information and how confidential information should be treated. The EHSI implementation project must address these problems and present a valid solution. On the side of benefits, the introduction of a system of electronic health records provides the means to track and report access to information, which is very cumbersome to control with the current paper record system.

Registries, Identification Indexes, International Classification Systems

The Lithuanian government has published an act "On measures to the realisation plan of the design strategy for an integral system of state registers". The main goal of this document is to set the legislation background for the creation, functioning and interrelation of registers. There is only one register accepted by the Information Society Development Committee for electronic use and maintenance, which is the so called "State register of managers of personal data" and is potentially accessible via the Internet. The administrator of the register is the State data protection inspectorate.

The Lithuanian Population register, in accordance with legislation, provides information to government, public administration, and others. Currently it consists of 3.605.718 entries. The users of the Population register are the SPF, the SSIF, the national organ transplantation bureau, and other less related to healthcare institutions. The basic rule governing the use of the Population register is that all transactions are online - users do not get copies of the register. Data is collected via the Internet (CRS) and a secure VPN connection. Table 4 presents the complete list of state registries which must be integrated into the EHSI development as information contributors.

Table 4. State registries as EHSI information contributors

Registry/ Administrator	EHSI requirement	Regulation confirmed	Data is collected in database	Accepted for maintenance	Technology
Ministry of healthcare					
Licenses of Pharmacy practice (pharmacies)	**	—	+		
Licenses of medical practice of doctors	**	+	+	—	
Donors of blood		+	+		
Medical devices		+	+	—	
Occupational diseases		+	+	—	
Licenses of nurses and oral care specialists	**	+	+	—	
Health care institutions	**	Reorganized			
Tuberculosis		+			
Drugs (SDCO for +ve list, SPD for prices)	**	—	+		
Donors and recipients of human tissues and organs		+	+	—	
Ministry of Interior					
Population register	**	+	+	—	Oracle 8i
Information Society Development Committee					
State register of managers of personal data		+	+	+	MS SQL server

Legacy Information Systems In Healthcare

By far the most substantial computerisation effort in the healthcare sector in Lithuania is under the auspices and management of the SPF for the purpose of reimbursement. The SPF IT system (named Sveidra) is the only national-level operational system since 1998, connecting the majority of healthcare institutions in Lithuania with the TPF (located in Vilnius, Kaunas, Klaipeda, Panevezys and Siauliai). The system is used for maintaining an account of medical services provided by GPs and specialists and drug reimbursement by the SPF. Hospitals, polyclinics, family health centres, GP offices, pharmacies, and other healthcare providers connect to the regional SPF systems via the Internet. Regional systems collect electronic versions of the official forms No 25 and No 66 created for this purpose in paper form, and email the eForms to the central system located in Vilnius. Data collection is based on the ICD-10 system of disease classification for specialist care. The central SPF system has access to the Population Register for patient identification (the SPF has permission for access to the Population Register Service by the Ministry of Interior Affairs) and provides data to the Social Insurance Fund (SODRA). The main tasks performed by the SPF are the management and processing of the data received by the Sveidra system, and the generation of reports for the SPF, the Ministry of Health, the Statistics Department, the Health Information Centre and the SIF. An add-on product is used for the generation of statistical reports. Table 5 lists all the EHSI integration requirements concerning legacy systems.

Table 5. Legacy systems to be integrated into the EHSI

System name	Administrator	Integration notes
SVEIDRA	State Patient Fund	Accounting of medical services and subsidised drugs
VAISKIS	State Medicines Control Agency (Drug Control)	Internet browser accessible database
Register of Patients	Kaunas Medical University Clinics	Database of treated patients on SQL server
Electronic Disease History	Vilnius University Hospital, Santariskiu Clinics	
MediPAS / Migra	Kaunas Medical University Clinics Vendor: Euromed Networks AB, Stockholm, Sweden.	Centralized database of images and text information on MS SQL Server
PACS	Kaunas Medical University Clinics	GE Medical Systems: Innova 2000
PACS	Vilnius University Hospital, Santariskiu Clinics	Siemens: SIENET

Other characteristics concerning ICT legacy in the Lithuanian healthcare sector systems are:

- Private health care institutions already have modern medical equipment and have developed their own local IT infrastructure;
- Lithuanian HCIs lack IT awareness and the level of IT applications is low;
- The electronic communication between HCIs in Lithuania is practically non-existent;
- Computer literacy and skills are constantly improving, but still remain at an inadequate level, especially among the lower levels of healthcare professional training;
- The internal ICT infrastructure of Lithuanian HCIs is limited;
- Computer usage for professional purposes (patient treatment, diagnosis, conclusions, etc.) among general practitioners is low;
- There is no standard software at HCIs except the Sveidra system described above;
- Most of medical documents are filled by handwriting and remain in the exclusive possession of the HCI which issued them. Same applies for laboratory tests results, digital imaging and radiography results, etc;
- The health registers controlled by the MoH are not integrated into any system.

Summary

During the past few years eHealth has become a widely accepted means, by the international healthcare community, for the modernisation, reform and further development of an efficient and quality-assured healthcare sector. Fragmented developments of eHealth components and already installed solutions confirm that all main stakeholders of the healthcare system - the Ministries of Health, the administration of HCIs, specialists and patients - understand and

accept the importance of eHealth development using modern information and communication technologies. However, the current situation is that activities are not coordinated and proposed IT solutions are not interoperable. This will lead in the near future to a situation where the number of disparate systems deployed will be overwhelming when considered as subject to integration into a common eHealth Services infostructure and infrastructure. This would lose the synergy effect, significantly reduce the effective utilisation of existing investments, and risk any further sustainable development in the area of eHealth. Furthermore, a paradigm and a platform is required for the development of systems geared towards the needs of the patient and the healthcare professional, with principles of interoperability and continuity-of-care supporting concepts, rather than the fragmented development of HCI proprietary systems, oriented towards administrative managerial aspects.

The current situation in Lithuania outlines a sustainable future for the development of eHealth for citizens. The need is recognised, the commitment exists, the legacy is limited, and the required infrastructure exists, both with regard to technologies as well as with regard to human resources.

Strengths:

- Patients/ citizens demand quality-assured healthcare services with improved facilitated access;
- There is a recognised need to solve the problem of data sharing and to facilitate the process, both practically as well as legislatively, including the patient's health history, medical data and the results of diagnostic investigations;
- There is a recognised need to facilitate the collection and communication of the data and evidence required for statistical reporting and policy/clinical decision making;
- There is the need to provide healthcare professionals with access to the knowledge society and to promote lifelong learning and professional excellence;
- There is the need to provide healthcare professionals with access to the information society, to ensure a sustainable future, and to leverage the benefit of cooperative health issue management;
- There is the need to provide citizens with access to the health and healthcare information society, to actively involve the patient in the process of healthcare delivery and to enable informed personal decisions on the various options available;
- There is the need to support GPs as gatekeepers into the healthcare system, and to create a sustainable future for healthcare professionals in rural and remote areas;
- There is the need to provide access to quality assured healthcare services to citizens regardless of their socioeconomic status or geographic location;
- There is the need to support preventive medicine, and to facilitate the dissemination of information on a healthy lifestyle;
- There is the need to improve the efficiency of the system, to improve workflows, to reduce time spent by healthcare professionals on administrative tasks, and to reduce duplicated data entry and laboratory tests;

Weaknesses:

- There is a lack of international medical vocabulary standardisation;
- The level of HCI computerisation of diagnostic service departments is very low;
- The level of ICT infrastructure at HCIs is very low;
- The level of computer literacy and skills of GPs and other healthcare professionals operating at HCIs may be currently inadequate;
- There is a lack of willingness by different HCIs to disclose, share and exchange medical information;
- There are issues to be resolved concerning legislation and the confidentiality/privacy and electronic exchange of medical information and personal health data;
- There are legislative and practical issues to be resolved concerning the legal status of the EHSI data management centres, the integration of registers, the authentication of users of the EHSI (e.g. electronic signatures);
- There is a risk of absence of authority over HCIs and their coordination as EHSI information contributors.