eHealth Strategies

Country Brief: Finland

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About the *eHealth Strategies* study

The eHealth Strategies study analyses policy development and planning, implementation measures as well as progress achieved with respect to national and regional eHealth solutions in EU and EEA Member States, with emphasis on barriers and enablers beyond technology. The focus is on infrastructure elements and selected solutions emphasised in the European eHealth Action Plan of 2004.

Disclaimer

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Executive summary

Finland's eHealth roadmap[1] from 2007 is a follow-up to the *Strategy for utilising information technology in the field of social welfare and healthcare in Finland*, which was launched in 1996. Its underlying principle is the development of seamless service chains, which requires the introduction of new technology, new types of information system architectures, and better compatibility between information systems. It refers to the EU eHealth Action Plan (2004), encompasses the assessment of the current eHealth status, implementation strategies, standards as well as infrastructural aspects and possible cross-border cooperation.

In order to consider Finland's position regarding eHealth interoperability objectives the following eHealth applications have been examined: patient summaries and electronic health records, ePrescription, standards and telemedicine. In overview Finland's situation is as follows:

In 2002, the Finnish Government decided to introduce nationwide electronic patient records by the end of 2007[2] and the National Health Project Program was launched, including an electronic patient record project. Previously every service provider had its own patient record system which was not usually interoperable. Then, in December 2006, a national EHR archive (eArchive) was introduced in order to enable access and exchange of patient information across organisations. To ensure this all EHR systems joining the national eArchive use a predefined structure.

The Finnish eArchiving solution to EHR interoperability is not a Patient Summary solution. The records of each healthcare provider are archived and accessed separately. It is likely that a Patient Summary view, combining data from the different EHRs, will be developed within the eArchiving service, although this has not yet been specified.

After a series of ePrescription pilots, starting in 2002, through which refinement took place, a final phase of ePrescription pilots started again in May 2010. Once ePrescription is fully operational, doctors can issue and sign ePrescriptions electronically as well as store them in the centralised system (Prescription Center).

A nationally elected set of standards has been defined, based on international standards such as HL7, CDAR2, ISO/OID or DICOM. But still, critics say that common standards are too few in Finland. On a different aspect of standards the project SAINI proposes to standardise technical solutions and electronic services for citizens.

A wide range of telemedicine applications has been implemented and runs as a regular service in Finland including telemonitoring, telediagnosis, teleconsultation and telelaborotory. Generally, telemedicine in Finland is regarded as a positive solution for overcoming geographical distances.

1 Ministry of Social Affairs and Health 2007

2 Decision-in-Principle by the Council of State on securing the future of health care, issued in April 2002

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1 Introduction to the report

1.1 Motivation of the eHealth Strategies study

Following the *Communication* of the European Commission (EC) on "eHealth – making healthcare better for European citizens: An action plan for a European eHealth Area",[3] Member States of the European Union (EU) have committed themselves to develop and issue national roadmaps – national strategies and plans for the deployment of eHealth applications addressing policy actions identified in the European eHealth Action Plan.

The *2004 eHealth Action Plan* required the Commission to *regularly monitor* the state of the art in deployment of eHealth, the progress made in agreeing on and updating national eHealth Roadmaps, and to facilitate the exchange of good practices. Furthermore, in December 2006 the EU Competitiveness Council agreed to launch the *Lead Market Initiative*[4] as a new policy approach aiming at the creation of markets with high economic and social value, in which European companies could develop a globally leading role. Following this impetus, the Roadmap for implementation of the "eHealth Task Force Lead Market Initiative" also identified better coordination and exchange of good practices in eHealth as a way to reduce market fragmentation and lack of interoperability.[5]

On the more specific aspects of electronic health record (EHR) systems, the recent *EC Recommendation on cross-border interoperability of electronic health record systems*[6] notes under "Monitoring and Evaluation", that "in order to ensure monitoring and evaluation of cross-border interoperability of electronic health record systems, Member States should: consider the possibilities for setting up a monitoring observatory for interoperability of electronic health record systems in the Community to monitor, benchmark and assess progress on technical and semantic interoperability for successful implementation of electronic health record systems." The present study certainly is a contribution to monitoring the progress made in establishing national/regional EHR systems in Member States. It also provides analytical information and support to current efforts by the European Large Scale Pilot (LSP) on cross-border Patient Summary and ePrescription services, the epSOS - European patients Smart Open Services - project.[7] With the involvement of almost all Member States, its goal is to define and implement a European wide standard for such applications at the interface between national health systems.

[3] European Commission 2004
[4] European Commission 2007
[5] European Communities 2007
[6] European Commission 2008
[7] European Patients Smart and Open Services (epSOS)

Earlier, in line with the requirement to "regularly monitor the state of the art in deployment of eHealth", the EC already funded a first project to map national eHealth strategies – the eHealth ERA "Towards the establishment of a European eHealth Research Area" (FP6 Coordination Action)[8] - and a project on "Good eHealth: Study on the exchange of good practices in eHealth"[9] mapping good practices in Europe - both of which provided valuable input to the present *eHealth Strategies* work and its reports. Member States' representatives and eHealth stakeholders, e.g. in the context of the *i2010 Subgroup on eHealth* and the annual European High Level eHealth Conferences have underlined the importance of this work and the need to maintain it updated to continue to benefit from it.

This country report on Finland summarises main findings and an assessment of progress made towards realising key objectives of the eHealth Action Plan. It presents lessons learned from the national eHealth programme, planning and implementation efforts and provides an outlook on future developments.

1.2 Survey methodology

After developing an overall conceptual approach and establishing a comprehensive analytical framework, national level information was collected through a long-standing Europe-wide network of national correspondents commanding an impressive experience in such work. In addition, a handbook containing definitions of key concepts was distributed among the correspondents to guarantee a certain consistency in reporting. For Finland, the National Institute for Health and Welfare[10] (THL) provided information on policy contexts and situations, policies and initiatives and examples for specific applications. THL generates information and know-how in the field of welfare and health and forwards them to decision-makers and other actors in the field. The Institute is overseen by the Finnish Ministry of Social Affairs and Health.

The key tool to collect this information from the different national correspondents was an online survey template containing six main sections:

A. National eHealth Strategy
B. eHealth Implementations
C. Legal and Regulatory Facilitators
D. Administrative and Process Support
E. Financing and Reimbursement Issues
F. Evaluation

[8] eHealth Priorities and Strategies in European Countries 2007
[9] European Commission; Information Society and Media Directorate-General 2009
[10] National Institute for Health and Welfare

Under each section, specific questions were formulated and combined with free text fields and drop-down menus. The drop-down menus were designed to capture dates and stages of development (planning/implementation/routine operation). In addition, drop-down menus were designed to limit the number of possible answering options, for example with regard to specific telemedicine services or issues included in a strategy document. The overall purpose was to assure as much consistency as reasonably possible when comparing developments in different countries, in spite of the well-know disparity of European national and regional health system structures and services.

Under Section B on eHealth implementation, questions regarding the following applications were formulated: existence and deployment of patient and healthcare provider identifiers, eCards, patient summary, ePrescription, standards as well as telemonitoring and telecare.

The data and information gathering followed a multi-stage approach. In order to create a *baseline* for the progress assessment, the empirica team filled in those parts of the respective questions dealing with the state of affairs about 3 to 4 years ago, thereby drawing on data from earlier eHealth ERA reports, case studies, etc. to the extent meaningfully possible. In the next step, national correspondents respectively partners from the study team filled in the template on recent developments in the healthcare sector of the corresponding country. These results were checked, further improved and validated by independent experts whenever possible.

Progress of eHealth in Finland is described in chapter 3 of this report in the respective thematic subsections. The graphical illustrations presented there deliberately focus on key items on the progress timeline and cannot reflect all activities undertaken.

This report was subjected to both an internal and an external quality review process. Nevertheless, the document may not fully reflect the real situation and the analysis may not be exhaustive due to focusing on European policy priorities as well as due to limited study resources, and the consequent need for preferentially describing certain activities over others. Also, the views of those who helped to collect, interpret and validate contents may have had an impact.

1.3 Outline

At the outset and as an introduction, the report provides in chapter 2 general background information on the *Finnish* healthcare system. It is concerned with the overall system setting, such as decision making bodies, healthcare service providers and health indicator data.

Chapter 3 presents the current situation of selected key eHealth developments based on detailed analyses of available documents and other information by national correspondents and data gathered by them through a well-structured online questionnaire. It touches on issues and challenges around eHealth policy activities, administrative and organisational structure, the deployment of selected eHealth applications, technical aspects of their implementation, legal and regulatory facilitators, financing and reimbursement issues, and finally evaluation results, plans, and activities

The report finishes with a short outlook.

2 Healthcare system setting

2.1 Country introduction

The Finnish state is composed of three administrative levels: the central level made up of the national ministries and central authorities; the regional level - which until the end of 2009 consisted of 6 provinces (Åland, South Finland, Eastern Finland, Western Finland, Lapland, and Oulu) and as of 1.1.2010 is represented by the Regional State Administrative Agency and the Centre for Economic Development, Transport and the Environment[11], and the municipal level, which has a high degree of sovereign power for policy-making, especially in the fields of healthcare and social services. Finland has a very low density of population and an economy which is heavily concentrated in the three big agglomerations around Helsinki, Tampere and Turku, all of which are in the south of the country. Most other parts of the country have somewhat lower rates of income and tend to suffer from emigration.

In general, there are three different healthcare systems in Finland: municipal healthcare, private healthcare and occupational healthcare. The systems have significant differences, as for example in the scope of the services provided, user-fees and waiting times.[12]

In its institutional structure, financing and goals, the Finnish healthcare system is closest to those of other Nordic countries and the UK, in that it covers the whole population and its services are mainly produced by the public sector and financed through general taxation. The Finnish healthcare system is one of the most

[11] Aluehallintovirasto [Regional Government Agency] , Elinkeino-, liikenne- ja ympäristökeskuksia [Centres for Economic Development, Transport and the Environment]

[12] Vuorenkoski, Mladovsky et al. 2008

decentralised in the world. Even the smallest of the (presently, March 2010) 342[13] municipalities (local government authorities) are responsible for arranging and taking financial responsibility for a whole range of 'municipal health services'. The population of municipalities (outside of Åland Islands) currently varies from 804 inhabitants to over 580 000. The mean size is about 16 000 inhabitants and the median about 5 800 inhabitants. In order to address the challenge of ensuring the provision of basic municipal services in the future, a major project of "Restructuring municipal services" (PARAS project, in Finnish) has been in progress since 2007[14]. In the new setting, organisational responsibility for primary healthcare, as well as certain welfare services closely related to health services, will reside with organisations covering at least 20000 inhabitants. The target date for completion of the process is 2012.

From an international perspective another unique characteristic of the system is the existence of a second public finance scheme (the National Health Insurance – NHI-scheme), which reimburses partly the same services as the first, but also services which are provided by the private sector. In addition to subsidising the use of specific private health services, the NHI scheme also finances occupational and student health services and outpatient medicines.[15]

The box below summarises the key facts about the Finnish healthcare system:

Key facts about the Finnish healthcare system:[16]

Life expectancy at birth: 79.7 years

Healthcare Expenditure as % of GDP: 8.2% (OECD 2007)

WHO Ranking of Healthcare systems: rank 31

Public sector healthcare expenditure as % of total healthcare expenditure: 75% (OECD 2007)

[13] Kuntaliitosselvitykset ja tulevat kuntaliitokset [Reports on merging of municipalities and forthcoming mergers]

[14] Vuorenkoski 2008

[15] Häkkinen 2005

[16] Data from World Health Organization 2000; World Health Organization 2009

2.2 Healthcare governance[17]

Decision making bodies, responsibilities, sharing of power

The Finnish Government decides on general national strategies and priorities and proposes bills to be discussed by Parliament. Healthcare policy is primarily the field of the MSAH[18]. The MSAH directs and guides the development and policies of social protection, social welfare and healthcare. It defines the main course of social and health policy, prepares legislation and key reforms and steers their implementation, and handles the necessary links with the political decision-making process. The general aims of social welfare and healthcare and the measures that will be taken in order to fulfil these aims are adopted in the National Development Programme for Social and Welfare (previously Target and Action Plan for Social Welfare and Health Care) that is drawn up for the whole period of office of each Government, normally for four years.

Municipalities (i.e. the local authorities) have, by law, the main responsibility for ensuring basic services such as education (except university education) and social and health services are provided for their inhabitants. Municipalities have the right to levy income and real estate taxes. They also receive a subsidy from the state to enable them to organise the services they are obliged to provide. In addition to the state subsidy for healthcare, they receive state subsidies for social services and schooling. The state subsidy to municipal social welfare and healthcare expenditure is determined by the population, age structure and morbidity in the municipality plus a number of other computational factors. The subsidies constitute about 25% to 30% of municipal spending on health services.

The main decision-making power in municipalities lies with the municipal council, which is elected every four years by the inhabitants of the municipality. There are variations in detail and emphasis in the decision-making process in municipalities. The general trend has been towards delegating power from municipal councils to the various committees and leading officials. Decisions on the planning and organisation of healthcare are made by the health committee, the municipal council and the municipal executive board. Here again there are variations. The leading persons of the municipal health centres are often also included in the planning and organisation of health services. To improve the coordination of social and health services, the traditionally separate health boards and social welfare and services boards have been merged into a single board in most municipalities.

In practice, the hospital district administration (see below) wields power over the organisation of specialist hospital services within municipal healthcare, even if the municipality formally procures the services. Specific legislation supports this power.

[17] Vuorenkoski, Mladovsky et al. 2008

[18] Ministry of Social Affairs and Health

There is a further administrative level between the state and municipalities, the province which has also undergone significant restructuring as of 1.1.2010 (see earlier in this section).

Healthcare service providers

Primary health services provided by municipalities are defined in the Primary Health Care Act[19]. The act states that every municipality must have a health centre which provides primary health services. Municipalities can either provide these services independently or join with neighbouring municipalities in joint municipal boards which set up a joint health centre (a municipal federation-maintained health centre).

In larger cities, the services of health centres are provided through several health stations located in different parts of the city (for example Helsinki has 29 health stations around the city). Municipalities can also purchase some primary health services from private providers or hospital districts. Health centres provide occupational healthcare services for those employers who choose to purchase these services from health centres.

Specialised care funded by municipalities is mainly provided by hospitals maintained by the hospital districts and regulated by the Act on Specialised Medical Care[20]. Currently, the Act divides the country into 20 hospital districts (excluding Åland Islands). Each municipality must be a member of one hospital district (the number of member municipalities varies from 6 to 58).

The hospital districts organise and provide specialist medical services for the population of their member municipalities. The hospital districts are federations of municipalities. These federations are separate from federations maintaining health centres. However, recently there have been local reforms to integrate these two organisations.

Each hospital district has a central hospital, five of which are university-level teaching hospitals. Hospital districts are managed and funded by the member municipalities. The catchment population of hospital districts varies from 65.000 to 1.4 million inhabitants. A referral from a licensed physician is needed for access to medical care provided at the hospital districts. Life-threatening emergencies are of course exempt from this requirement. The referring physician does not have to work in the municipal health centre. Referrals from private practice, occupational health services or other clinics in the specialist hospital are equally honoured.

Nongovernmental organisations (NGOs) and foundations are also active in the healthcare sector. These organisations provide a very broad spectrum of services. Municipalities and hospital districts can purchase services from these providers. These organisations can receive subsidies from the Finnish Slot Machine

[19] Act on Primary Healthcare 66/72

[20] Act on Specialised Medical Care 1062/89

Association (which has a monopoly on gambling in Finland and is governed by the state) for providing healthcare services.

The aforementioned structure of healthcare service provision is expected to undergo major changes with the upcoming introduction of the completely new Health Care Act (a merge of the Primary Health Care Act of 1972 and the Act on Specialized Medical Care of 1989) [21] The proposal for the new Act is expected to be brought to Parliament by the end of April 2010. It is expected that it will be a major milestone in the development of the Finnish healthcare system and it will create a good platform for future development of the municipal healthcare system[22].

The figure below summarises important features of Finnish healthcare organisation:

Figure 1: Important features of primary healthcare organisation in Finland[23]

Political/administrative unit responsible for primary healthcare	Municipal responsibility.
Consumer Choice	Mixed: area or list patient organised.
Financing	Mainly tax-based financing.
Public or private providers	Mixed: both private GP practices and publicly employed doctors.
Gatekeeping function of the GP	GP gatekeeping function in the public sector, but patients have direct access to specialists and hospitals in the private sector.
Integrating health: initiatives for coordination	Joint team work; developmental projects for collaboration, national healthcare plans; local and regional coordination groups/boards.

[21] Vuorenkoski 2008

[22] More information available at: http://www.stm.fi/vireilla/lainsaadantohankkeet/sosiaali_ja_terveydenhuolto (only in Finish)

[23] Krasnik and Paulsen 2009

2.3 Recent reforms and priorities of health system/public health

Earlier reforms in the health and social care systems[24]

The most important reform in Finnish healthcare in the last decade occurred in early 1993 as part of a reform of the entire state subsidy system. The main objective of the reform was to define the relationship between the state and the municipalities rather than to directly introduce major changes in health policy priorities. An essential element of the reform was the revision of the grounds for determining state subsidies to municipalities for health services. Under the old system, state subsidies to municipalities or federations of municipalities (producers) were ear-marked and related to real costs. Under the reformed system, state subsidies for running costs in health services provided by municipalities are non-earmarked lump-sum grants, which are calculated prospectively by using a specific need-based capitation formula.

The aim of the reform was to reduce central government control and to increase local freedom in the provision of services. This made it possible for municipalities to adopt a more active role as a purchaser instead of acting in the mainly producer's role as previously. Particularly in the field of specialist hospital care, the reform meant that the system changed somewhat from a public integrated model to a public contract model.

Furthermore, an independent centre for HTA[25], known as Finohta, was established in 1995 within STAKES[26]. The centre's main objective is to promote evidence-based medicine and to improve the effectiveness and cost-effectiveness of care (mainly non-drug diagnostic or treatment methods). Finohta coordinates HTA research, disseminates information and gives methodological and financial support to research projects aiming at evaluating the clinical effectiveness or cost-effectiveness of a given health technology. The majority of the funding for Finohta comes from the state. As a result of the decisions that were made based on the National Project to Ensure the Future of Health Care, the annual state funding of Finohta was doubled from 1.1 million to 2.2 million euros between 2004 and 2007.

In 2007, the Government initiated a new four-year multi-sectoral Government programme entitled the "policy programme for health promotion". The objectives of the health-promotion programme are to improve the general state of health of the population and to reduce health inequalities. The policy programme continues with efforts to promote health and prevent health hazards beyond conventional administrative boundaries. Issues to be addressed in the context of the programme

[24] Vuorenkoski, Mladovsky et al. 2008

[25] Health Technology Assessment

[26] STAKES and the National Public Health Institute (KTL) were merged in 2008 and are now known under the name of "National Institute for Health and Welfare" (THL).

will include developing measures to promote health and related legislation, promote the well-being of children and youth, improve the health, functional capacity and work-place welfare of people of working age, promote the health and functional capacity of older people, assign responsibility for preventive efforts and allocate related resources, stress the importance of physical activity and culture for well-being and increase the health of the environment.

2.4 ICT use among general practitioners

This section provides a brief overview of relevant ICT related infrastructure and services data. It draws on earlier studies commissioned by the EC, notably the Indicators eHealth Study . Although the results of this study date from 2007 and may therefore not reflect latest changes, a more recent pan-European survey is not available[27]*.*

In terms of infrastructure 100% of GP practices in Finland are equipped with one or more PCs. The same share, that is 100% of the practices, disposes of an Internet connection. In Finland, broadband represents the most common form of access to the Internet with 93% of GP practices resorting to broadband connections.

The storage of electronic medical patient data is universal in Finland as 100% of the GP practices register at least one type of patient data.

In Finland, the use of electronic networks for the transmission of medical patient data is well established and wide-spread. 90% of the GP practices use networks to receive laboratory results and 55% exchange data with other healthcare providers.

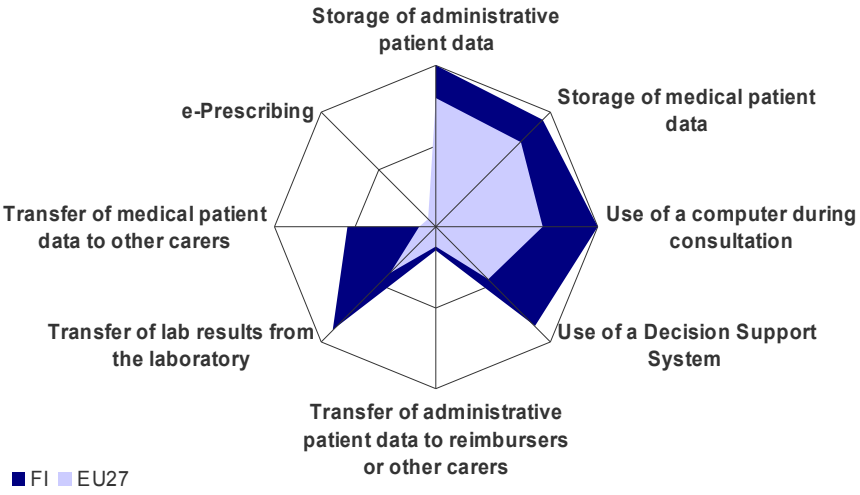
The exchange of administrative data is averagely well developed. 21% of the Finnish GPs use networks to exchange administrative patient data with other carers.[28]

Nationwide ePrescribing has not yet arrived in Finland.

[27] ICT and eHealth use among General Practitioners in Europe 2007

[28] In other studies (eHealth of Finland 2008), 77% of Finnish healthcare centres reported exchanging eReferrals and eDischarge letters (so both administrative and clinical data) with other healthcare providers. The percentage was 45% in 2005. This discrepancy can be explained by methodological differences in the two studies. Annex I below provides a list of the indicators used for the data presented here.

Figure 2[29]: eHealth use by GPs in Finland



Indicators: Compound indicators of eHealth use (cf. annex for more information), % values. Source: empirica, Pilot on eHealth Indicators, 2007.

3 eHealth strategies survey results

The following sections present the results of the eHealth strategies online survey. In a first section, the eHealth policy actions undertaken in Finland are presented. This is followed by a presentation of administrative and organisational measures taken. Section 3.2 presents results on key eHealth applications. Section 3.3 focuses on the technical side of eHealth, namely the role of patient and healthcare provider identifiers and the role of eCards. Legal and regulatory facilitators as well as financing and reimbursement issues are presented in the following chapters, 3.4 and 3.5. The report concludes with evaluation activities (3.6) in the country and an outlook (4.).

[29] The notion of „compound indicator" designates an indicator build from a set of other indicators/survey questions regarding the same topic. The compound indicator reflects an average calculated from different values. (see Annex) The final results of the study on eHealth Indicators is available at www.ehealth-indicators.eu.

3.1 eHealth policy action

The eHealth strategies of EU and EEA countries are not always labelled as such. Some countries may indeed publish a policy document which refers to the ICT strategy in the healthcare sector. Other countries such as France and Germany have enshrined the central eHealth activities in legislation governing the healthcare sector. In Germany, the relevant law is the law on the modernisation of healthcare; in France the introduction of an electronic medical record is included in a law concerning social security.

Sometimes, also documents from domains such as eGovernment or Information Society strategies may contain provisions which concern eHealth. In cases where the healthcare system is decentralised, i.e. where power is delegated to the regional level, there may even be strategy documents regarding eHealth from regional authorities.

3.1.1 Current strategy/roadmap30

Finland's eHealth roadmap31 from 2007 is a follow-up to a national strategy called "Strategy for utilising information technology in the field of social welfare and healthcare in Finland", which was launched by the Ministry of Social Affairs and Health in 1996. Its underlying principle is the development of seamless service chains, which is considered to require the extensive introduction of new technology, the creation of new types of information system architectures, and better compatibility between information systems.

From 1996 onwards, the Ministry of Social Affairs and Health has consistently pursued the creation of an implementation chain for the deployment of eHealth with four important landmarks, summarised in the box below:

[30] Tekes; Ministry of Social Affairs and Health 2007

[31] Ministry of Social Affairs and Health 2007

Important landmarks in Finnish eHealth policy development

1996: Strategy for utilising information technology in the field of social welfare and healthcare in Finland

1998: Update of the strategy, placing emphasis on several issues, e.g. digital patients records, nationwide interoperability or privacy protection

2002: Decision-in-Principle by the Council of State for the introduction of nationwide patient records

2007: "eHealth Roadmap for Finland" is published by the Ministry of Social Affairs and Health

After the first strategy from 1996was built around the principle of citizen-centred, seamless service structures an update followed in 1998, placing emphasis on the following targets:

- adoption of digital patient and client records in all levels of care;
- national-wide interoperability between distributed legacy systems;
- high level of security and privacy protection.

Following the Government Resolution from 2002, a national electronic patient record system development project (2003-2007) was set up as part of the National Health Programme. Implementation was organised through the working group steering the introduction of electronic patient records appointed by the Ministry of Social Affairs and Health. This working group outlined a national implementation strategy for electronic patient records, which was published in 2004. In a follow-up report (2005), the principal requirements to which all electronic patient record systems should conform were published.

The purpose of the current Finnish roadmap from 2007, which directly refers to the EU eHealth Action Plan (2004), is to summarise the major national policy achievements during the past ten years and to chart future challenges, and also to present Finland's strategic objectives with regard to the European targets set by the Commission. The roadmap was developed by a working group appointed by the Ministry of Social Affairs and Health (STM). In sum, it encompasses the assessment of the current eHealth status, implementation strategies, standards as well as infrastructural aspects and possible cross-border cooperation.

Furthermore, different legal acts were established within recent years. These are shortly named here and further explained in section 3.4 on "legal and regulatory facilitators". Acts, which are connected to the establishment of an eHealth structure, are the following:

Legal acts concerning eHealth development in Finland

Personal Data Act from 1999

Act on Experiments with Seamless Service Chains in Social Welfare and

Care Services from 2000

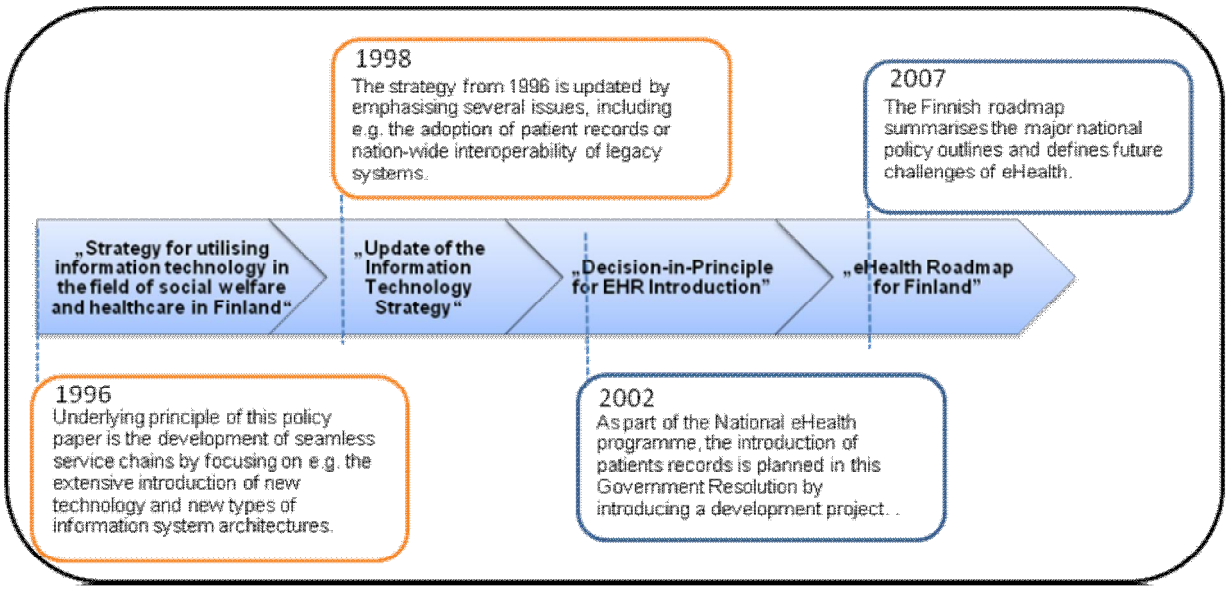
Decree on the Storing of Patient Data from 2001

Regulation on the Use of Electronic Social and Healthcare Client and Patient Information from 2007, also called the "Client Data Act"

Legislation on the Use of ePrescription from 2007

Documents from other domains include the e-Welfare programme (2005). It is part of a new information society programme and is aiming to develop ICT for social services. TEKES, the Finnish Funding Agency for Technology and Innovation[32] (formerly the National Technology Agency of Finland) managed the FinnWell - Future Healthcare Programme that lasted five years (2004–2009) and included a healthcare development programme, while since 2009 it has enabled the establishment and operations of the Strategic Centre for Health and Well-being (SalWe)[33].

Figure 3: Finnish policy documents related to eHealth



[32] Tekes

[33] SalWe 2010

3.2 Administrative and organisational structure[34]

The Ministry of Social Affairs and Health has the leading role in eHealth policy. The same Ministry also has the responsibility to develop the regulatory framework and the legislation for the management of personal digitalised health information. Municipalities and their jointly owned hospital districts have, by law, a strong decision making power in all health policy matters including eHealth. The Prime Minister's office established an Information Society Programme in 2003-2007, which has been followed by the Ubiquitous Information Society Action Programme 2008 - 2011. The Ministry of Justice, through the Data Ombudsman Office has established a permanent security and privacy protection group for healthcare (TELLU). The State IT-organisation, which is financed and guided by the Ministry of the Interior, is co-ordinating national development in the field of eGovernment. The Ministry **of Transport and Communications has the leading role in eInclusion** development. The Ministry of Trade and Industry is financing the Finnish Funding Agency for Technology Development and Innovation (TEKES), which, in turn, is funding R&D programs. The Ministry of Education participates also in the Information Society Programme.[34] Recently (in summer-autumn 2009), the Ministry of Finance has launched in the framework of the program on eServices and eDemocracy (SADe program) the preparation of an integrated platform for the provision of health and social care services to citizens (as one of the targeted activity areas).

With regard to national level eHealth implementation the major stakeholders are the following**:** [35]

- the **Ministry of Social Affairs and Health,** which in addition to its policy role has the responsibility for the national architecture, semantic and technical definitions (user cases for EHR-programs), certification of EHR-systems, healthcare units and central infrastructure;
- **KELA** (The Social Insurance Institution of Finland), that has the responsibility of the central infrastructure, i.e. the eArchive and Prescription center, acts as the register keeper of the Prescription centre and manages the development of the eView (application for citizens' access to the eArchive);
- **VALVIRA** (National Supervisory Authority for Welfare and Health), that acts as the authentication of healthcare professionals. Its role as national verifier for healthcare professionals through smart cards for strong authentication and electronic signature will in 2010 be transferred to the Population Register Centre.;
- **THL** (National Institute for Health and Welfare), that maintains the national code center and contributes to the further development of structured EHR systems.

[34] Kallio 2008

[35] European Patients Smart and Open Services (epSOS)

At the local level, the main eHealth implementation stakeholders are;

KUNTALIITTO (Kommunförbundet, League of Local Authorities) for organizing the co-operation of clusters, co-operation communities (7 in total) for making definitions and ordering changes to EHR-systems; **KunTo,** the Municipal Project Coordination Office providing guidance and assisting local implementations, the **Hospital Districts**, who manage distribution of smart cards, are the regional actors in local and regional implementations and finance necessary changes to EHR-systems, and **municipalities** for the local implementations and the financing of changes to EHR-systems**.**

Other important stakeholder, particularly in the context of the development and implementation of KanTa - the National Archive of Health Information (see section 3.2.1 for further details) are healthcare providers, both public and private, pharmacies, subcontractors for the EHR systems and network services, as well as the Association of Finnish Pharmacies and the Finnish Medical Association.

Finally, there are three more relevant actors in Finnish eHealth activities: 1) The National Institute for Health and Welfare – Unit for Information Structures and Classifications (former Unit for eHealth and eWelfare); 2) The Finnish Society of Telemedicine and eHealth (FSTeH) and 3) The Finnish Social and Health Informatics Association (FinnSHIA).

The function of the THL Unit for Information Structures and Classifications is, in addition to maintaining the national coding systems and terminologies within healthcare and social services, to engage in research and development and provide expertise in information society issues in the social and health sector. The use of information and communications technology is a key priority area. The Unit is an expert body that bases its work on multidisciplinary research and development expertise, and national and international cooperation.

The Unit is mainly engaged in the following tasks:

Tasks of the THL Information Structures and Classifications Unit:

Research, maintenance and development of information structures that support the operational processes of social care and healthcare;

Development , maintenance and dissemination of the structures, classifications and vocabularies necessary for client documentation through the national code server;

Research and Evaluation of structured client documents utilization and related changes in and impact on the social and healthcare systems, as well as in the health and welfare of citizens.

The Finnish Society of Telemedicine and eHealth was established in 1995 and aims to promote the health of the population through telecommunication and to disperse

the expert knowledge within healthcare. It has a close collaboration with other national and international organisations, healthcare service providers and users.

The activities of the FSTeH include:

- Development of professional expertise
- Arrangement of seminars, presentations, training courses, workshops, symposia
- Issuing of publications (both printed and electronic)
- Support of academic research
- Evaluation of current issues
- Collaboration with international organisations

The FinnSHIA, the Finnish Social and Health Informatics Association, is the national member society of the International Medical Informatics Association (IMIA) and the European Federation for Medical Informatics (EFMI). This means that the association poses a link between Finnish social and healthcare information technology, information management researchers and other stakeholders to international organisations. FinnSHIA has been established in 1974 and has – since then – expanded its activities in the healthcare industry and the social sector in general.

In general, research and development in health informatics is funded by the public sector, such as the Ministry of Social Affairs and Health, the Academy of Finland (the prime funding agency for basic research, operating within the administrative sector of the Ministry of Education) (, the Finnish Innovation Fund (SITRA - an independent public fund under the supervision of the Finnish Parliament) or from semi-public sector (such as the Finnish Funding Agency for Technology Development and Innovation - TEKES).

3.2.1 Patient summary and electronic health record (EHR)[36]

In this study, the epSOS project's definition[37] of a patient summary was used as a general guideline. There a patient summary is defined as a minimum set of a patient's data which would provide a health professional with essential information needed in case of unexpected or unscheduled care (e.g. emergency, accident), but also in case of planned care (e.g. after a relocation, cross-organisational care path).

Lacking a standard definition, a patient's electronic health record (EHR) is here understood as an integrated or also interlinked (virtual) record of ALL his/her health-related data independent of when, where and by whom the data were recorded. In other words, it is an account of his diverse encounters with the health system as recorded in patient or medical records (EPR or EMR) maintained by various

[36] KanTa

[37] Global 360 2009

providers like GP, specialists, hospitals, laboratories, pharmacies etc. Such records may contain a patient summary as a subset. As of yet, fully-fledged EHR systems rarely exist, e.g. in regional health systems like Andalucia in Spain or Kronoberg in Sweden, or in HMOs (health maintenance organisations) like Kaiser Permanente in the USA.

It should be noted that in most policy documents reference is made simply to an "EHR" without any explanation of what is meant by it, thereby in reality even a single, basic electronic clinical record of a few recent health data may qualify. As a consequence, this section can only report on national activities connected to this wide variety of health-related records without being able to clearly pinpoint what (final) development stage is actually aimed for or has been reached so far.

Use of EHRs in connection to national eArchiving service

In 2002, the Finnish Government made the decision for "nationwide electronic patient records (to) be introduced by the end of 2007"38. The National Health Project Program was launched and an electronic patient record project was included in the program. Until that time, every service provider had its own patient record system and these systems usually were not interoperable. In 2004, the development of a core or minimum data set for use in all electronic health record systems begun. The Finnish minimum data set contains the following core data elements: information for patient identification, clinical data (such as diagnoses, investigations, procedures, medications, nursing data, physiological measurements etc), health risk data and other data, as e.g. a treatment will or an organ donor will. Until the fall of 2009, extensions to the core data set for specific clinical domains had been developed for: emergency care, occupational health, dental health, respiratory diseases, psychiatry, diabetes and vascular disease treatment and prevention, and maternity and child care.

In December 2006, the Parliament decided to introduce a national EHR archive (eArchive) in order to enable access and exchange of patient information across healthcare service provider organisations at the point of care, based on patient consent. KanTa, the National Archive of Health Information, will be composed of several national medical information systems: the ePrescription and national Pharmaceutical database, the eArchive (electronic archive of patient records) and online access for citizens to their personal prescription and medical record data.[39]

For the use of EPRs, a national digital archiving service has been set up for health service providers, in which every organisation has their own patient record archive. However, the structure of the archives is uniform. All public service providers are obliged to have their patient record archive in the new system and private providers have to join the system if they have electronic archives. Every service provider will

[38] Decision-in-Principle by the Council of State on securing the future of health care, issued in April 2002

[39] Jylhä and Saranto 2008

have access to all archives through the national index service, controlled by patient consent. According to the original law, the system should be fully functional in 2011; however, the deadline is being postponed to 2014. From a technical perspective, all EHR systems joining the national eArchive are obliged to use a predefined structure. Finnish registries use international classification systems such as ICD-10 and ICPC-2 and the EHR minimum data set will also to a large extent be coded on the basis of these classification systems. The codes needed for the minimum data set (which essentially acts as a patient summary) are provided to EHR systems developers via the national code server. The accomplishment and implementation of the structured content of data, core data definitions, and national classifications and code services have prepared the ground for collaboration between patient data systems. Several regional services with most of the required functionalities are routinely operational. According to the future law, all public service providers will be obliged to provide data to the national eArchive by 2014, and the private providers by 2015 if they maintain electronic archives. The data, which is included in the Finnish national archive, will be expanded gradually. In the firs phase is the following:

Data stored in the Finnish national eArchive:

First phase

- Administrative/ demographics
- Electronic medication record
- GP record/ summary
- Medical record
- Referral and discharge letters
- Laboratory results
- Radiology reports
- Summary of nursing information
- Emergency care data
- Log information

Next steps

- Radiology, endoscopy etc images
- Medical statements
- Dental healthcare
- Biosignals

The Finnish eArchiving solution to EHR interoperability is not strictly speaking a Patient Summary solution. In its basic form, the records of each healthcare provider are archived and accessed separately. It is likely that a Patient Summary view, combining core data from the different EHRs, will be developed within the eArchiving

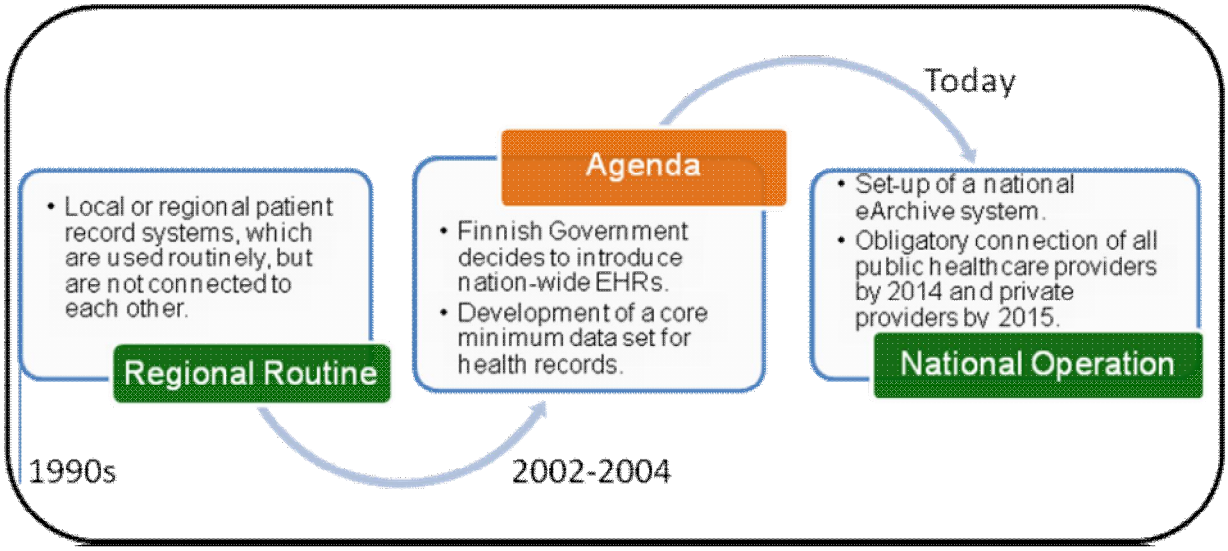
service, although such a view has not yet been specified. The current law only obliges to include “search information” such as the patient’s unique identifier, healthcare service provider information and treatment period information in healthcare providers’ records.

Although storage space for patient files, especially in hospitals[40], is seen as a challenge, the main challenge elated to EHR systems in Finland is the fragmented architecture of EHR systems. This affects both storage and proper retrieval and overview of medication information, as it can be stored in different parts of the EPR system. For instance, within an electronic patient record system, medication information may need to be entered separately in the physician's orders, the medication list, nursing care plans, nursing notes and patient information flow sheets – components which are currently not interoperable. All this means that healthcare professionals have to make several entries in order to fully document patients' medication information. In addition, changes in medication information have to be updated at every entry in order to make the new information available to all professionals with a legitimate concern in the matter. This merits consideration, as duplicated documentation and copy-paste methods used across non-interoperable systems expose patients to errors in medication care.[41] With regard to the realization of the national level plans, the main challenge to be overcome in the near future is the upgrading of existing organisational and regional systems to the required national standards.

[40] European Patients Smart and Open Services (epSOS)

[41] Korppas L and Rika 2010

Figure 4: Patient summary in Finland



3.2.2 ePrescription[42]

In the framework of this study and following work in epSOS[43], ePrescription is understood as the process of the electronic transfer of a prescription by a healthcare provider to a pharmacy for retrieval of the drug by the patient. In this strict sense, only few European countries can claim to have implemented a fully operational ePrescription service.

In 2002,a national ePrescription pilot was launched in Finland, which included the electronic transmission of prescriptions to collaborating pharmacies and decision support. The pilot was stopped because the system was not technically ready for implementation. However, all the experiences were reported and evaluated.

After that, the actual technical construction of the system took two years, and the first clinical pilot started in 2004. By the end of 2005, two out of four piloting healthcare units had implemented ePrescription in the electronic patient record. In spring 2005, the organisation of the national pilot was changed to a major consultancy company, which reorganised the administration entirely. The amount of produced ePrescriptions remained very small with about 1075 electronic prescription issued.

[42] Valkeakari 2008

[43] European Patients Smart and Open Services (epSOS)

Construction of a central ePresription database

Between the stop and the relaunch of the pilots, legislation on ePrescriptions was accepted by the Parliament in December 2006 and placed in effect in 2007.[44] This will lead to a central ePrescription database, hosted by the Social Security Institution (KELA). The ePrescription database is meant to be fully integrated with the different existing ePrescription systems. As mentioned in section 3.2.1 on electronic patient records, the full implementation of electronic prescribing is connected to the realisation of the National Archive of Health Information (KanTa).

During 2008, one of the main issues in the field of eHealth has been building the national ePrescription system. The central ePrescription database, hosted by the Social Security Institution (KELA), is functioning. ePrescription pilots started again in May 2010 in the first region.

Once ePrescription is fully operational, doctors can issue and sign ePrescriptions electronically as well as store them in the centralised system (Prescription Center). The Prescription Centre is a national database that stores the ePrescriptions and the dispensing entries made by pharmacies. During the first 30 months the ePrescriptions will have to remain readily available in the so called “active electronic prescription centre”. After this period the prescriptions will be automatically transferred to a long term electronic archive, where they are stored for 10 more years and after which the data need to be destroyed. When all of the prescriptions made out to a patient are stored centrally in the Prescription Centre, doctors and nurses can, with patient consent, review the patient's medication regime in order to prevent adverse drug interactions and duplications. Patients may also request a pharmacist or assistant pharmacist to review their medication.

Reuse of medication information

After the implementation of the ePrescription system, all healthcare units and pharmacies will furthermore have access to a single Pharmaceutical Database. It contains information necessary for the prescribing and dispensing of pharmaceuticals, including their prices and compensability and any interchangeable products. The database also covers compensable emollients and clinical nutrients. Even after the implementation of the ePrescription system, patients will continue to have the right to choose to receive their prescription on paper.

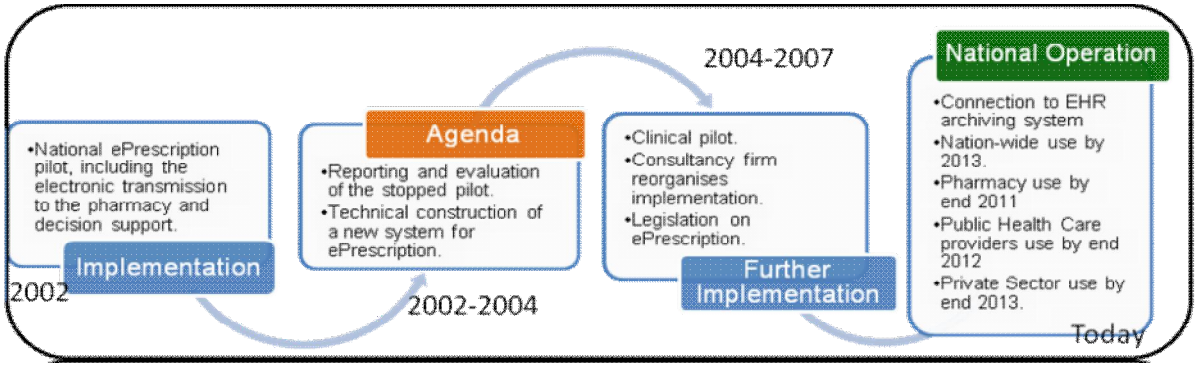
Generally, the reuse of the collected medication data is possible, as prescription information can be used for supervision, drug safety operations, payment of drug reimbursements, and research for a period of up to 10 years following data removal from the Prescription Centre.

Remaining challenges have been identified with regard to the following issues; impact of the introduction of the new system on ways of working; negative attitudes among some of the healthcare professionals; the unavoidable overlapping time of

[44] The prescriptions are part of the EHR and thus electronic, but must be transmitted to the pharmacies by paper (and signature) – thus, they are not ePrescriptions in the sense of the epSOS definition.

the old and new system being simultaneously in use; unknown realization of the expected benefits[45].

Figure 5: ePrescription progress in Finland



3.2.3 eView and citizens' eHealth services

Complementing the eArchiving and ePrescription services, eView is a service for citizens wishing to view their own eHealth information This service is an integral part of the national eHealth services, and is already functional for the ePrescription data included in the ongoing pilot. The eView service is seen as a key tool for empowerment of citizens in the maintenance of their own health and in their participation in their care plan.

Citizens can view their personal information over the Internet. They can view their prescription information and patient records and print out a summary of their e-prescriptions. The patient records only show information approved by a medical professional.

Access to one's personal information requires authentication with an online banking code or electronic ID.

E-prescriptions and dispensing data are available for view for a total of 30 months or 2.5 years from when the e-prescription was issued. Information stored in the electronic archive of patient records is available for as long as it remains in the archive (usually life long).

The eView service is one basis for an extensive program of citizen-oriented electronic health and social services, being developed as a part of a cross-sectoral

[45] European Commission 2008

governmental policy program for citizen's electronic services (SADe program, 2010 - 2014),

3.2.4 Standards[46]

Standards are not only crucial to enable interoperable exchange of meaningful information in the healthcare system; they also ensure secure access to patient records by healthcare providers and citizens. This study aims to identify, among other usage, standards related to the domain of health informatics, such as the SNOMED Clinical Terms or the LOINC terminology.

THL Unit for eHealth and eWelfare and SAINI as main providers

In Finland, the THL Unit for Information Structures and Classifications is responsible for maintaining, producing and disseminating the most important classifications in social and healthcare. This provision of standards is connected to the development of national electronic health record systems, as it demands a consensus on open standards for interoperability.

Currently, the deployment of the eHealth structure is based upon nationally approved terms, classifications and codes, which are updated by the national code server. Furthermore, a nationally selected set of standards has been defined, based on international standards such as HL7, CDAR2, ISO/OID or DICOM. But still, critics say that common standards – both technical and especially semantic – are too few in Finland.

On a different area of standardization, the project SAINI, coordinated by SITRA and involving the Ministry of Social Affairs and Health, The Social Insurance Institution of Finland, the National Public Health Institute, the Association of Finnish Local and Regional Authorities, the Finnish Centre for Health Promotion and other partners proposed a roadmap for the implementation of online healthcare services for citizens.[47] The objective of the proposed architecture was to standardise technical solutions and services of present and future electronic services for citizens - particularly those that support citizens' health-related decision making, as well as the interaction and information flow between professionals.

3.2.5 Telemedicine[48]

The use of telemedicine applications is recognised as beneficial to enable access to care from a distance and to reduce the number of GP visits or even inpatient admissions. Commission services define telemedicine as "the delivery of healthcare services through the use of Information and Communication Technologies (ICT) in a situation where the actors are not at the same location"49. In its recent

[46] Population Register Centre
[47] National Supervisory Authority for Welfare and Health
[48] Vuorenkoski, Mladovsky et al. 2008
[49] Finnish Government 1999

communication on telemedicine for the benefit of patients, healthcare systems and society, the Commission re-emphasises the value of this technology for health system efficiency and the improvement of healthcare delivery[50].

First experiments with telemedicine took place as early as 1969 and Finnish representatives have participated in telemedicine surveys and projects supported by the Nordic Council of Ministers and the Nordic University Network since the early 1990s. In 1999 for example, over 200 smaller telemedicine projects were registered, which were mostly conducted by hospitals.

Since then, a wide range of applications has been implemented and been running as a regular service in Finland, including the following:

Telemedicine applications in Finland:

- Teleconsultation (emergency transportation)
- Telediagnosis
- Telemonitoring
- Telelaboratory services
- Videoconferences (telepsychiatry, teleophtalmology)

Specifically, digital radiological image transmission is a standard procedure in major hospitals and teleradiology is also available in all university hospitals and in most central hospitals. Teleconsultation is not a common practice overall, but within certain specialties and patient groups (e.g. telestroke services) the services between hospitals are efficient.

Early experiences (1969) and further implementation of telemedicine

The service of consultations by televideoconferencing has increased since 2003. But in Finland, a direct televideoconferencing between the physician and the patient at their home is available only experimentally or in restricted pilot projects.

Overall telemedicine is regarded to be a positive solution to overcome geographical distances rather then a risk for patient safety. For future developments, the Finnish eHealth roadmap furthermore emphasises the importance of telemedicine in relation to the mobility of doctors. It is stated that “there will be companies renting out doctors, and some health centres will use these services when organizing their on-call duty rosters. The patient’s right to choose a service provider will probably change in the future. In view of the jurisprudence of the European Court of Justice, this has already happened in certain cases involving the procurement of services from another Member State”.

[50] Finnish Government 2000

3.3 Technical aspects of implementation

A key prerequisite for the establishment of an eHealth infrastructure is the ability to uniquely identify citizens/patients and healthcare professionals. This part of the survey deals with identifiers and how they are stored. This section does not deal with the tokens through which identification can or will take place. One such possibility would be via an eCard. This topic is dealt with in the following section. The current section focuses solely on whether or not unique identifiers are in place in Finland and for which purpose.

3.3.1 Unique identification of patients

The Finnish personal identity code or Finnish Unique Identifier (FINUID, or SATU in Finnish) is issued by the Population Register Centre to citizens born in or outside Finland on the basis of a birth certificate. FINUID is mapped to the Social Security Identity Number (SSIN, or HETU in Finnish), which functions as a unique identifier for Finnish citizens and permanent residents to eGovernment services. The personal identity code is needed in order to be able to apply for pensions and other benefits. It is also needed for the payment of wages, salaries and fees. The code is also essential in bank transactions, and the banks require it when one is opening an account.[51] A personal identity code is also issued to foreigners who reside in Finland for over a year or permanently.

When providing citizens with a personal identity code, the Population Register Centre creates also an electronic identity for them (FINEID). The electronic client identifier is used for electronic user identification in secure online transactions. It is a dataset consisting of a series of numbers and a check character that helps identify Finnish citizens and, in accordance with the Municipality of Residence Act, foreign citizens permanently residing in Finland who are entered in the Population Information System.

The electronic client identifier is activated only when a person receives a certificate card, utilising the Population Register Centre's Citizen Certificate, for instance a chip ID card. The Citizen Certificate is an electronic identity, which contains, among other information, a citizen's first name, last name and an electronic client identifier.

3.3.2 Unique identification of healthcare professionals

In Finland, the National Supervisory Authority for Welfare and Health "Valvira" grants, upon application, the right to practice as a licensed or authorised professional and authorises the use of the occupational title of healthcare professional.

Under Finnish law, licensing is granted to the following professions:

[51] Ruotsalainen, Doupi et al. 2007

Licensed professions in Finland:

Physician, dentist, pharmacist, psychologist, speech therapist, dietician, dispenser, nurse, mid-wife, public health nurse, physiotherapist, medical laboratory technologist, radiographer, dental hygienist, occupational therapist, optician and dental technician.

The protected occupational titles as defined in the Decree on Healthcare professionals are:

Occupational titles in Finland:

Orthopaedic technician, podiatrist, trained masseur, chiropractor, naprapath, osteopath, practical nurse for social and healthcare, psychotherapist, hospital physicist, hospital geneticist, hospital chemist, hospital microbiologist and hospital cell biologist.

Professionals entitled to use a protected occupational title are entered into the central register of healthcare professionals "TERHIKKI", maintained by the National Supervisory Authority for Welfare and Health.

The National Supervisory Authority for Welfare and Health can also grant an authorisation to practice to nationals of countries outside the EU/EEA and who have obtained their qualifications in a country outside of the EU/EEA.

3.3.3 The role of eCards[52]

FINEID - Smart Citizen ID-card with PKI-based certificate

Persons registered in the population register are issued an identity card only if they apply for one and since 1999 (following studies undertaken from 1995 to 1997) the only available identity card has been the electronic FINEID card. FINEID is a smart Citizen ID-card with PKI-based citizen certificate. The data and certificates of the cards are provided by the Population Register, which acts as the issuing organisation; however FINEID cards are applied for and distributed by the local police.

Since the card is not mandatory and carries an out-of-pocket cost, very few people own one (by the end of June 2009, Citizen Certificates had been issued to a total of 259,000 people). Up to this point, only a small amount of services are available where the card can be used, but certain municipalities are already offering eHealth services based on patient identification by the Citizen Certificate (or alternatively, the eBanking identification, which is also based on the Population Register data and certificates). Instead passports are more common as travel documents and drivers licence are more common as identity documents.[53]

[52] Hämäläinen, Reponen et al. 2007

[53] IDABC, Country Profile Finland (update), 2009.

Health Insurance Card - KELA card

All permanent residents of Finland receive a personal health insurance card, the KELA card, which is distributed by the Finnish Social Insurance Institution "Kela"[54]. This card is a plastic card with one-dimensional bar codes, which is sent automatically and at no cost to everyone covered under the Finnish social security system. By presenting the card at the pharmacy or at private clinics, citizens can get a direct reimbursement of the service costs (i.e. a discount equal to the amount covered by KELA). Until mid-October 2008, KELA used to also issue card with a photograph of the card holder which functions as identification in KELA offices, banks and post offices, as well as other organisations which choose to accept it as an official ID (not, however, outside Finland). Renewal of these cards is possible until 2014.

ID card with health insurance data

There is also the possibility of combining the national ID card issued by the police with health insurance data, and thusallow the ID card to function as a KELA card (with the exception of including the indication of pensioner status). The ID card is valid for five years and costs 40 euros. It can be used as a travel document in many European countries and as authentication token when logging into various government online services. If the person's health insurance details change while the ID card is still valid, a renewal is in order (again for the fee of 40€).

European Health Insurance Card

The European Health Insurance card is also issued by KELA and it is available to everyone covered under the Finnish health insurance system (since March 2010, also to Finnish pensioners residing abroad). About 400.000 EHIC plastic cards have been distributed.

Related to data storage, Finland has made a policy decision that no health related information is saved on the eCards. Cards are used only for identification either when receiving healthcare services in person or for online services.

For the purpose of identification of healthcare professionals, there is also the VALVIRA smart card and certificate, which validates competences in order to access KANTA[55] applications and health related information. It is also possible to electronically sign documents and other data transferred in the healthcare information systems.[56] The card is based upon the VALVIRA Central Register of Healthcare Professionals TERHIKKI (established in 2009), which offers an authentic database describing the capacity and competences of the medical professional. The responsibility for verifying healthcare professional electronic identities is being transferred fro VALVIRA to the Population Register Centre in 2010.

[54] Kela operates under the supervision of Parliament. The administration and operations of Kela are supervised by 12 trustees appointed by Parliament and 8 auditors chosen by the trustees. Kela has a 10-member Board of Directors that manages and develops its operations.

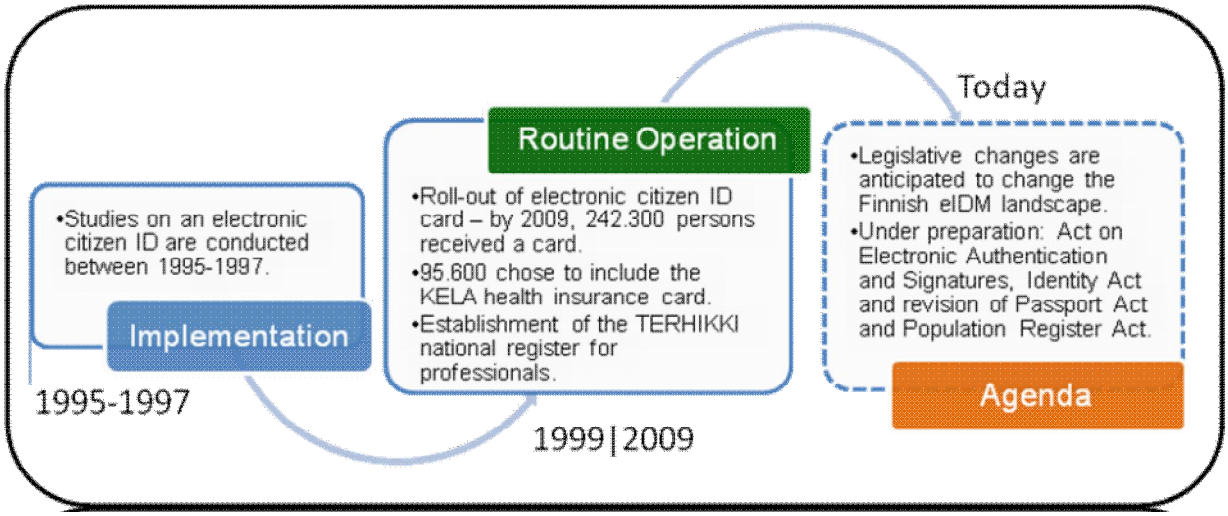
[55] KANTA is the national digital archive for health information, operated and maintained by the Social Insurance Institution (Kela).

[56] Hyppönen, Doupi et al. 2009

On a regional level, smart cards for a strong electronic identification of healthcare professionals are in use in 8/21 hospital districts and in 9% of the healthcare centres (2008 data). The rest of hospital districts and healthcare centres use a second password method with a password list or user names and passwords. In Finland, the former is available as a commercial solution of the banking sector and can also be applied in healthcare upon regional agreement within the healthcare system. The identifiers including user names and passwords had been fixed to the unambiguous identity number of an employee in 13 of the 21hospitals districts and 39% of the healthcare centres.

Challenging aspects regarding the development of eID and the deployment of eCards in are connected to the fact that there is a slow take-up of eCard technology due to slow spread of services facilitated by the same. Specifically with regard to healthcare, , the practical organisation of the smart card distribution to all healthcare professionals poses a logistic problem (organising the local registration and distribution facilities in the hospital districts), as well as financial burden, for local systems upgrade in order to be integrated into the national system.

Figure 6: eCards in Finland



3.4 Legal and regulatory facilitators

Legal and regulatory issues are among the most challenging aspects of eHealth: privacy and confidentiality, liability and data-protection all need to be addressed in order to make eHealth applications possible. Rarely does a country have a coherent set of laws specifically designed to address eHealth. Instead, the eHealth

phenomenon has to be addressed within the existing laws on professional liability, data protection etc.

As briefly mentioned in section 0, there are several important legal acts in Finland, which are connected to the deployment of a health information structure and eHealth applications. These are:

Legal acts related to eHealth:

Personal Data Act from 1999[57]

Act on Experiments with Seamless Service Chains in Social Welfare and Care Services from 2000

Decree on the Storing of Patient Data from 2001[58]

Act on the Use of Electronic Social and Healthcare Client and Patient Information from 2007, also called the Client Data Act

Legislation on the Use of ePrescription from 2007

The objectives of the **Personal Data Act** are "to implement, in the processing of personal data, the protection of private life and the other basic rights which safeguard the right to privacy, as well as to promote the development of and compliance with good processing practice". This includes the collection, recording, organisation, use, transfer, disclosure, storage, manipulation, combination, protection, deletion and erasure of personal data. It is stated that a healthcare unit or a healthcare professional is allowed to process data "collected in the course of their operations and relating to the state of health, illness or handicap of the data subject or the treatment or other measures directed at the data subject, or other data which are indispensable in the treatment of the data subject". The Act sets conditions for the exchange of information (i.e. patient data) between different register controllers and for the storage of information in data files. Article 3 §13 stresses that sensitive data should be erased from the data file immediately when there is no longer a reason for its processing. The reason and need for processing shall furthermore be re-evaluated at five-year intervals at the longest.

The **Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Services and with a Social Security Card** entered into force on 1.1.2000, with an original period of validity until the end of 2003. As of 1.1.2004, the Act was expanded to cover the whole country and its period of force was extended until the end of 2005. The Act was aiming to "to gain experience of arranging seamless service chains, and of ways of optimising the use of information technology so that it answers the needs of the clients of social welfare and healthcare services and general social protection, and of establishing how best to

[57] Act on Personal Data of 22 April 1999/523;

[58] Decree on the Storing of Patient Data 2001/99

allocate information technology resources in these activities in a sensible way". In relation to reference health data, it defines that this data can be disclosed when: 1) there is a written consent of the client 2) for the purposes of scientific research and statistics according to the Act on the Openness of Government Activities or other legislation and 3) in situations such as the issuing of new cards by the insurance company, where the consent of the client cannot be obtained. The main focus of the legislation was to support the development of regional cooperation for seamless services, promote continuity of care and advance the building of regional information service systems and adapters between existing legacy systems.

The Decree on the Storing of Patient Data of 2001 regulates the management of medical records and related documents such as referrals, laboratory results and radiology documents. The Decree regulates in a detailed way the design and implementation of patient data storing systems, the right of access to the documents, the right to make entries in the documents, the minimum level of information to be registered about the patient, illness and treatment time entries etc.

The Client Data Act from 2007, covers archive services, encryption and certification services as well as the patient's access to data. The Client Data Act provides the patient with a right to a medical record, carefully updated and safely stored by the health professional. Medical records need to be kept in electronic format. By 2011 the law requires all public healthcare units as well as private healthcare units that do not use paper-based archives, to be incorporated into the electronic archiving system. Article 11 of the Act specifies that a medical record should consist of at least a so called General Medical Record (GMR) and a patient consent record. One GMR should be kept for every patient by the general practitioner in charge of the patient's treatment. The Act also states that the national eArchiving service for electronic patient records will be maintained by the Social Insurance Institution (Kela)[59], using a unique number per patient. The archive will be accessible to all physicians who are involved in the provision of care to the patient, after obtaining consent. Individuals have access to their own patient records, are entitled to see the access log of their care record and to obtain a copy.

According to the **Act on the Use of Electronic Prescription** and the Decree of the Ministry of Social Affairs and Health (which entered into force on 1.1.2008), electronic prescriptions are allowed for medicines for human use. The law further states that the central national electronic prescription database will be maintained by KELA, the Social Insurance Institute of Finland. In this system prescriptions will be sent directly in electronic form from the physician's office to the central database to which pharmacies have electronic access. All service providers are obliged to make prescriptions electronically by 2011. Patients' consent is not required for writing an electronic prescription, but the patient will still have the possibility to deny the use of

[59] Article 14

an electronic prescription and receive his prescription on paper. When the prescription is made electronically, the patient does have to be informed about the national data base service so that he is aware of the data exchange and archiving operations that will take place. The fact that the patient is provided with this information has to be noted in the patient's record in order to free the healthcare provider from the obligation to obtain consent.

3.5 Financing and reimbursement issues

In Finland, funding for health technology systems is mainly provided by public and private sources. Private funding for ICT support has been secured since 1998 through research and development programmes of the Finnish Funding Agency for Technology Development and Innovation(TEKES[60]). TEKES provides funding for companies and consortia, for example through the "FinnWell programme", and also direct corporate funding. Healthcare organisations spend about 2% to 3% of their operating budget on IT.

The Ministry of Social Affairs and Health has financed and continues to finance work on national specifications through separate budget funding (e.g. Association of Finnish Local and Regional Authorities, THL, KELA, HL7 Association). The Ministry of Social Affairs and Health has provided EUR 11 million cluster projects between 2006 and 2009 (50% funding contribution). ESF funding has also been used in development projects. The central government has contributed a total of EUR 33 million to the construction and introduction of national services (archive, prescription centre, eView for citizens) between 2006 and 2010, and plans to be contributing 55 million EUR between 2011 and 2014 for development, implementation and operation of the system. Thereafter, services will be funded through user fees collected from healthcare providers.

In sum it can be stated that, although ambitious, Finland's eHealth plan is being delivered on a fairly modest budget.

Generally, the financing for healthcare IT projects has been provided through several channels. Thereby, the coordination of financing and the lack of permanent budget funding have proved to be challenging. Also, financial management has been shown to be insufficiently effective in ensuring uniform implementation.

3.6 Evaluation results/plans/activities

From a public policy perspective, evaluation is a key activity in the policy-cycle. It provides insights into the success or failure of a policy or project and leads to new policy goals and new methods of implementation. The need for evaluation of eHealth

[60] Every year, Tekes grants around EUR 600 million towards innovative projects aimed at generating new know-how and new kinds of products, processes, and service or business concepts. Funding is also available for developing work organisations.

policies and projects has been stressed time and again by the EC, not least in order to further the spread of eHealth in the process of healthcare delivery.

Finnish "Check Point Reports" from 2003, 2007 and 2008 evaluate eHealth

Evaluation activities in Finland are mainly carried out by THL or the Ministry of Social Affairs and Health. Past evaluations of the progress made in nation-wide eHealth deployment have been published under the so-called "Check Point Reports", so far published in 2003, 2007[61] and 2008. Also evaluations focusing on specific topics, such as e.g. the first ePrescription pilot have also been undertaken (see section 3.2.2, when the ePrescription pilot was stopped and an assessment was carried out in order to understand remaining technical and organisational obstacles.

During the period 2003-2007, regional pilots of EHR core data development and implementation funded by the Ministry were also subjected yearly to evaluation by the Ministry of Social Affairs and Health (internal reporting).

With regard to the national eHealth implementation plans, it is still too early to evaluate the changes in care processes and the possible impact on healthcare quality, safety and effectiveness. However, the need to follow up the change and its effects on citizens and professionals has been identified by the Ministry of Social Affairs and Health. The planning of a large scale evaluation of the national eHealth developments has been started. In the fall of 2008, the Ministry commissioned the National Institute for Health and Welfare (THL) over a 6 month period to draw up an evaluation framework for the national eHealth services. The project was finalised and delivered its final report in April 2009 (Stakes 2008c).

The evaluation plan framework was created as a joint effort of all interested research and development parties in Finland. The Finnish Ministry of Social Affairs and Health will still need to collaborate with funding bodies to create a platform for starting the actual evaluation work.

4 Outlook

Finland has been working on the development and deployment of IT in healthcare since the beginning of the 1990s and has since continuously raised questions of centralised systems and interoperable archives for data storage and access. These commencements were combined into an overarching project of electronic patient records, which includes different types of eHealth applications and system development. Hereby, the technical framework builds upon local health IT, which has been deployed by municipalities at an early stage.

[61] National Institute for Health and Welfare (THL) 2010

This development – especially the early political commitment and the drawing upon existing systems – made Finland a well-prepared country for any eHealth commitment. In recent years, it became apparent that the main obstacles Finland will face or is facing are interoperability issues of the different local systems and the high level of management and decision-making decentralisation, as this leads to overlapping IT investments and a lack of uniform terminology.

At present implementation is underway. The eArchiving system for citizen data – including health and medication information – is the crucial data node, which is directly linked to the EPR project. The Finnish Government is aiming to make the use of the system compulsory and declare full implementation by 2015.

In sum, it can be stated that the full deployment of the national EPR system will significantly change Finnish eHealth and it remains to be seen how aspects of decentralisation and interoperability will hinder full deployment and smooth working of the system in general.

5 List of abbreviations

DRG	Diagnosis Related Group
EC	European Commission
EEA	European Economic Area
EFMIA	European Federation for Medical Informatics
EHR	Electronic Health Record
EMR	Electronic Medical Record
EPR	Electronic Patient Record
epSOS	European patients Smart Open Services
ERA	European Research Area
EU	European Union
FINEID	Electronic Identity in Finland
FinnSHIA	Finnish Social and Health Association
FINUID/SATU	Finnish Unique Identifier
FSTeH	Finnish Society for Telemedicine and eHealth
GDP	Gross Domestic Product
GP	General Practitioner
HCP	Healthcare Provider
HL7	Health Level Seven International (authority on standards for interoperability)
HMO	Health Maintenance Organisation
HPC	Health Professional Card
HTA	Health Technology Assessment
ICT	Information and Communication Technology
ID	Identification (e.g. number, card or code)
IHTSDO	International Health Terminology Standards Development Organisation
IMIA	International Medical Informatics Association
IT	Information Technology
KanTa	Finnish National Archive of Health Information

KELA	Social Insurance Institution of Finland
LSP	Large Scale Pilot
MSAH/STM	Ministry of Social Affairs and Health
NHI	National Health Insurance Scheme
OECD	Organisation for Economic Co-operation and Development
PARAS	Restructuring Municipal Services Project
PHS	Personal Health System
R&D	Research and Development
SSIN/HETU	Social Security Identity Number
SNOMED	Systematized Nomenclature of Medicine-Clinical Terms
TEKES	Finnish Agency for Technology and Innovation
TERHIKKI	Central Register of Healthcare Professionals
THL	National Institute for Health and Welfare
VALVIRA	National Supervisory Authority for Welfare and Health
WHO	World Health Organization

6 Annex

6.1.1 Annex 1: Compound indicators of eHealth use by GPs

Compound indicator name	Component indicators	Computation
Overall eHealth use	- Electronic storage of individual medical patient data - Electronic storage of individual administrative patient data - Use of a computer during consultation with the patient - Use of a Decision Support System (DSS) - Transfer of lab results from the laboratory - Transfer of administrative patient data to reimbursers or other care providers - Transfer of medical patient data to other care providers or professionals - ePrescribing (transfer of prescription to pharmacy)	Average of component indicators
Electronic storage of individual medical patient data	- A2a - Symptoms or the reasons for encounter - A2c - Medical history - A2c - Basic medical parameters such as allergies - A2d - Vital signs measurement - A2e - Diagnoses - A2f - Medications - A2g - Laboratory results - A2h - Ordered examinations and results - A2i - Radiological images - A2j - Treatment outcomes	Average of component indicators
Electronic storage of individual administrative patient data	- A1 - electronic storage of individual administrative patient	A1 value
Use of a computer during consultation with the patient	- B2 - Computer use during consultation	B2 value
Use of a Decision Support System (DSS)	- B3a - Availability of DSS for diagnosis - B3b - Availability of DSS for prescribing	Average of component indicators
Transfer of lab results from the laboratory	- D1e - Using electronic networks to transfer prescriptions electronically to dispensing pharmacists?	D1e value
Transfer of administrative patient data to reimbursers or other care providers	- D1a - Using electronic networks to exchange of administrative data with other healthcare providers - D1b - Using electronic networks to exchange of administrative data with reimbursing organisations	Average of component indicators
Transfer of medical patient data to other care providers or professionals	- D1c - Using electronic networks to exchange medical data with other health care providers and professionals	D1c value
ePrescribing (transfer of prescription to pharmacy)	- D1d - Using electronic networks to transfer prescriptions electronically to dispensing pharmacist	D1d value

Dobrev, Haesner et al. 2008

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