

eHealth Roadmap - Finland

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DOCUMENTATION PAGE

Publisher: Ministry of Social Affairs and Health, Finland		Date	
Authors Coordination Group for international cooperation on eHealth Chairman: Eero Lahtinen Secretary: Annakaisa Iivari Writers: Annakaisa Iivari and Pekka Ruotsalainen		Type of publication Working Group Memorandum	
		Commissioned by Ministry of Social Affairs and Health	
		Date of appointing the organ 18 March 2005	
Title of publication: eHealth Roadmap - Finland			
Summary The European Union's eHealth Action Plan (COM 2004(356)) called for the member states to draw up their national eHealth Roadmaps by the end of 2006. Finland's eHealth Roadmap is a continuation of the work with national strategies started in the middle of the 1990s. It gathers together the major policy definitions and achievements of the national development work from the last ten years and outlines future challenges in particular in relation to cooperation at the European level. Finland's national objective is to secure the access to information for those involved in care regardless of time or place. The means used to achieve that objective have included a comprehensive digitalisation of patient data, development of the semantic and technical compatibility of the electronic patient record systems in regard to the entire content of a record, development of the national health care infrastructure and information network solutions, identification and verification solutions and electronic signature, and also maintaining of information that supports decision-making on the net. Another major objective is to enable the involvement of citizens and patients, to increase the citizens' access to information and to ensure a high quality of health information. The measures have included development of a health information portal for citizens, providing citizens an access to their own patient/health records and log information, and enhancement of interactive electronic services. Finland's objectives are mainly compatible with the national objectives of other EU member states and the EU level objectives defined by the European Commission. It is characteristic of the Finnish approach to emphasise data security and data protection and to develop the systems in a way that is sustainable from an ethical and juridical point of view. According to the Finnish policy definitions the storing and use of health information is based on networked corporate data with a high data security. The infrastructure for eHealth is comprehensive in Finland. The Coordination Group expects that the demand for European cooperation will increase in the next few years. It states that in regard to eHealth the Ministry should assume the responsibility for international preparation at the political and strategic level. The expert institutions (Social Insurance Institution, National Authority for Medicolegal Affairs, National Research and Development Centre for Welfare and Health STAKES) should take part in international cooperation in accordance with their national areas of responsibility. The Ministry should organise the coordination of international cooperation and develop the exchange of information so that the various actors involved promote the jointly defined objectives in international activities. It must be ensured at the same time that there are adequate resources available for the international cooperation. The Coordination Group proposes organising the cooperation for instance by setting up a subcommittee responsible for international cooperation under the Advisory Committee on Electronic Information Management in Social Welfare and Health Care.			
Key words electronic identification, electronic services, health, health care, international cooperation, patients, portals			
Other information: www.stm.fi/english			
Title and number of series Reports of the Ministry of Social Affairs and Health 2007:15		ISSN 1236-2115	ISBN 978-952-00-2285-3 (paperpack) 978-952-00-2286-0 (PDF)
Number of pages: 31	Language: Finnish	Price: 10.80 €	Publicity: Public
Orders Helsinki University Press PO Box 4 (Vuorikatu 3 A) FI-00014 HELSINKI UNIVERSITY, FINLAND		Financier Ministry of Social Affairs and Health	

KUVAILULEHTI

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		HARE-nro ja toimielimen asettamispäivä STM017:00/2005, 18.3.2005	
Julkaisun nimi Suomen eTerveys -tiekartta			
Tiivistelmä <p>Euroopan unionin eHealth Action Plan (COM 2004(356)) on asettanut jäsenmaille vaatimuksen laatia kansallinen eTerveyden tiekartta vuoden 2006 loppuun mennessä. Suomen eTerveys-tiekartta on jatkumoa 1990-luvun puolessa välissä alkaneelle kansalliselle strategiatyölle. Se kokoaa yhteen kymmenen viime vuoden kansallisen kehittämistyön keskeiset linjaukset ja aikaansaannokset ja linjaa tulevia haasteita erityisesti suhteessa Euroopan tason yhteistyöhön.</p> <p>Suomen kansallisenä tavoitteena on tiedon saatavuuden varmistaminen hoitoon osallistuville ajasta ja paikasta riippumatta. Tähän on pyritty asiakastietojen kattavalla digitalisoinnilla, sähköisten potilaskertomusjärjestelmien semanttisen ja teknisen yhteistoiminnallisuuden kehittämisellä koko kertomuksen sisällön osalta, kansallisen terveydenhuollon infrastruktuurin ja tietoverkkoratkaisujen kehittämisellä, tunnistamis- ja todentamiskäytännöillä ja sähköisellä allekirjoituksella sekä ylläpitämällä päätöksentekoa tukevaa tietoa verkossa.</p> <p>Toisena keskeisenä tavoitteena on kansalaisen ja potilaan osallistumisen mahdollistaminen ja kansalaisen tiedonsaannin lisääminen ja laadukkaan terveystiedon varmistaminen. Tähän pyritään kansalaisen terveystietoportaalin kehittämisellä, tarjoamalla kansalaiselle pääsy omiin potilas/terveystietoihin ja lokitietoihin sekä kehittämällä interaktiivisia sähköisiä palveluita.</p> <p>Suomen tavoitteet ovat pääosin yhteneväiset muiden EU:n jäsenmaiden kansallisten tavoitteiden sekä komission linjaamien EU-tason tavoitteiden kanssa. Ominaista suomalaiselle toteutukselle on tietoturvan ja tietosuojan korostaminen sekä kehittämistyön toteuttaminen eettisesti ja juridisesti kestäväällä tavalla. Suomen linjausten mukaan terveystietojen tallettaminen ja käyttö perustuu verkotettuihin tietoturvallisiin tietovarantoihin. eTerveyden perusinfrastruktuuri on Suomessa kattava.</p> <p>Työryhmän näkemyksen mukaan eurooppalaisen yhteistyön tarve korostuu tulevina vuosina. Työryhmä toteaa, että ministeriön tulisi vastata eTerveyteen liittyvästä poliittisen ja strategisen tason kansainvälisestä valmistelusta. Asiantuntijalaitosten (Kela, TEO, Stakes) tulisi osallistua kansainväliseen yhteistyöhön kansallisten vastuidensa mukaisesti. Ministeriön tulisi järjestää kansainvälisen yhteistyön koordinointi sekä kehittää tiedonvaihtoa siten, että eri toimijat edistävät yhteisesti määriteltyjä tavoitteita kansainvälisessä toiminnassa. Samalla tulee varmistaa, että kansainväliseen yhteistyöhön on käytettävissä riittävät resurssit. Työryhmä esittää, että yhteistyö organisoitaisiin esimerkiksi perustamalla tulevan sosiaali- ja terveydenhuollon sähköisen tietohallinnon neuvottelukunnan yhteyteen kansainvälisestä yhteistyöstä vastaava jaosto.</p>			
Asiasanat: kansainvälinen yhteistyö, sähköinen asiointi, sähköinen tunnistaminen, terveydenhuolto, terveys, portaalit, potilaat			
Muut tiedot www.stm.fi			
Sarjan nimi ja numero Sosiaali- ja terveysministeriön selvityksiä 2007:15		ISSN 1236-2115	ISBN 978-952-00-2285-3(nid.) 978-952-00-2286-0 (PDF)
Kokonaissivumäärä 31	Kieli Suomi	Hinta 10,80 €	Luottamuksellisuus Julkinen
Jakaja Yliopistopaino Kustannus PL 4 (Vuorikatu 3 A) 00014 HELSINGIN YLIOPISTO		Kustantaja Sosiaali- ja terveysministeriö	

PRESENTATIONSBLAD

Utgivare: Social- och hälsovårdsministeriet		Utgivningsdatum	
Författare (Uppgifter om organet: namn, ordförande, sekreterare) Koordinationsgruppen för internationellt e-Hälsosamarbete Ordf. Eero Lahtinen Skr. Annakaisa Iivari Författare: Annakaisa Iivari		Typ av publikation	
		Uppdragsgivare Social- och hälsovårdsministeriet	
		Projektnummer och datum för tillsättandet av organet	
Publikationens titel: Finlands vägkarta för e-Hälsa			
Referat <p>Europeiska unionens eHealth Action Plan (COM 2004(356)) har ställt ett krav på medlemsländerna att utarbeta en nationell vägkarta för e-Hälsa senast vid utgången av år 2006. Finlands vägkarta för e-Hälsa är en fortsättning på det nationella strategiarbete som inleddes i mitten av 1990-talet. Den samlar ihop centrala riktlinjer för och prestationerna i det nationella utvecklingsarbetet under de senaste tio åren och drar upp linjerna för kommande utmaningar särskilt i förhållande till samarbete på Europainivå.</p> <p>Finlands nationella målsättning är att trygga tillgången till information för de personer som deltar i vården oberoende av tid och plats. Detta har man eftersträvat genom täckande digitalisering av klientuppgifter, utveckling av semantisk och teknisk samverkan av systemen för journalhandlingar med avseende på innehållet i hela handlingen, utveckling av infrastruktur och datanätlösningar för den nationella hälso- och sjukvården, lösningar för identifiering och verifiering och elektronisk underskrift samt genom upprätthållande av information som stöder beslutsfattande.</p> <p>En annan central målsättning är att göra det möjligt för medborgaren och patienten att delta, öka medborgarens information och trygga hälsoinformation av hög kvalitet. Detta försöker man genom att utveckla en hälsoinformationsportal för medborgaren, att erbjuda medborgaren tillträde till hans eller hennes egna patient-/hälsouppgifter och logguppgifter samt att utveckla interaktiva elektroniska tjänster.</p> <p>Finlands målsättningar är till huvuddelen sammanfallande med de nationella målen i de övriga medlemsländerna i EU samt med de mål på EU-nivå som kommissionen har dragit upp. Karakteristiskt för det finländska genomförandet är framhävandet av datasäkerhet och datasekretess och genomförandet av utvecklingsarbete på ett etiskt och juridiskt hållbart sätt. Enligt de finländska riktlinjerna baserar sig lagring och användning av hälsouppgifter på nätverkskopplade, dataskyddade databanker. I Finland är den grundläggande infrastrukturen för e-Hälsa täckande.</p> <p>Enligt arbetsgruppen framträder behovet av europeiskt samarbete under de kommande åren. Arbetsgruppen konstaterar att ministeriet borde ansvara för internationell beredning på politisk och strategisk nivå med anknytning till e-Hälsa. Expertinstitutionerna (FPA, Rättsskyddscentralen för hälsovården, Forsknings- och utvecklingscentralen för social- och hälsovården) borde delta i internationellt samarbete i enlighet med sitt nationella ansvar. Ministeriet borde ordna koordineringen av internationellt samarbete samt utveckla informationsutbytet så att olika instanser gemensamt främjar fastställda mål i den internationella verksamheten. Samtidigt skall man säkerställa att det finns tillräckliga resurser för det internationella samarbetet. Arbetsgruppen föreslår att samarbetet skall organiseras genom att t.ex. grunda en sektion med ansvar för internationellt samarbete i anslutning till delegationen för elektronisk informationsadministration inom social- och hälsovården.</p>			
Nyckelord Elektronisk identifiering, elektronisk kommunikation, hälsa, hälso- och sjukvård, internationellt samarbete, patienter portaler			
Övriga uppgifter: www.stm.fi/svenska			
Seriens namn och nummer Social- och hälsovårdsministeriets rapporter 2007:15		ISSN 1236-2115	ISBN 978-952-00-2285-3 (inh.) 978-952-00-2286-0 (PDF)
Sidoantal: 31	Språk: Finska	Pris: 10,80 €	Sekretessgrad: Offentlig
Försäljning Helsingfors Universitetsförlaget PB 4 (Berggatan 3 A) FI-00014 HELSINGFORS UNIVERSITET		Förlag Social- och hälsovårdsministeriet	

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1 BACKGROUND TO THE PREPARATION

Finland's eHealth Road Map is a follow-up to a national strategy launched in the mid-1990s. The Ministry of Social Affairs and Health published the 'Strategy for utilising information technology in the field of social welfare and health care in Finland' in 1996.¹ Its underlying principle was the development of seamless service chains, which was considered to require the extensive introduction of new technology, the creation of new types of information system architectures, and better compatibility between information systems.

Following on from the strategy, a regional architecture was outlined to enable the regional integration of client information systems from various suppliers on the basis of messages conveyed between the systems and a 'reference directory'. The reference ('patient record location reference information') here originally comprised data indicating which information system contained the actual electronic patient record required. The method chosen for integration was message handling rather than database integration, for instance. The message handling concept dovetailed with use of standards in the HL7 standard family,² which was already in widespread use in Finland at the time. Regional implementation began in Satakunta in 1998 and was then extended to the Hospital District of Helsinki and Uusimaa (HUS) and the Pirkanmaa region. To support regional deployment, the Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Services was enacted for the period 1 January 2001 to 31 December 2003. This period was later extended, and nearly all municipalities and hospital districts brought themselves into its domain. However, the regional implementation involved somewhat differing architectures, and what was to have been a reference directory became in practice a detailed data directory.

In 2003, a national electronic patient record system development project (2003-07) was set up as part of the National Health Programme. According to the Government Resolution of 11 April 2002, an integrated national electronic patient record system was to be introduced by the end of 2007. Implementation was organized 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 1/2004.³ In a follow-up report⁴ (1/2005), the principal requirements to which all electronic patient record systems should conform were published. Appropriations in the central government budget for regional development projects to implement these requirements totalled EUR 10 million in 2004, EUR 10 million in 2005 and EUR 5 million in 2006. A further EUR 5 million is budgeted for 2007. Also, municipal actors have at least matched this funding for development projects, which have been organized around system suppliers as project clusters coordinated at the national level.

The electronic patient record system development project demonstrated that centralized services at the national level are needed in addition to standardization of basic information systems and regional systems supporting their integration. The national-level services were defined in the na-

¹ Sosiaali- ja terveysministeriö: Sosiaali- ja terveydenhuollon tietoteknologian hyödyntämisstrategia. Työryhmämuistioita 1995:27. Helsinki 1996. [Ministry of Social Affairs and Health]

² HL7 = Health Level 7, an international organization for agreeing on the standards required for universal health care integration.

³ Sosiaali- ja terveysministeriö: Sähköisten potilasasiakirjojen valtakunnallinen määrittely ja toimeenpano. Työryhmämuistioita 2003:38. [Ministry of Social Affairs and Health]

⁴ Sosiaali- ja terveysministeriö: Sähköisten potilasasiakirjajärjestelmien toteuttamista ohjaavan työryhmän loppuraportti. Työryhmämuistioita 2004:18 [Ministry of Social Affairs and Health]

tional architecture formulated by the POKA working group in 1/2006.⁵ At the same time, development guidelines for information management cooperation between local and central government were drafted within the Information Society Programme (KuntaTIME). In this context, the creation of a centralized electronic archive for the health care sector emerged as an important spearhead project.⁶

The Information Society Programme ministerial committee chaired by Prime Minister Matti Vanhanen outlined the basic precepts of the national health care information system architecture in March 2006. These were incorporated into bills, which were submitted to Parliament and passed into law in December 2006 (Act on the electronic processing of health care and social welfare client data, HE 253/2006 [hereinafter the Client data act], and Act on ePrescriptions, HE 250/2006). The legislation requires health care organizations to join the national information system architecture within a specified transition period; this architecture's essential services include archiving and distribution of electronic patient records, a national prescription database, an electronic certification service for health care professionals, and a maintenance service for classifications, codes and terminology. Detailed specification of these national services will be completed in February 2007, and the services will be put online between 2007 and 2010.

A national social welfare IT development project has been launched alongside the parallel project in the health care sector.⁷ The solutions to be applied in the social welfare sector will follow those in the health care sector, as applicable.

In its communication on the eHealth Action Plan (COM 2004(356)), the Commission of the European Communities proposed that Member States should draw up eHealth Road Maps by the end of 2006. The Commission also put forward European targets for eHealth.

The purpose of this eHealth Road Map is to summarize the major national policy outlines during the past ten years and to chart future challenges, and also to present Finland's strategic outlines with regard to the European targets set by the Commission. The Road Map was drawn up by a working group appointed by the Ministry of Social Affairs and Health (STM). The working group (STM017:00/2005) met between 21 March 2005 and 31 December 2006 and comprised the following experts: Senior Medical Officer Eero Lahtinen, STM (chair); Ministerial Adviser Ralf Ekebom, STM (deputy chair); Ministerial Adviser Carin Lindqvist-Virtanen, STM; Ministerial Counsellor Heikki Savolainen, STM; Senior Officer Noora Heinonen, STM, and after her resignation from the Ministry, Senior Officer Merja Huovinen, STM; Senior Medical Officer Antti Huunan-Seppälä, Social Insurance Institution (KELA), replaced as of 19 May 2006 by Senior Medical Officer Kyösti Haukipuro, KELA; Research Professor Juhani Eskola, National Institute of Public Health (KTL); Development Manager Päivi Hämäläinen, National Research and Development Centre for Welfare and Health (STAKES); Development Manager Ritva Larjomaa, Association of Finnish Local and Regional Authorities; Special Advisor Pentti Itkonen, STM; Senior Officer Pirjo Sarvimäki, STM; and Senior Adviser Tero Kuitunen, Ministry of Trade and Industry. Each member had a personal deputy member. Those deputy members who participated in meetings were: Senior Officer, Legal Affairs Johanna Huovinen, STM; Press Officer Eija Hukka, KTL; Assistant

⁵ Sosiaali- ja terveysministeriö: Terveystieteiden tutkimuskeskuksen tietojärjestelmäarkkitehtuurin periaatteet. Alueellisista ratkaisuista kansalliseen kokonaisuuteen. Selvityksiä 2006:8. Helsinki 2006. [Ministry of Social Affairs and Health]

⁶ Valtioneuvoston kanslia: Kuntien ja valtion tietohallinnon yhteisten menettelytapojen ja koordinoinnin kehittäminen. Kehittämistyöryhmän loppuraportti. Valtioneuvoston kanslian julkaisusarja 10:2005. Helsinki 2005. [Prime Minister's Office]

⁷ Sosiaali- ja terveysministeriö: Tietoteknologian käytön edistäminen sosiaalihuollossa –hankesuunnitelma. Monisteita 2005:1. Helsinki 2005. [Ministry of Social Affairs and Health]

Director Jorma Järvisalo, KELA; Senior Adviser Riitta Masukoski, Ministry of Trade and Industry; Ministerial Counsellor Lauri Pelkonen, STM; EU Assistant Satu Koskenkorva, STM; and Research Professor Pekka Ruotsalainen, STAKES. Professor Ruotsalainen also wrote up the Road Map. The working group consulted the following experts: Hannu Hämäläinen, director of innovation strategy project, STAKES; System Manager Heljä-Marja Ketola, KELA; and Senior Medical Officer Matti Ojala, STAKES. The secretary of the working group was Project Manager Annakaisa Iivari, STM. The working group met seven times.

2 DESCRIPTION OF PRESENT STATE (SWOT)

Vis-à-vis the development of eHealth, Finland has several strengths. There is already a comprehensive basic IT infrastructure in health care. Electronic patient records are in use at almost every health centre. In special medical care, most units have introduced electronic patient records, and a number of units are in the process of doing so. Patient data are increasingly transmitted electronically between health care organizations; in some hospital districts, almost all referrals and nursing summaries are sent electronically. In imaging, regional transfers of radiological images are already routine. There are also various regional solutions for access to patient data between different data controllers. Doctors have access to the Internet and can use a variety of support and consultation services in their decision-making process. The Duodecim health portal is widely used. 'Best treatment' recommendations are also available online. Health care personnel have a high level of IT competence.

Another of Finland's strengths is that the health care sector has widely adopted a uniform set of procedures for data processing. The tradition of the cumulative hard-copy patient record extends back several decades. There are comprehensive instructions on the markings to be entered on documents and on the use and disclosure of medical data, and the principles of data protection are well known. Patient document procedures are provided for by act and decree. The legislation has only just been revised to cover the needs of electronic data processing. Political commitment is also significant for the development of eHealth, and recent Governments have focused on strengthening the information society. There is thus strong political support for the introduction and steering of IT in the health care sector.

The social welfare sector has extensive experience in the use of IT in insurance procedures, and citizens have a high level of confidence in these information systems. There are already national registers in place in Finland, and there is a long and established procedure for the unique identification of individuals.

The weaknesses in the system are largely due to the structures of the Finnish health care system, which contribute to decentralized decision-making. Shortcomings have been noted in cooperation between health care service providers. The statutory requirement for local authorities to provide health care services has led to overlapping IT investments and to difficulties in integrating local IT solutions. Proprietary patient record systems are closed systems, effectively preventing interfacing. In proprietary information systems, patient records currently do not exist in a structural format (in other words, they are stored in company-specific relational databases) and are thus not suitable for interoperability. There are considerable deficiencies in terminological uniformity between patient record systems. Information systems have been seen primarily as systems for information collecting and documentation, with little support for work processes or client management. Current patient record systems do not have appropriate facilities for long-term data storage. Because a data register is bound by law to the operating unit which maintains it, management of information disclosure has been unduly complicated. There is no clear steering system for information management in the health care sector. Apart from the legal provisions, there has only been project-based steering of development efforts. Project funding is available from several sources which are not mutually coordinated, and this too has made it difficult to undertake development and to achieve the nationally defined targets.

Despite the numerous strengths identified, full use of the productivity benefits of investments has not been made in terms of the basic aims of health care and the promotion of health. Another weakness is that the viewpoint of the individual citizen has been of secondary importance in devel-

opment efforts. There are precious few public-sector health care e-services aimed directly at individual citizens. Although all Finnish citizens can obtain a FINEID card and thereby engage in secure e-transactions,⁸ this opportunity has been only used minimally so far. The new legislation will bring several fundamental improvements in the status of citizens and of patients. One of the most important challenges in health care is the quality of services. Information systems provide good tools for quality improvement and monitoring, but existing information systems do not support quality management. Another weakness is that monitoring of the debate and development trends at the European level is under-resourced and inadequately organized. Participation in preparatory groups at EU level has been sporadic, and it has not been possible to provide national decision-makers with a comprehensive analysis of European policies important for Finland.

The new legislation and the national information system architecture and new steering system to be based on that legislation open up many new opportunities for developing eHealth. Patient information will be available in real time whenever the treatment relationship and patient consent allow, and this will improve the continuity, quality and patient safety of services. Structurally uniform entry, storage and transfer of data make data easier to find and easier to reuse. Structured information will also enable the introduction of smart support systems for decision-making directly in medical care situations. The supra-organizational availability of data will enable the introduction of new procedures and agreements on cooperation and division of duties between organizations in the health care system. The centralized archive system will enable patients to view data and usage logs pertaining to themselves. This will increase the potential for citizens to participate in their medical treatment and, consequently, increase citizens' confidence in the system. Centralized services make planning, monitoring (including real-time statistics) and management much easier and also open up new opportunities for research. International cooperation is easier to organize when national systems are uniform. Uniformity also means that the IT infrastructure can be built more cost-effectively while ensuring a high level of data security.

There are also several threats involved in the construction of a national information system architecture and centralized services. These have to do with the difficulty of anticipating the costs of the system, the technical executability of the design, the timetabling of implementation and the acceptability of the system among the various interest groups. The principal factor in gaining the acceptance of citizens is ensuring privacy protection. The 24/7 functioning of archive and certificate services in particular is critical for the functioning of the entire system in centralized national services. The accessibility of the system faces the underlying information systems with challenges, as they must be capable of efficiently processing the retrieval of information deriving from the patient registers of various organizations and stored in a central archive. Another critical threat to the acceptability of the entire architecture from the user's point of view is in the usability of the system, i.e. response times, ease of retrieval, finding the relevant data among huge masses of information, processing patient consent and using electronic signatures.

A more detailed description of the IT in use in the Finnish health care sector and the penetration of various solutions has been published in Finnish in the report *Informaatio- ja kommunikaatioteknologian käyttö Suomen terveydenhuollossa vuonna 2005*⁹ and in English in the report *eHealth in Finland –Checkpoint 2005*.¹⁰

⁸ FINEID = Finnish Electronic ID. Also referred to by its Finnish acronym HST.

⁹ Winblad Ilkka, Reponen Jarmo, Hämäläinen Päivi, Kangas Maarit: *Informaatio- ja kommunikaatioteknologian käyttö Suomen terveydenhuollossa vuonna 2005. Tilanne ja kehityksen suunta. Raportteja 7/2005*. Stakes, Helsinki.

¹⁰ Hämäläinen Päivi, Reponen Jarmo, Winblad Ilkka: *eHealth in Finland –Checkpoint 2005. Reports X/2007*. Stakes, Helsinki.

3 FROM PRESENT STATE TO TARGET STATE

3.1 Strategic focus areas for development

Finland's strategic choices are:

1. To ensure the availability of information for patients undergoing treatment, regardless of time and place, in both public and private health care. The means to achieve this include comprehensive digitization of customer data, development of the semantic and technical compatibility of electronic patient record systems for the entire content of patient records, development of the national health care infrastructure and information network solutions, identification and authentication solutions, electronic signatures, and maintaining online information to support decision-making.
2. To enable the participation of citizens and patients, and ensure that citizens have access to more information and to high-quality health information. The means to achieve this include development of a citizen's health information portal, access for citizens to their own patient records, health information and log data, and development of e-services (booking of appointments, e-discussion, e-document transfer, online consultation).

The strategy is being implemented in a legally and ethically sustainable way, ensuring sufficient funding and strengthening steering and coordination. Data security and data protection constitute a through-going principle in all electronic information processing, and privacy protection based on the Personal Data Act is a central element in this. Legislation governs the continuity and ground rules of the implementation, and in order to ensure that the legislation is enforced, the processes of the health care system are monitored, and the certification and accreditation of information systems are ensured. Standards are applied in all functions where generally accepted and usable standards exist. All measures undertaken are based on the fundamental ethical values of health care: all measures are intended to promote health, to prevent and treat illness, and not to cause harm. Measures financed out of public funds benefit citizens to the value of the investment made.

The following is a more detailed discussion of the principal development measures and a comparison of the focus areas of development with points emphasized at the EU level (e.g. in the eHealth Action Plan).

3.2 Interoperability

The interoperability of health care information systems — particularly patient record systems — is an essential national aim which is re-emphasized in the legislation that will come into force on 1 April 2007. The aim is initially to attain interoperability between service providers in the public and private sectors, and later to attain interoperability between health care systems and social welfare systems. Interoperability subsumes both semantic and technical compatibility. Interoperability is based on the application of international standards localized for Finland.

Interoperability has been approached at the national level through legislation, national recommendations and specifications. Regional implementation projects have been granted government funding, and efforts towards national coordination have been undertaken. Clients using the same

systems have been grouped into national client clusters. Project progress has been evaluated annually through project reviews. The legislation-driven national architecture to be built will essentially 'force' technical interoperability of the systems involved. In practice, the national archive service will require clear messages in standard format, which will have the effect of compelling the systems using the archive service to conform.

Achieving semantic interoperability is a good deal more challenging. There is a nationally defined structure for the electronic patient record, developed on the basis of the well-established and widely used hard-copy patient record format. There are some 30 thematic headings that have been agreed on nationally (e.g. problems and diagnoses), including the structures, core data, classifications and codes used within them. These specifications are just being introduced in patient record products; they will be implemented in system supplier specific clusters by 2008 and nationally coordinated. In addition to the core data, there are certain speciality-specific structural data that will be introduced by degrees. The introduction of classifications and codes has been largely agreed. So far, the Ministry has only issued a Decree on the use of ICD10 and the Nordic Surgical Procedure Classification (NSPC), while ATC classification, radiological procedure classification and the laboratory nomenclature have been in use on a voluntary basis.

The Decree on Patient Documents will be revised in 2007 with a view to specifying the data structures and required classifications of patient records in more detail. A national code service has been built for the purpose of transferring codes and classifications. STAKES (National Research and Development Centre for Welfare and Health) has been designated the responsible authority for the maintenance, development and coordination of classifications. There is also a major training challenge involved. For medical treatment, a national model for agreeing on the structure and classifications of patient records is being developed.

European interoperability of health care information systems has not been a focus area in Finland. Generally, the aims coincide, but Finland has already to a significant extent made its own decisions on the interoperability of health care information systems. No such decisions have yet been made at the EU level. The Commission is preparing a recommendation on interoperability to be issued in spring 2007.

Because Finland is quite well advanced by international comparison in the use of electronic patient records and the national harmonization of these records, and because cooperation between the authorities responsible for eHealth, health care organizations and system suppliers is already well organized, Finland would be interested in participating for instance in the 'emergency data set' or 'medication/ePrescription' harmonization and piloting proposed by the Commission at the European level.

Measures

- Enacting the Client data act and the Act on ePrescriptions between 2007 and 2010.
- Participating in standardization.
- Closer cooperation between Member States (best practices). Participating in European-level piloting.
- Active Finnish participation in essential international preparation.

3.3 Identification and authentication of patients and citizens

Finland has long used individual personal identity numbers (hetu) for every citizen, and today every citizen also has an Electronic ID (satu). In e-transactions, a citizen/patient can be identified and verified using a FINEID card and PKI.¹¹ Some 60,000 cards have been issued.

Banks provide authentication based on one-time codes (TUPAS). Online banking services are used by about 2 million citizens.

The public administration is introducing a joint platform for online identification and payment (VETUMA), financed out of the central government budget. The platform will accommodate FINEID, TUPAS identifiers, user ID + password combinations and, at a later date, mobile certificates.

The Client data act requires reliable patient identification. A forthcoming Decree will specify the minimum requirements for identification and authentication in various applications. The extensively used TUPAS identifiers have also been tried on a limited scale in certain health care e-transactions projects. The development of chip cards and mobile certificates, and progress on the European Health Insurance Card (eHIC) are being monitored.

Data security is an important aspect of development in the National Health Programme. Units in the health care sector are required to apply a uniform data security policy based on the ISO 27799 standard.

Measures

- Instructions by Decree.
- Introduction of a uniform platform for electronic identification.
- Distribution of FINEID cards and introduction of advanced mobile identifiers.
- Monitoring of European developments. Management of European identity through an interlinking of national solutions.

3.4 Identification and authentication of health care professionals

The Client data act requires the National Authority for Medicolegal Affairs (TEO) to administer a certification service for health care professionals. This service will involve a smart card and a national PKI system. Over half of all hospital districts are already introducing a professional ID card enabling strong authentication. In the future national architecture, use of TEO certification service will be compulsory. The determination and administration of user authorizations will be left to be implemented at the local level. The aim is to introduce role-based and rule-based authorization management based on international ISO standards. Single Sign-On (SSO desktop integration) must also be implemented at the local level; at the regional level, directory-based user-rights management (LDAP) will also be needed.

¹¹ PKI = Public Key Infrastructure, an encryption method where a pair of keys is generated which is then used as the basis for encryption algorithms.

Finland and the EU have coinciding aims regarding the identification of health care professionals. However, deciding how to implement identification and authentication of professionals at the European level is a major challenge, and planning work should be launched urgently. It should be possible to interlink national certification authorities at the European level, and Finland should participate in efforts towards European harmonization in this field.

Measures

- Enactment of the Client data act, the Act on ePrescriptions and the national information system architecture.
- Participation in European efforts towards harmonization.

3.5 Naming, identification and authentication of operating units

The national information system architecture requires all operating units to be designated with a unique identifier (ISO/OID code). Units will be certified by a national certification authority for e-transactions. Organization authentication was tried out in the ePrescription pilot project in 2005 and 2006. STAKES maintains the health care unit register and instructs operating units on the issue of OID codes. So far, the unit encoding is not comprehensive, and the related responsibilities and procedures have not been agreed on in detail. Private service providers get their codes from the licensing authority. The unit register is being maintained on a national code server as required for the national architecture.

At EU level, there are no comparable aims regarding the identification of operating units, even though organization identification is an absolute necessity for electronic exchange of information between organizations. Finland should actively export information on its experiences and participate in drafting of the necessary specifications at the EU level.

Measures

- Implementation of the above as part of the implementation of the national architecture. Requires binding instructions.
- Finland is active at the European level in developing the identification and authentication of operating units.

3.6 Electronic signature

Electronic signatures are provided for by law (Act on Electronic Signatures 14/2003, Client data act HE 253/2006).

The national architecture requires that patient documents be signed electronically before being deposited in the archive. Electronic signatures will be created on a decentralized basis, in the units that generate the records to be signed. The architecture specifications and the Decree on Patient

Documents, to be amended, will need to specify how extensively personal signatures will be required, when a server signature will be sufficient, and what the role of electronic signatures created by the national archive will be. ePrescriptions will always need to be signed personally. Electronic signatures on patient consent documents will require the FINEID card to be in widespread use.

The present position is that some health care organizations have experimented with electronic signatures. Server signatures are not yet being used.

There is an EU directive defining the requirements for electronic signatures. The European model for electronic signatures requires development, however. Finland considers that the signatures of health care units and professionals should be accepted throughout Europe.

Measures

- | Implementation of the above as part of the implementation of the national architecture.
- | Reinforced cooperation at the EU level.

3.7 Infrastructure and information network

There is no separate national information network for the health care sector in Finland. The information networks in use are based on network services sourced from commercial operators. The public sector has several regional information networks. Some service providers use municipal information networks or regional network services. Certain units employ customized communication solutions. The Association of Finnish Pharmacies and the University Pharmacy have their own information networks, and there are company networks in the private sector. KELA (Social Insurance Institution) has a national information network of its own. The Public Authority Network (VIRVE) is used for instance by paramedics. Citizens have access to broadband services from commercial service providers and to three national GSM mobile phone networks.

Under the new legislation, the following national health care information services will be maintained by KELA:

- patient record registering and directory services
- archive
- consent management services, logging and monitoring services
- prescription database

TEO will provide certification services for health care professionals and organizations. The Population Register Centre will maintain certification services for citizens.

The national information system architecture will specify a secure message handling service to link local and regional patient record systems, the national archive and the prescription database.

The aims of Finland and of the EU largely coincide. The transfer of confidential patient data in the health care system requires a secure infrastructure and secure information networks. The future European health care information network should be implemented by joining national networks together. Finland considers that a decentralized architecture is the best and quickest approach. In

addition to technical solutions, EU-level data security policy and data protection requirements are needed. These should be produced in open coordination, in which Finland will participate.

Measures

- Implementation of the national architecture.
- Development of European solutions that ensure confidentiality and data protection.
- Testing and linkage of national networks.

3.8 E-services and information for citizens

So far, e-services and e-transactions have been developed on a project-by-project basis. Health care service providers fairly universally have websites with general information such as service descriptions, contact information, opening hours and so on. Service providers in the private sector also have online appointment booking functions.

Some health care organizations have introduced more advanced e-transactions.

Organizations have actively developed their online services, offering expert support and virtual discussion forums for various patient groups, for instance.

The new legislation will improve the availability to citizens of information in electronic form. In the future, citizens will be able to access the national eArchive and retrieve their patient records and log data on the transfer of information pertaining to them. They will also be able to review their ePrescriptions.

The National Public Health Institute is building a health information portal for citizens (terveysuomi.fi). This portal will provide citizens with high-quality health information, which will for instance help them in reading their own patient records.

Solutions to support e-services for citizens should be built on top of the national architecture. Citizens should be given reliable information on the following: health promotion; the symptoms and treatment of illnesses; service providers in the public, private and third sectors; the content, availability (queues), cost and quality (quality indicators) of services; and their benefits and rights. Interactive e-services are also needed, such as appointment booking, consultation, interpreter services, Q&A, virtual discussion forums, self-help systems for chronic illnesses, etc.

Measures

- The legislation-based architecture will enable the development of e-services for citizens with a uniform infrastructure.
- Exploration of the legal ramifications of e-services (responsibilities, compensations, operating procedures).
- Drafting of national specifications for e-services and building of the necessary shared information system services. Promotion of service introduction with national funding. Enhancement of cooperation between the various bodies financing e-trans-

action services. Drafting of certification requirements for information systems that will be joining the national architecture.

Development and expansion of the citizens' health portal so that it will contain comprehensive information on health promotion, on the symptoms and treatment of illnesses, on health care service providers, and on the quality and cost of services. The portal should also provide a channel to e-transaction services.

3.9 Quality of the work of professionals and patient safety

Measuring and monitoring the quality and effectiveness of treatment, and developing patient safety, should form an integral part of health care information systems. However, at the moment there is no commonly used systematic monitoring of the quality of the work done by professionals in the health care sector, with the exception of the adverse event reporting procedure in the Finnish Health Care Register (HILMO), which covers hospital treatment. There are patient ombudsmen at health care units, and the Provincial State Offices and TEO monitor quality on the basis of complaints. Also, changes in the patient injury situation are monitored in the patient insurance system.

Quality systems (based for instance on ISO 10000) have been sporadically introduced, and a handful of units have a quality certificate.

The availability of electronic consultation and information services improves the quality of health care. Doctors already make widespread use of the www.terveysportti.fi service. There are also regional e-consultation services.

In the future, once patient data are recorded according to a national structural standard, information to support decision-making can be imported into treatment situations. A development project regarding this is being pursued by Duodecim (http://www.kaypahoito.fi/kotisivut/sivut.koti?p_sivusto=1434).

Finland considers that in transnational health care it is at least as important for treatment decisions to be based on internationally acceptable evidence (Evidence Based Medicine, EBM) as it is for the medical history of an individual patient to be readily available. Accordingly, Finland emphasizes the importance of developing good practices in the sector.

Quality standards for health care sector software are being developed. ISO TC 215 and CEN TC 251 have jointly launched the drafting of risk management standards for health care sector software, covering the design, implementation, use and migration of software.

Measures

Use of national funding to develop uniform treatment instructions and information to support decision-making.

Provision of compatible information for citizens on the quality of health care at various units.

Participation in the standardization of risk management in health care sector software.

3.10 Developing health care statistics and monitoring

Going over to an electronic patient record that is interoperable in structure and uniform in content, and having information available at the national level, will in many ways improve and add potential to up-to-date monitoring of health care services and of the health of the population. This, in turn, will enable earlier anticipation of the steering and health care policy measures required.

Measures

Taking the potential afforded by electronic patient records into account when developing statistics and health monitoring.

4 WAYS OF IMPLEMENTING THE STRATEGY

4.1 Legislation and ethical sustainability

The following is a hierarchical list of the principles, law and regulations that govern eHealth.

General ethical principles

- International law
- EU data protection directive
- Electronic signature directive
- Council of Europe data protection convention
- Council of Europe medical recommendation

National law

- Personal Data Act
- Archives Act
- Act and Decree on the Openness of Government Activities
- Act on Electronic Signatures
- Act on the Protection of Privacy in Electronic Communications
- Outline on service structure and municipal structure reform

Health care legislation

- Act on the Status and Rights of Patients
- Government bill for the Client data act
- Government bill for the Act on ePrescriptions
- Decree on Patient Documents

Instructions and recommendations

- National architecture
- National health project recommendations (patient records, data security, interfaces)
- Public administration recommendations (JHS)
- Measures
 - Administrative and technical measures
 - Introduction, training, monitoring

Instructions and recommendations are being specified and augmented. For example, a Finnish translation of the ethical rules for IT workers in the health care sector is in preparation, and the specifications for the national architecture are being finalized.

The principal challenge lies in the support and instructions for introduction. A national survey of the need for learning materials and training among health care personnel has been conducted.¹²

The EU harmonizes national legislation through instruments such as directives. Although legislation at the EU level is probably needed to govern cross-border use of health care services, it is likely that decision-making concerning health care systems will remain at the national level. Different countries have very different legislation on the handling of patient records, which makes it difficult to transfer medical data across borders. More debate and research on legal aspects of the development of eHealth are needed at the EU level.

Measures

Enforcement of the act and the provision of more specific related instructions and training.

Action to ensure better consideration of legal and ethical aspects in the development of cross-border eHealth services.

Drafting of a uniform guide for designing, introducing and using health care IT systems in accordance with the legislation, regulations and instructions. This guide would be designed to complement the certification requirements.

4.2 Funding

Procurement of the basic IT systems is the responsibility of the service providers. In Finland, health care organizations spend some 2% to 3% of their operating budget on IT.

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

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, STAKES, KELA, HL7 Association). Central government will be contributing a total of EUR 10 million to the construction and introduction of national services (archive, prescription centre) between 2007 and 2010. Thereafter, services will be funded through user fees.

The Ministry of Social Affairs and Health has provided EUR 5 to 10 million per year for regional and cluster projects between 2004 and 2007 (50% funding contribution). ESF funding has also been used in development projects.

Companies are responsible for funding their own R&D. The Technology Development Centre of Finland (TEKES) provides funding for companies and consortia, for example through the Finwell programme, and also direct corporate funding.

¹² Veikkolainen Marja, Hämäläinen Päivi: Sosiaali- ja terveydenhuollon henkilöstön tieto- ja viestintätekniikan koulutus- ja oppimateriaalitarve ja koulutuksen kehittämisen haasteet. Raportteja 9/2006. STAKES, Helsinki.

The funding available for standardization is inadequate and partly unorganized.

Measures

Ensuring the availability of resources required for the new functions of national actors (Ministry of Social Affairs and Health, KELA, STAKES, TEO). Development of a funding system for national services that the various parties can approve. Support for migration of regional systems to the national architecture through project funding.

Ensuring better funding coordination and reform of the project funding system.

4.3 Coordination and steering

A new, permanent steering system will be set up on the basis of the new legislation, which will determine the roles and responsibilities of national actors. The role of the Ministry of Social Affairs and Health in steering information management in the health care and social welfare sectors will be strengthened. KELA maintains national electronic archiving of patient records and a national prescription database. STAKES is responsible for maintaining the national code service, and TEO for maintaining the certification service for health care professionals.

The functions of the Ministry of Social Affairs and Health in implementation of the national information system architecture are as follows:

1. Managing overall steering of the process, for example by taking responsibility for steering national development projects and information system services provided at the national level
2. Managing the drafting of legislation
3. Managing preparation of the central government budget and steering of the principles underlying the service-financing mechanisms
4. Governing the preparation and maintenance of national guidelines by commissioning expert assistance
5. Assuming responsibility for the national health care data security policy and its implementation
6. Assuming responsibility for steering the information system architecture, for example by supporting the migration of regional systems to the national architecture
7. Managing communications
8. Managing the strategic steering of information management in the social welfare and health care sectors together with other ministries (including local and central government IT units, KuntaIT and ValtIT)
9. Assuming responsibility for international strategic cooperation

An advisory board will be set up at the Ministry of Social Affairs and Health to discuss issues of principle in information management, the implementation of national information system services, and harmonization and development of the information systems currently used by health care organizations. The Government will appoint the members of this advisory board for a fixed term. The advisory board will represent major interest groups in national information system services and will be responsible for the approval procedure for the codes and classifications required.

Measures

A steering model for various interest groups will be jointly created, with a view to clarifying and networking the roles, duties and responsibilities of the various expert organizations. This will require, among other things, redefinition of the functions of agencies and institutions in the administrative branch of the Ministry of Social Affairs and Health in a sustainable, long-term way.

5 FUTURE PROSPECTS

5.1 Mobility of patients, professionals and services nationally and within the EU

With the advent of local government reform and service structure reform, municipalities and hospital districts will be introducing new procedures and new administrative structures. Municipalities will be encouraged to merge. Municipalities can also set up intermunicipal authorities. The aim is for every basic health care unit and its related social welfare services to have a population base of at least 20,000. Special medical care and services for the disabled will be provided on a population-base basis corresponding to the hospital districts. Some specialist procedures will be centralized nationally. Introduction of these new models of cooperation and distribution of duties requires the underlying information systems to function smoothly.

Doctors are entitled to practise anywhere in the country. Telemedicine services support the mobility of doctors. 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.

There is a trend at the EU level towards a Europe-wide health care market. Doctors already have the right to practise anywhere in the EU. Access to electronic patient records is an enabling factor for this kind of mobility.

The social security regulations of the EU (1408/71 and 574/72) enable patient mobility. The aim is that it should be possible to verify electronically in one EU Member State that a patient has a valid insurance policy in another Member State. At the same time, electronic forms are being introduced. In the long term, the Commission will be promoting the harmonization of electronic patient record systems so that it will be possible to transfer not only billing data but patient data too in cases of cross-border medical care.

The use of electronic health care services (e.g. consultations) in Europe is becoming more common. Therefore, we need common principles on compensation for transnational use of electronic health care services.

5.2 Standardization and certification of information systems

At the 2006 eHealth meeting in Malaga, the EU Ministers of Health and the US Secretary of Health called for the certification of health care information systems in the future. Finland's policy agrees with this.

During 2007, the Ministry of Social Affairs and Health is to supervise the drafting of certification requirements for health care information systems with regard to compatibility, information security and privacy protection.

In addition to national efforts, the functioning of international standards must be monitored. This is being done for instance by Integrated Health Enterprise (IHE). Finland supports the founding of a European IHE organization and is interested in participating in its work. It must be decided at a national level how participation in standardization can be provided for on a long-term basis.

5.3 Finland's participation in international eHealth cooperation

European eHealth cooperation operates on a voluntary basis, i.e. through open coordination. The problem in Finland has been that, in the absence of permanent appointments with responsibility for eHealth, there has been no national coordination of participation in this cooperation, which has instead been random and dependent on the initiative of a variety of bodies. There has been Finnish participation in the Commission's eHealth groups and sub-groups (Ministry of Social Affairs and Health, STAKES), in EHTEL (STAKES), in EU IST projects (e.g. STAKES in the eHealth ERA project), the EU eTEN project (Netcards, KELA and STAKES), cooperation in WHO classification (STAKES), cooperation in standardization (STAKES and the HL7 Association), and Nordic cooperation (Ministry of Social Affairs and Health and STAKES). Also, universities have extensive international contacts, and there are TEKES projects with international networks of their own.

The basic principle is that the Ministry participates in political and strategic preparation. Expert bodies (KELA, TEO, STAKES) participate in international cooperation in accordance with their national responsibilities. The Ministry should organize coordination of international cooperation and improve information exchange so that the various actors can promote jointly agreed objectives in the international arena. At the same time, sufficient resources for international cooperation must be secured. This cooperation can be achieved for example by setting up an international cooperation division under the future advisory board.

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