Estonian nationwide health information system

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During the last decade, Estonia became well known as a country with advanced e-services, not only in the business sector (especially banking), but also in e-Government services (electronic tax board, state commercial, car and shipping registers, e-voting, e-school, e-ticket etc.). The state has already established and maintains a nationwide technical infrastructure called the X-road platform. It is a platform independent standard interface for secure data processing, a connection of all Estonian public sector databases and information exchange. Other IT-solutions such as digital signatures and ID-card authentication are recent innovations, and their use is comprehensively regulated by a national law. These developments are the bases of implementing sectoral policies like creating country wide health information system.

The idea of eHealth and national health information system emerged already in 2002. The purpose was to develop nationwide framework (database) using different medical documents in the digital format that facilitates the exchange of diffuse health information, which was available only in local databases and information systems that were not able to communicate with each other.

In 2005, as the recipient of the structural aid, the Estonian Ministry of Social Affairs launched a new e-health concept by phasing in four projects: Electronic Health Record, Digital images, Digital Registration and Digital Prescription (eHealth projects). The result of implementing eHealth projects is the Estonian health information system that was launched on December 17th 2008.

The main goals for starting the eHealth projects were:

-Decreasing the level of bureaucracy in doctors work process

-Increasing the efficiency of the health care system

-Making the time-critical information accessible for the attending physician

-Developing health care services that are more patient friendly and have higher quality

Management and partners

The eHealth projects were complex multi-annual projects involving a number of partners. The Ministry of Social Affairs fulfilled the coordinating and directing rule in implementing the eHealth projects. As the eHealth projects were not just large IT projects, but also social development projects involving a large partnership. Alongside the implementation of new information technology concepts, it also includes other aspects, such as medical standardisation, ethics and legislation. To ensure effective management of the e-Health projects the Estonian E-Health Foundation was established in 2005 by the Ministry of Social Affairs and several other healthcare providers for leading the four eHealth projects.

Implementation partners for all activities are the IT companies selected by means of public procurement procedures. The **technical solutions of eHealth projects** were supplied by the consortium of three partners: the lead partner Hewlett-Packard Estonia Ltd and as other partners Microlink Eesti Ltd., and IceFire Ltd. Software solutions are developed by Medisoft Ltd.

The gradual development of the system will continue until 2013. According to the Health Information System Statue (July, 2008), the processor of the health information system is the Ministry of Social Affairs and the authorized processor of the health information system is the Estonian eHealth Foundation.

Data usage

The Health Services Organization Act and Associated Acts Amendment Act accepted by the Riigikogu (the Estonian Parliament) on December 20th of 2007 provides that as of September 1st of 2008 the health care service providers are obligated to forward medical data to the health information system. The rules for data usage state that only the health care employee (the attending physician) currently associated with patient's treatment has the right to make enquiries about patient's data, i.e. the patient's attending physician or a medical assistant. Making enquires about patient's health data outside of treatment process is not allowed. Health data will be issued to health care employees registered with Health Care Board and who are marked as the attending physician.

Patients have the right to set restrictions of access to their data. In this case the patient will be informed by information system at the time of setting the restriction that it is dangerous to his/her life and health to provide health care services based on insufficient information. There will be no access allowed to initial documents even in the emergency situation and the patient will take full responsibility regarding possible consequences that may arise from banning access to data.

HIS in numbers

Gathering of the data began on December 17th 2008 and by now the health information system contains about 153 thousand medical documents. For the moment the agreed amount of data is sent to the system, containing discharge letters (inpatients and outpatients), referrals and links to digital images.

To effect their legally binding obligation to send medical documents to the information system, over 700 health care providers out of the total 1451 licenced in Estonian Health Care Board have signed the contract with Estonian eHealth Foundation, which is the authorized processor of the health information system. 158 of those are by now participating in the actual data exchange. This may seem a small number but we have to take into consideration the fact that the implementation of a system this large will take it's time.

Innovation results of Estonian health information system

The most innovative technological aspect is that implementation of the health information system does not cause massive re-engineering of the existing in-house information systems and communication infrastructure, which will just be integrated ("linked") by special system modules. The message exchange module (the so-called agent centre) enables data exchange and interoperability of all integrated users and delivers all messages which conform to the standard message type.

Providing the users (medical personnel or patients) with message exchange and administration, the agent centre makes possible several rights and services, which make the system user-friendly: 1) central security solution, 2) administration of rights and users, 3) authentication and authorisation of users, 4) integration with external information systems (via the X-road), 5) message administration and message-based integration, and 6) log-in (for example, for the online Patient Portal).

The Patient's Portal which has been developed enables the patient to access his/her medical data irrespective of time and place.

Transferability

The Estonian health information system is globally unique which encompasses the whole country, registers virtually all residents' medical history from birth to death, and is based on the comprehensive state-developed basic IT infrastructure.

This concept of a nationwide integrated medical health information system covering the whole population is fully transferable only if all of the following preconditions are fulfilled: 1), the existence of a nation-wide secured data-exchange platform, 2), the application of the highest security standards for system accessibility and users' authentication, signature and encryption, and 3) the enforcement of the national laws for collection and exchange of personal medical data. It is evident that implementation costs may differ case-by-case, but it is assumed that such a project should be based on the results of comprehensive feasibility studies.

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